

PUBLIC BID PACKAGE NEW PUBLIC WORKS GARAGE AND SALT SHED BID NO. 2025-010

AT

**2nd and Pennell Street
Chester, Pennsylvania**

FOR THE

**City of Chester
Department of Public Works
1 4th Street
Chester, PA 19013
(610) 447-7700**

PROJECT MANUAL Volume I

**Bidding Documents
Divisions 00 through 14**


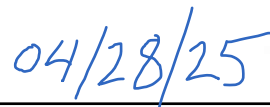

April 28, 2025

**Colliers Engineering & Design
1500 JFK Blvd, 2 Penn Center Suite 700
Philadelphia, PA 19102**

SEALS PAGE


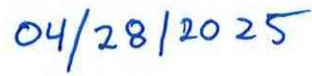

PROJECT MANUAL
PUBLIC WORKS FACILITIES
2nd and Pennell Street
Chester, Pennsylvania

ARCHITECT

Signature Date

STRUCTURAL ENGINEER

Signature Date

MECHANICAL ENGINEER



Matthew L. Sholomskas

04/28/25

Signature

Date

PLUMBING ENGINEER



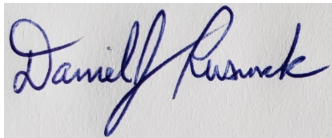
Matthew L. Sholomskas

04/28/25

Signature

Date

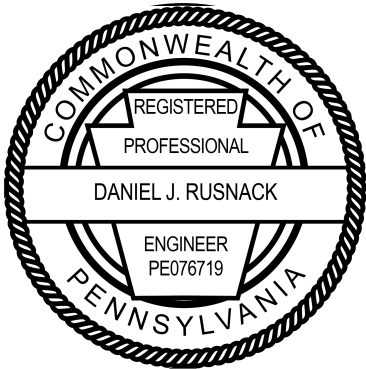
ELECTRICAL ENGINEER



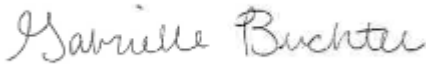
04/28/2025

Signature

Date



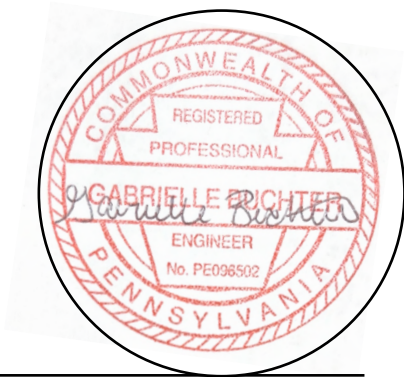
SITE/CIVIL ENGINEER



4/28/2025

Signature

Date



END OF SECTION 000107

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END OF SECTION 000110

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00 -- GENERAL

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| 5.0 | UTILITIES PLAN |
| 5.1 | PROFILES |
| 6.0 | SOIL & EROSION & SEDIMENT CONTROL PLAN |
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| 6.2 | SOIL & EROSION & SEDIMENT CONTROL DETAILS |
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| 10.3 | CONSTRUCTION DETAILS |
| 11.0 | PCSM PLAN |
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| A204 | BUILDING SECTIONS |
| A301 | WALL SECTIONS -- GARAGE |
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| A504 | EXTERIOR DETAILS |
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05 -- MECHANICAL

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| M120 | ROOF MECHANICAL PLAN |
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| P102 | NATURAL GAS PIPING PLAN |

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|------|---|
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| P401 | ENLARGED PLUMBING PLANS |
| P501 | PLUMBING DETAILS |
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08 -- ELECTRICAL

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| E002 | ELECTRICAL COMCHECK |
| ES002 | ELECTRICAL SITE PLAN |
| E101 | POWER PLAN |
| E201 | LIGHTING PLAN |
| E401 | FIRE ALARM PLAN |
| E601 | DIAGRAMS |
| E701 | DETAILS |
| E801 | SCHEDULES |
| E802 | SCHEDULES |

END OF SECTION 000115

PROCUREMENT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids in accordance with Instructions to Bidders.
- B. Procurement Prior Approval Requests: Requests for approval of products or manufacturers from those required by the Contract Documents as defined by product selection procedures in Section 016000 "Product Requirements."
 - 1. Procurement prior approval is required when products or manufacturers are listed in specifications under "Sole Product," "Sole Manufacturer," "Limited List of Products," or "Limited List of Manufacturers" introductory paragraphs.
 - 2. Procurement prior approval is not required when products or manufacturers are listed in specifications under "Non-Limited List of Products" or "Non-Limited List of Manufacturers" introductory paragraphs.
 - 3. Where use of "Sole Product," "Sole Manufacturer," "Limited List of Products," or "Limited List of Manufacturers" introductory paragraphs is not allowed by statute, procurement prior approval request is not required.
- C. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See the General Conditions and Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment without a listed approved equal.

- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
1. Extensive revisions to the Contract Documents are not required.
 2. Proposed changes are in keeping with general intent of the Contract Documents, including level of quality of the Work represented by requirements therein.
 3. Request is fully documented and properly submitted.
 4. The substitution does not result in the extension of the project construction end date.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to **Architect**. Procurement Substitution Request must be made in writing **by a prime contractor only** in compliance with the following requirements:
1. Requests for substitution of materials and equipment will be considered if received no later than **21 calendar** days prior to date of procurement.
 2. Submittal Format, Electronic: Submit Procurement Substitution Request, using format provided on Project web-based bidding management software site.
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and Drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - 2) Product data, including drawings and descriptions of products and fabrication and installation procedures.
 - 3) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 4) Copies of current, independent third-party test data of salient product or system characteristics.
 - 5) Samples where applicable or when requested by Architect.
 - 6) Detailed comparison of significant qualities of proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 7) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 8) Research reports, where applicable, evidencing compliance with building code in effect for Project, from **ICC-ES, NFPA or ASTM**
 - 9) Coordination information, including a list of changes or modifications

needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate proposed substitute.

- c. Provide certification by manufacturer that proposed substitute is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to product or equipment specified in the application indicated.
- d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of substitute to perform as represented in the Procurement Substitution Request.
- e. And all other information contained in the sample substitution request form

B. Architect's Action:

- 1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all Bidders of acceptance of proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of substitute during bidding does not relieve Contractor of the responsibility to submit required Shop Drawings and to comply with all other requirements of the Contract Documents.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 002600

PROJECT FORMS AND DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The forms listed in this section relate to the Division 1 Specification Sections.

1.2 SUMMARY

- A. This Section lists project forms used by Prime Contractors as issued by Construction Manager for administration of the project.

1.3 FORMS

A. SAFETY

1. Task Hazard Analysis (THA)
2. Visitors Assumption of Risk, Release and Hold Indemnification Agreement
3. Crane Pick Plan / Crane Operator Daily Inspection
4. Daily Forklift Inspection
5. Demolition Equipment Requirements
6. Energized Electrical Work Permit
7. Equipment – Safety Inspection
8. Excavation and Trench Daily Inspection
9. Fire Extinguisher Inspection
10. Hot Work Permit Form
11. Excavation Checklist
12. Line Break Permit
13. Pressure Testing Checklist
14. Scaffolding Inspection Checklist
15. Weekly Inspection
16. System Shutdown Request Form

B. SCHEDULE

1. Three Week Look-Ahead Schedule

C. CONSTRUCTION

1. Standard Testing Record Form – Equipment
2. Standard Testing Record Form – Piping
3. Building Systems Training and Orientation
4. Contractor Certification Statement – SWPPP

D. APPLICATION FOR PAYMENT

1. Labor Rate Sheet

2. Affidavit And Waiver Of Lien
3. Bond Acknowledgement
4. Final release, Final Waiver Of Claims And Liens And Release Of Rights
5. Final Release From Subcontractor Or Supplier, Final Waiver Of Claims And Liens And Release Of Rights
6. Surety Statement

E. SELECTED AIA DOCUMENTS

1. AIA A101 – Standard Form of Agreement Between Owner and Contractor
2. AIA A201 – General Conditions of the Contract for Construction
3. AIA 312 – Payment Bond
4. AIA 312 – Performance Bond
5. AIA G702 – Application and Certificate of Payment
6. AIA G703 – Continuation Sheet
7. AIA G706 – Contractor's Affidavit of Payment of Debts and Claims
8. AIA G706A – Contractor's Affidavit of Release of Liens
9. AIA G707 – Consent of Surety to Final Payment
10. AIA G710 – Architects Supplemental Instructions

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 008520

PUBLIC BID PACKAGE NEW PUBLIC WORKS GARAGE AND SALT SHED BID NO. 2025-010

AT

**2nd and Pennell Street
Chester, Pennsylvania**

FOR THE

**City of Chester
Department of Public Works
1 4th Street
Chester, PA 19013
(610) 447-7700**

PROJECT MANUAL Volume I

**Bidding Documents
Divisions 00 through 14**


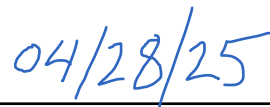

April 28, 2025

**Colliers Engineering & Design
1500 JFK Blvd, 2 Penn Center Suite 700
Philadelphia, PA 19102**

SEALS PAGE


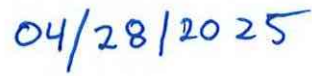

PROJECT MANUAL
PUBLIC WORKS FACILITIES
2nd and Pennell Street
Chester, Pennsylvania

ARCHITECT

Signature Date

STRUCTURAL ENGINEER

Signature Date

MECHANICAL ENGINEER



Matthew L. Sholomskas

04/28/25

Signature

Date

PLUMBING ENGINEER



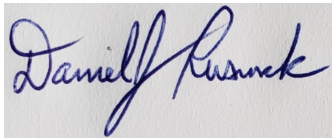
Matthew L. Sholomskas

04/28/25

Signature

Date

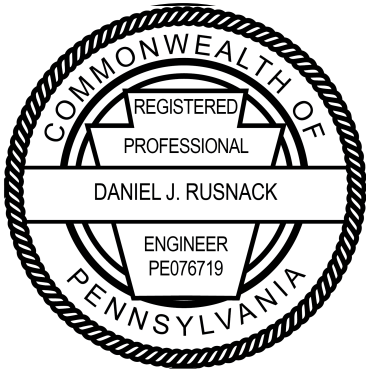
ELECTRICAL ENGINEER



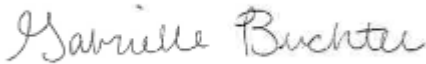
Signature

04/28/2025

Date



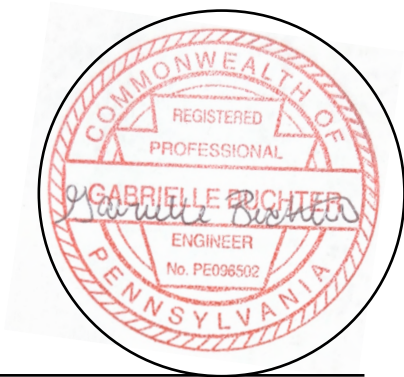
SITE/CIVIL ENGINEER



Signature

4/28/2025

Date



END OF SECTION 000107

DIVISION 0 - PROCUREMENT AND CONTRACTING REQUIREMENTS

| | |
|-----------|--|
| 000101 | PROJECT TITLE PAGE |
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| 000110 | TABLE OF CONTENTS |
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| 000120 | LIST OF SCHEDULES |
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| 001115 | ADVERTISEMENT FOR PREQUALIFICATIONS OF BIDDERS |
| 001116 | INVITATION TO BID |
| 001153 | REQUEST FOR QUALIFICATIONS |
| 002113 | INSTRUCTONS TO BIDDERS |
| 002213 | SUPPLEMENTARY INSTRUCTIONS TO BIDDERS |
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| 002600 | PROCUREMENT SUBSTITUTION PROCEDURES |
| 003113 | PRELIMINARY SCHEDULE |
| 003119 | EXISTING CONDITION INFORMATION |
| 003126 | EXISTING HAZARDOUS MATERIAL INFORMATION |
| 003132 | GEOTECHNICAL DATA |
| 003143 | PERMIT APPLICATION |
| 004116 | BID FORM-STIPULATED SUM (MULTI-PRIME CONTRACT) |
| 004136 | BID FORM- COST PLUS FREE (MULTI- PRIME CONTRACT) |
| 004313 | BID SECURITY FORMS |
| 004321 | ALLOWANCE FORM |
| 004322 | UNIT PRICES FORM |
| 004323 | ALTERNATES FORM |
| 004373 | PROPOSED SCHEDULE OF VALUES FORM |
| 004393 | BID SUBMITTAL CHECKLIST |
| 004519 | NON-COLLUSION AFFIDAVIT OF PRIME BIDDER |
| 005100 | NOTICE OF AWARD |
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| 007300 | SUPPLEMENTARY GENERAL CONDITIONS |
| 007310 | SAMPLE INSURANCE ACCORD FORM |
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| 007343.01 | WAGE RATE SCHEDULE |
| 009113 | ADDENDA |

DIVISION 1 - GENERAL REQUIREMENTS

| | |
|-----------|-------------------------------------|
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| 011000 | SUMMARY |
| 011700 | LIST OF STANDARD ABBREVIATIONS |
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| 012500 | SUBSTITUTION PROCEDURES |
| 012900 | PAYMENT PROCEDURES |
| 013000 | ADMINISTRATIVE REQUIREMENTS |
| 013100 | COORDINATION |
| 013200 | CONSTRUCTION PROGRESS DOCUMENTATION |
| 013300 | SUBMITTAL PROCEDURES |
| 013300.01 | SUBMITTAL COVER SHEET |

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| 013500 | ELECTRONIC DOCUMENT TRANSFER |
| 013500.01 | ELECTRONIC DOCUMENT TRANSFER AGREEMENT |
| 014100 | SPECIAL INSPECTIONS AND TESTING |
| 014100.01 | STATEMENT OF SPECIAL INSPECTIONS |
| 014200 | REFERENCES |
| 015000 | TEMPORARY FACILITIES AND CONTROLS |
| 015100 | TEMPORARY UTILITIES |
| 015630 | WATER CONTROL |
| 015690 | CONSTRUCTION CLEANING |
| 015700 | FINAL CLEANING |
| 017310 | CUTTING AND PATCHING |
| 017700 | CLOSEOUT PROCEDURES |
| 018000 | MAINTENANCE |
| 019113 | GENERAL COMMISSIONING REQUIREMENTS |

DIVISION 2 – EXISITING CONDITIONS

| | |
|-----------|---|
| 023200 | GEOTECHNICAL INVESTIGATIONS |
| 023200.01 | GEOTECHNICAL REPORT DATED 11/14/2024 |
| 023200.02 | STORMWATER INFILTRATION EXPLORATION 11/14/2024 |
| 024119 | SELECTIVE DEMOLITION |
| 026000 | CONTAMINATED SITE MATERIAL REMOVAL & SOIL CAPPING |

DIVISION 3 – CONCRETE

| | |
|--------|----------------------------------|
| 031000 | CONCRETE FORMING AND ACCESSORIES |
| 032000 | CONCRETE REINFORCING |
| 033000 | CAST-IN-PLACE CONCRETE |

DIVISION 4 - MASONRY

| | |
|--------|-----------------------|
| 042200 | CONCRETE UNIT MASONRY |
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DIVISION 5 - METALS

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| 054000 | COLD-FORMED METAL FRAMING |
| 055000 | METAL FABRICATIONS |
| 055213 | PIPE AND TUBE RAILINGS |

DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

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|--------|---|
| 061000 | ROUGH CARPENTRY |
| 061053 | MISCELLANEOUS ROUGH CARPENTRY |
| 061600 | SHEATHING |
| 062023 | INTERIOR FINISH CARPENTRY |
| 064013 | INTERIOR ARCHITECTURAL WOODWORK |
| 064116 | PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS |

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

| | |
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| 071113 | BITUMINOUS DAMPROOFING |
| 071900 | WATER REPELLENTS |
| 072100 | THERMAL INSULATION |
| 072500 | WEATHER BARRIERS |
| 072600 | VAPOR RETARDERS |

| | |
|--------|-------------------------------|
| 076200 | SHEET METAL FLASHING AND TRIM |
| 076526 | SELF-ADHEARING SHEET FLASHING |
| 077200 | ROOF ACCESSORIES |
| 077253 | SNOW GUARDS |
| 078443 | JOINT FIRESTOPPING |
| 079200 | JOINT SEALANTS |
| 079219 | ACOUSTICAL JOINT SEALANTS |

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| | |
|--------|--------------------------------------|
| 080671 | DOOR HARDWARE SCHEDULE |
| 081113 | HOLLOW METAL DOORS AND FRAMES |
| 081416 | FLUSH WOOD DOORS |
| 083113 | ACCESS DOORS AND FRAMES |
| 083323 | OVERHEAD COILING DOORS |
| 083613 | SECTIONAL DOORS |
| 084523 | FIBERGLASS SANDWICH PANEL ASSEMBLIES |
| 087100 | DOOR HARDWARE |
| 088000 | GLAZING |

DIVISION 9 - FINISHES

| | |
|--------|--------------------------------|
| 092216 | NON-STRUCTURAL METAL FRAMING |
| 092900 | GYPSUM BOARD |
| 093013 | CERAMIC TILING |
| 095113 | ACOUSTICAL PANEL CEILINGS |
| 096513 | RESILIENT BASE AND ACCESSORIES |
| 096519 | RESILIENT TILE FLOORING |
| 096813 | TILE CARPETING |
| 099123 | INTERIOR PAINTING |
| 099600 | HIGH-PERFORMANCE COATINGS |

DIVISION 10 - SPECIALTIES

| | |
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| 101423.16 | ROOM IDENTIFICATION PANEL SIGNAGE |
| 102113.19 | PLASTIC TOILET COMPARTMENTS |
| 102600 | WALL AND DOOR PROTECTION |
| 102800 | TOILET, BATH, AND LAUNDRY ACCESSORIES |
| 104300 | EMERGENCY AID SPECIALTIES |
| 104416 | FIRE EXTINGUISHERS |
| 105113 | METAL LOCKERS |
| 107316.13 | METAL CANOPIES |

DIVISION 11 - EQUIPMENT

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| 113100 | RESIDENTIAL APPLIANCES |
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DIVISION 12 – FURNISHINGS

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| 122413 | ROLLER WINDOW SHADES |
| 123661.16 | SOLID SURFACING COUNTERTOPS |

DIVISION 13 – SPECIAL CONSTRUCTION

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| 133419 | METAL BUILDING SYSTEMS |
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133133 FRAMED FABRIC STRUCTURES

DIVISION 14 - CONVEYING EQUIPMENT

144500 HEAVY DUTY VEHICLE LIFTS

DIVISION 21 – FIRE SUPPRESSION

210517 SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING
210518 ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
210523 GENERAL-DUTY VALVES FOR WATER-BASED FIRE SUPPRESSION PIPING
210529 HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT
210533 HEAT TRACING FOR FIRE SUPPRESSION PIPING
210553 IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT
211100 FACILITY FIRE-SUPPRESSION WATER SERVICE PIPING
211119 FIRE DEPARTMENT CONNECTIONS
211313 WET-PIPE SPRINKLER SYSTEMS
211316 DRY-PIPE SPRINKLER SYSTEMS

DIVISION 22 - PLUMBING

220516 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
220517 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
220518 ESCUTCHEONS FOR PLUMBING PIPING
220519 METERS AND GAGES FOR PLUMBING PIPING
220523.12 BALL VALVES FOR PLUMBING PIPING
220523.14 CHECK VALVES FOR PLUMBING PIPING
220523.15 GATE VALVES FOR PLUMBING PIPING
220529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
220533 HEAT TRACING FOR PLUMBING PIPING
220553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
220593 TESTING, ADJUSTING AND BALANCING FOR PLUMBING
220719 PLUMBING PIPING INSULATION
221113 FACILITY WATER DISTRIBUTION PIPING
221116 DOMESTIC WATER PIPING
221119 DOMESTIC WATER PIPING SPECIALTIES
221123.13 DOMESTIC WATER PACKAGED BOOSTER PUMPS
221313 FACILITY SANITARY SEWER
221316 SANITARY WASTE AND VENT PIPING
22319 SANITARY WASTE PIPING SPECIALTIES
22319.13 SANITARY DRAINS
221323 SANITARY WASTE INTERSEPTORS
221513 GENERAL-SERVICE COMPRESSED AIR PIPING
221519 GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS
221623 NATURAL GAS PIPING
223300 ELECTRIC, DOMESTIC-WATER HEATERS
224213.13 COMMERCIAL WATER CLOSETS
224213.16 COMMERCIAL URINALS
224216.13 COMMERCIAL LAVATORIES
224216.16 COMMERCIAL SINKS
224223 COMMERCIAL SHOWERS
224500 EMERGENCY PLUMBING FIXTURES

224713 DRINKING FOUNTAINS

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230513 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT
230516 EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING
230517 SLEEVES AND SLEEVE SEALS FOR HVAC PIPING
230518 ESCUTCHEONS FOR HVAC PIPING
230529 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
230548.13 VIBRATION CONTROLS FOR HVAC
230553 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
230593 TESTING, ADJUSTING, AND BALANCING FOR HVAC
230713 DUCT INSULATION
230719 HVAC PIPING INSULATION
230923 DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC
230993.11 SEQUENCE OF OPERATION FOR HVAC DDC
232300 REFRIGERANT PIPING
233113 METAL DUCTS
233300 AIR DUCT ACCESSORIES
233423 HVAC POWER VENTILATORS
233439 HIGH-VOLUME, LOW-SPEED FANS
233713 DIFFUSERS, REGISTERS, AND GRILLES
235523.13 LOW-INTENSITY, GAS-FIRED, RADIANT HEATERS
235533.16 GAS-FIRED UNIT HEATERS
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238129 VARIABLE REFRIGERANT FLOW HVAC SYSTEMS
238239.19 WALL AND CEILING UNIT HEATERS

DIVISION 26 – ELECTRICAL

260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
260526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
260529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
260533 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
260543 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
260544 SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING
260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS
260573 OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY
260573.13 SHORT-CIRCUIT STUDIES
260573.19 ARC-FLASH HAZARD ANALYSIS
260923 LIGHTING CONTROL DEVICES
262213 LOW-VOLTAGE DISTRIBUTION TRANSFORMERS
262416 PANELBOARDS
262713 ELECTRICITY METERING
262726 WIRING DEVICES
262813 FUSES
262816 ENCLOSED SWITCHES AND CIRCUIT BREAKERS
263213.13 DIESEL EMERGENCY ENGINE GENERATORS
263600 TRANSFER SWITCHES
264113 LIGHTNING PROTECTION FOR STRUCTURES
264313 SURGE PROTECTION FOR LOW VOLTAGE ELECTRICAL POWER CIRCUITS

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| 265119 | LED INTERIOR LIGHTING |
| 265213 | EMERGENCY AND EXIT LIGHTING |
| 265613 | LIGHTING POLES AND STANDARDS |
| 265619 | LED EXTERIOR LIGHTING |

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

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| 284621.11 | ADDRESSABLE FIRE ALARM SYSTEMS |
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DIVISION 31 – EARTHWORK

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| 311000 | SITE CLEARING |
| 312000 | EARTHWORK |
| 312319 | DEWATERING |
| 312500 | EROSIN & SEDIMENT REPORT |
| 312513 | EROSIN & SEDIMENT CONTROL |
| 315000 | EXCAVATION SUPPORT AND PROTECTION |

DIVISION 32 – EXTERIOR IMPROVEMENTS

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| 321216 | ASPHALT PAVING |
| 321313 | CONCRETE PAVING |
| 321373 | CONCRETE PAVING JOINT SEALANTS |
| 321623 | SIDEWALKS |
| 322000 | SIGNS AND PARKING APPURTENANCES |
| 323113 | FENCES AND GATES |
| 329100 | SOIL PREPARATION |
| 329200 | TURFS AND GRASSES |
| 329300 | PLANTS |

DIVISION 33 - UTILITIES

| | |
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| 330513 | MANHOLES AND STRUCTURES |
| 330516 | PRECAST CONCRETE UTILITY STRUCTUTRES |
| 330517 | PRECAST CONCRETE METER BOXES |
| 331116 | SITE WATER DISTRIBUTION PIPING |
| 333100 | SANITARY UTILITY DRAINAGE PIPING |
| 334100 | STORM UTILITY DRAINAGE PIPING |
| 334416 | UTILITY TRENCH DRAINS |
| 334600 | PCSM REPORT |
| 334713 | UNDERGROUND BASIN LINERS |

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| 001115 | ADVERTISEMENT FOR PREQUALIFICATIONS OF BIDDERS |
| 001116 | INVITATION TO BID |
| 001153 | REQUEST FOR QUALIFICATIONS |
| 002113 | INSTRUCTONS TO BIDDERS |
| 002213 | SUPPLEMENTARY INSTRUCTIONS TO BIDDERS |
| 002513 | PRE-BID MEETINGS |
| 002600 | PROCUREMENT SUBSTITUTION PROCEDURES |
| 003113 | PRELIMINARY SCHEDULE |
| 003119 | EXISTING CONDITION INFORMATION |
| 003126 | EXISTING HAZARDOUS MATERIAL INFORMATION |
| 003132 | GEOTECHNICAL DATA |
| 003143 | PERMIT APPLICATION |
| 004116 | BID FORM-STIPULATED SUM (MULTI-PRIME CONTRACT) |
| 004136 | BID FORM- COST PLUS FREE (MULTI- PRIME CONTRACT) |
| 004313 | BID SECURITY FORMS |
| 004321 | ALLOWANCE FORM |
| 004322 | UNIT PRICES FORM |
| 004323 | ALTERNATES FORM |
| 004373 | PROPOSED SCHEDULE OF VALUES FORM |
| 004393 | BID SUBMITTAL CHECKLIST |
| 004519 | NON-COLLUSION AFFIDAVIT OF PRIME BIDDER |
| 005100 | NOTICE OF AWARD |
| 006000 | PROJECT FORMS |
| 007300 | SUPPLEMENTARY GENERAL CONDITIONS |
| 007310 | SAMPLE INSURANCE ACCORD FORM |
| 007343 | WAGE RATE REQUIREMENTS |
| 007343A | WAGE RATE SCHEDULE |
| 009113 | ADDENDA |

DIVISION 1 - GENERAL REQUIREMENTS

| | |
|--------|-------------------------------------|
| 010000 | GENERAL REQUIRMENTS |
| 011000 | SUMMARY |
| 011700 | LIST OF STANDARD ABBREVIATIONS |
| 012100 | ALLOWANCES |
| 012300 | ALTERNATE AND UNIT PRICES |
| 012500 | SUBSTITUTION PROCEDURES |
| 012900 | PAYMENT PROCEDURES |
| 013000 | ADMINISTRATIVE REQUIREMENTS |
| 013100 | COORDINATION |
| 013200 | CONSTRUCTION PROGRESS DOCUMENTATION |
| 013300 | SUBMITTAL PROCEDURES |
| | SUBMITTAL COVER SHEET |

| | |
|---------|--|
| 013500 | ELECTRONIC DOCUMENT TRANSFER |
| | ELECTRONIC DOCUMENT TRANSFER AGREEMENT |
| 014100 | SPECIAL INSPECTIONS AND TESTING |
| 014100B | STATEMENT OF SPECIAL INSPECTIONS |
| 014200 | REFERENCES |
| 015000 | TEMPORARY FACILITIES AND CONTROLS |
| 015100 | TEMPORARY UTILITIES |
| 015630 | WATER CONTROL |
| 015690 | CONSTRUCTION CLEANING |
| 015700 | FINAL CLEANING |
| 017310 | CUTTING AND PATCHING |
| 017700 | CLOSEOUT PROCEDURES |
| 018000 | MAINTENANCE |
| 019113 | GENERAL COMMISSIONING REQUIREMENTS |

DIVISION 2 – EXISITING CONDITIONS

| | |
|--------|--|
| 023200 | GEOTECHNICAL INVESTIGATIONS |
| | GEOTECHNICAL REPORT DATED 11/14/2024 |
| | STORMWATER INFILTRATION EXPLORATION 11/14/2024 |
| 024119 | SELECTIVE DEMOLITION |

DIVISION 3 – CONCRETE

| | |
|--------|----------------------------------|
| 031000 | CONCRETE FORMING AND ACCESSORIES |
| 032000 | CONCRETE REINFORCING |
| 033000 | CAST-IN-PLACE CONCRETE |

DIVISION 4 - MASONRY

| | |
|--------|-----------------------|
| 042200 | CONCRETE UNIT MASONRY |
|--------|-----------------------|

DIVISION 5 - METALS

| | |
|--------|---------------------------|
| 054000 | COLD-FORMED METAL FRAMING |
| 055000 | METAL FABRICATIONS |
| 055213 | PIPE AND TUBE RAILINGS |

DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

| | |
|--------|---|
| 061000 | ROUGH CARPENTRY |
| 061053 | MISCELLANEOUS ROUGH CARPENTRY |
| 061600 | SHEATHING |
| 062023 | INTERIOR FINISH CARPENTRY |
| 064013 | INTERIOR ARCHITECTURAL WOODWORK |
| 064116 | PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS |

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

| | |
|--------|-------------------------------|
| 071113 | BITUMINOUS DAMPROOFING |
| 071900 | WATER REPELLENTS |
| 072100 | THERMAL INSULATION |
| 072500 | WEATHER BARRIERS |
| 072600 | VAPOR RETARDERS |
| 076200 | SHEET METAL FLASHING AND TRIM |
| 076526 | SELF-ADHEARING SHEET FLASHING |
| 077200 | ROOF ACCESSORIES |
| 077253 | SNOW GUARDS |
| 078443 | JOINT FIRESTOPPING |
| 079200 | JOINT SEALANTS |
| 079219 | ACOUSTICAL JOINT SEALANTS |

DIVISION 8 - OPENINGS

| | |
|--------|--------------------------------------|
| 080671 | DOOR HARDWARE SCHEDULE |
| 081113 | HOLLOW METAL DOORS AND FRAMES |
| 081416 | FLUSH WOOD DOORS |
| 083113 | ACCESS DOORS AND FRAMES |
| 083323 | OVERHEAD COILING DOORS |
| 083613 | SECTIONAL DOORS |
| 084523 | FIBERGLASS SANDWICH PANEL ASSEMBLIES |
| 087100 | DOOR HARDWARE |
| 088000 | GLAZING |

DIVISION 9 - FINISHES

| | |
|--------|--------------------------------|
| 092216 | NON-STRUCTURAL METAL FRAMING |
| 092900 | GYPSUM BOARD |
| 093013 | CERAMIC TILING |
| 095113 | ACOUSTICAL PANEL CEILINGS |
| 096513 | RESILIENT BASE AND ACCESSORIES |
| 096519 | RESILIENT TILE FLOORING |
| 096813 | TILE CARPETING |
| 099123 | INTERIOR PAINTING |
| 099600 | HIGH-PERFORMANCE COATINGS |

DIVISION 10 - SPECIALTIES

| | |
|-----------|---------------------------------------|
| 101423.16 | ROOM IDENTIFICATION PANEL SIGNAGE |
| 102113.19 | PLASTIC TOILET COMPARTMENTS |
| 102600 | WALL AND DOOR PROTECTION |
| 102800 | TOILET, BATH, AND LAUNDRY ACCESSORIES |
| 104300 | EMERGENCY AID SPECIALTIES |
| 104416 | FIRE EXTINGUISHERS |
| 105113 | METAL LOCKERS |
| 107316.13 | METAL CANOPIES |

DIVISION 11 - EQUIPMENT

| | |
|--------|------------------------|
| 113100 | RESIDENTIAL APPLIANCES |
|--------|------------------------|

DIVISION 12 – FURNISHINGS

- 122413 ROLLER WINDOW SHADES
- 123661.16 SOLID SURFACING COUNTERTOPS

DIVISION 13 – SPECIAL CONSTRUCTION

- 133419 METAL BUILDING SYSTEMS

DIVISION 14 - CONVEYING EQUIPMENT

- 144500 HEAVY DUTY VEHICLE LIFTS

DIVISION 21 – FIRE SUPPRESSION

- 210517 SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING
- 210518 ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING
- 210523 GENERAL-DUTY VALVES FOR WATER-BASED FIRE SUPPRESSION PIPING
- 210529 HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT
- 210533 HEAT TRACING FOR FIRE SUPPRESSION PIPING
- 210553 IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT
- 211100 FACILITY FIRE-SUPPRESSION WATER SERVICE PIPING
- 211119 FIRE DEPARTMENT CONNECTIONS
- 211313 WET-PIPE SPRINKLER SYSTEMS
- 211316 DRY-PIPE SPRINKLER SYSTEMS

DIVISION 22 - PLUMBING

- 220516 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
- 220517 SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
- 220518 ESCUTCHEONS FOR PLUMBING PIPING
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- 220523.12 BALL VALVES FOR PLUMBING PIPING
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- 220533 HEAT TRACING FOR PLUMBING PIPING
- 220553 IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT
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- 221123.13 DOMESTIC WATER PACKAGED BOOSTER PUMPS
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- 22319.13 SANITARY DRAINS
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- 223300 ELECTRIC, DOMESTIC-WATER HEATERS
- 224213.13 COMMERCIAL WATER CLOSETS

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| 224213.16 | COMMERCIAL URINALS |
| 224216.13 | COMMERCIAL LAVATORIES |
| 224216.16 | COMMERCIAL SINKS |
| 224223 | COMMERCIAL SHOWERS |
| 224500 | EMERGENCY PLUMBING FIXTURES |
| 224713 | DRINKING FOUNTAINS |

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

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| 230516 | EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING |
| 230517 | SLEEVES AND SLEEVE SEALS FOR HVAC PIPING |
| 230518 | ESCUTCHEONS FOR HVAC PIPING |
| 230529 | HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT |
| 230548.13 | VIBRATION CONTROLS FOR HVAC |
| 230553 | IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT |
| 230593 | TESTING, ADJUSTING, AND BALANCING FOR HVAC |
| 230713 | DUCT INSULATION |
| 230719 | HVAC PIPING INSULATION |
| 230923 | DIRECT DIGITAL CONTROL (DDC) SYSTEM FOR HVAC |
| 230993.11 | SEQUENCE OF OPERATION FOR HVAC DDC |
| 232300 | REFRIGERANT PIPING |
| 233113 | METAL DUCTS |
| 233300 | AIR DUCT ACCESSORIES |
| 233423 | HVAC POWER VENTILATORS |
| 233439 | HIGH-VOLUME, LOW-SPEED FANS |
| 233713 | DIFFUSERS, REGISTERS, AND GRILLES |
| 235523.13 | LOW-INTENSITY, GAS-FIRED, RADIANT HEATERS |
| 235533.16 | GAS-FIRED UNIT HEATERS |
| 237339 | INDOOR, DIRECT-FIRED HEATING AND VENTILATING UNITS |
| 238129 | VARIABLE REFRIGERANT FLOW HVAC SYSTEMS |
| 238239.19 | WALL AND CEILING UNIT HEATERS |

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| 260519 | LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES |
| 260526 | GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS |
| 260529 | HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS |
| 260533 | RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS |
| 260543 | UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS |
| 260544 | SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING |
| 260553 | IDENTIFICATION FOR ELECTRICAL SYSTEMS |
| 260573 | OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY |
| 260573.13 | SHORT-CIRCUIT STUDIES |
| 260573.19 | ARC-FLASH HAZARD ANALYSIS |
| 260923 | LIGHTING CONTROL DEVICES |
| 262213 | LOW-VOLTAGE DISTRIBUTION TRANSFORMERS |
| 262416 | PANELBOARDS |
| 262713 | ELECTRICITY METERING |

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| 262726 | WIRING DEVICES |
| 262813 | FUSES |
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| 263213.13 | DIESEL EMERGENCY ENGINE GENERATORS |
| 263600 | TRANSFER SWITCHES |
| 264113 | LIGHTNING PROTECTION FOR STRUCTURES |
| 264313 | SURGE PROTECTION FOR LOW VOLTAGE ELECTRICAL POWER CIRCUITS |
| 265119 | LED INTERIOR LIGHTING |
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| 265613 | LIGHTING POLES AND STANDARDS |
| 265619 | LED EXTERIOR LIGHTING |

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

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| 312000 | EARTHWORK |
| 312319 | DEWATERING |
| 315000 | EXCAVATION SUPPORT AND PROTECTION |
| 317000 | SLOPE PROTECTION AND EROSION CONTROL |

DIVISION 32 – EXTERIOR IMPROVEMENTS

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| 321216 | ASPHALT PAVING |
| 321300 | CONCRETE PAVING |
| 321373 | CONCRETE PAVING JOINT SEALANTS |
| 322000 | SIGNS AND PARKING APPURTENANCES |
| 323113 | CHAIN LINKS FENCES AND GATES |
| 323121 | BI-FOLD SECURITY GATE AND OPERATORS |
| 329100 | SOIL PREPARATION |
| 329200 | LAWNS AND GRASSES |
| 329300 | PLANTS |

DIVISION 33 - UTILITIES

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| 334200 | STORMWATER CONVEYANCE |

END OF SECTION 000110

LIST OF DRAWING SHEETS

00 -- GENERAL

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| G000 | COVER SHEET |
| G001 | CODE REVIEW |
| G002 | CODE COMPLIANCE AND LIFE SAFETY |

02 -- CIVIL

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| 1.0 | COVER SHEET |
| 2.0 | EXISTING CONDITIONS AND DEMOLITION PLAN |
| 3.0 | SITE PLAN |
| 4.0 | GRADING PLAN |
| 5.0 | UTILITIES PLAN |
| 5.1 | PROFILES |
| 6.0 | SOIL & EROSION & SEDIMENT CONTROL PLAN |
| 6.1 | SOIL & EROSION & SEDIMENT CONTROL DETAILS |
| 6.2 | SOIL & EROSION & SEDIMENT CONTROL DETAILS |
| 7.0 | TRUCK MOVEMENT PLAN |
| 8.0 | LANDSCAPE PLAN |
| 8.1 | LANDSCAPE DETAILS |
| 9.0 | LIGHTING PLAN |
| 9.1 | LIGHTING DETAILS |
| 10.0 | CONSTRUCTION DETAILS |
| 10.3 | CONSTRUCTION DETAILS |
| 11.0 | PCSM PLAN |
| 12.0 | EXISTING DRAINAGE MAP |
| 13.0 | PROPOSED DRAINAGE MAP |
| 14.0 | INLET DRAINAGE AREA MAP |
| 15.0 | PCSM NOTES & DETAILS |
| 15.2 | PCSM NOTES & DETAILS |

03 -- STRUCTURAL

| | |
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| S001 | STRUCTURAL NOTES & ABBREVIATIONS |
| S002 | STRUCTURAL NOTES |
| S100 | FOUNDATION PLANS |
| S501 | SECTIONS & DETAILS |
| S502 | SECTIONS & DETAILS |

04 -- ARCHITECTURAL

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| A001 | ARCHITECTURAL SITE PLAN |
| A002 | SITE PLAN DETAILS |
| A101 | ARCHITECTURAL FLOOR PLAN – OVERALL |
| A102 | ARCHITECTURAL FLOOR PLAN – ENLARGED OFFICE |
| A103 | ARCHITECTURAL ROOF PLAN |
| A103A | ROOF AND MECHANICAL SCREENING DETAILS |
| A104 | REFLECTED CEILING PLAN - OVERALL |
| A105 | REFLECTED CEILING PLAN – ENLARGED OFFICE |

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| A106 | FLOOR FINISH PLAN – OVERALL (GARAGE/OFFICE & SALT SHED) |
| A107 | FLOOR FINISH PLAN – ENLARGED GARAGE & ENLARGED OFFICE |
| A108 | FINISHES SCHEDULES |
| A109 | FF&E PLAN – OVERALL (GARAGE/OFFICE & SALT SHED) |
| A110 | FF&E PLAN – ENLARGED OFFICE |
| A111 | FF&E SCHEDULE |
| A201 | EXTERIOR ELEV. – OFFICE & GARAGE |
| A202 | EXTERIOR ELEV. – SALT SHED |
| A203 | BUILDING SECTIONS |
| A204 | BUILDING SECTIONS |
| A301 | WALL SECTIONS -- GARAGE |
| A302 | WALL SECTIONS -- OFFICE |
| A303 | WALL SECTIONS – OFFICE & GARAGE |
| A401 | RESTROOM/LOCKER PLANS, ELEVATION & DETAILS |
| A403 | INTERIOR ELEVATIONS – OFFICES & CONF. ROOMS |
| A404 | INTERIOR ELEVATIONS – OPEN AREA & BREAK ROOM |
| A405 | INTERIOR ELEVATIONS – LOBBY & VESTIBULE |
| A406 | INTERIOR ELEVATIONS – GARAGE AREA |
| A501 | PARTITION TYPES & DETAILS |
| A502 | EXTERIOR DETAILS |
| A503 | EXTERIOR DETAILS |
| A504 | EXTERIOR DETAILS |
| A505 | INTERIOR DETAILS |
| A506 | INTERIOR DETAILS |
| A507 | MILLWORK DETAILS |
| A508 | TRANSITION DETAILS |
| A601 | DOOR TYPES, SCHEDULE & DETAILS |
| A602 | WINDOW TYPES, SCHEDULE & DETAILS |

05 -- MECHANICAL

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| M000 | MECHANICAL LEGEND SHEET |
| M001 | MECHANICAL THERMAL ZONES |
| M101 | 1 ST FLOOR HVAC PLAN |
| M120 | ROOF MECHANICAL PLAN |
| M401 | ENLARGED HVAC PLANS |
| M402 | ENLARGED HVAC PLANS |
| M403 | HVAC SECTIONS |
| M500 | MECHANICAL DETAILS |
| M501 | MECHANICAL DETAILS |
| M600 | HVAC SCHEDULES |
| M701 | MECHANICAL CONTROL DIAGRAMS |

06 -- PLUMBING

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| P000 | PLUMBING SYMBOLS, ABBREVIATIONS, LEGEND & GENERAL NOTES |
| P100 | UNDERFLOOR PLUMBING PLAN |
| P101 | PLUMBING FLOOR PLAN |
| P102 | NATURAL GAS PIPING PLAN |

| | |
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| P103 | SALT SHED PLUMBING FLOOR PLAN |
| P401 | ENLARGED PLUMBING PLANS |
| P501 | PLUMBING DETAILS |
| P600 | PLUMBING SCHEDULES |
| P901 | SANITARY WASTE & VENT PIPING RISER DIAGRAM |
| P902 | DOMESTIC WATER PIPING & NATURAL GAS PIPING RISER DIAGRAM |

07 -- FIRE PROTECTION

| | |
|------|---|
| F000 | FIRE PROTECTION SYMBOLS, ABBREVIATIONS, LEGEND & GENERAL NOTES |
| F101 | FIRE PROTECTION FLOOR PLAN & SCHEDULES |
| F601 | FIRE PROTECTION DETAILS |

08 -- ELECTRICAL

| | |
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| ES002 | ELECTRICAL SITE PLAN |
| E101 | POWER PLAN |
| E201 | LIGHTING PLAN |
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| E601 | DIAGRAMS |
| E701 | DETAILS |
| E801 | SCHEDULES |
| E802 | SCHEDULES |

END OF SECTION 000115

PUBLIC BID PACKAGE NEW PUBLIC WORKS GARAGE AND SALT SHED BID NO. 2025-010

AT

**2nd and Pennell Street
Chester, Pennsylvania**

FOR THE

**City of Chester
Department of Public Works
1 4th Street
Chester, PA 19013
(610) 447-7700**

PROJECT MANUAL Volume I

**Bidding Documents
Divisions 00 through 14**


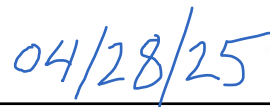

April 28, 2025

**Colliers Engineering & Design
1500 JFK Blvd, 2 Penn Center Suite 700
Philadelphia, PA 19102**

SEALS PAGE


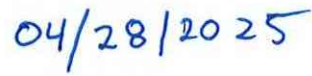

PROJECT MANUAL
PUBLIC WORKS FACILITIES
2nd and Pennell Street
Chester, Pennsylvania

ARCHITECT

Signature Date

STRUCTURAL ENGINEER

Signature Date

MECHANICAL ENGINEER



Matthew L. Sholomskas

04/28/25

Signature

Date

PLUMBING ENGINEER



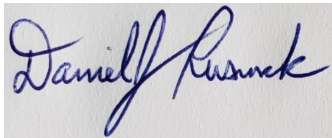
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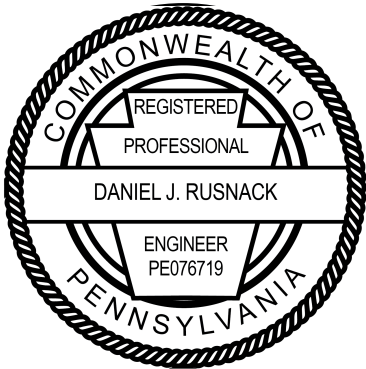
ELECTRICAL ENGINEER



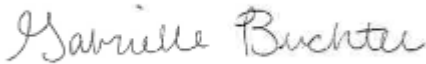
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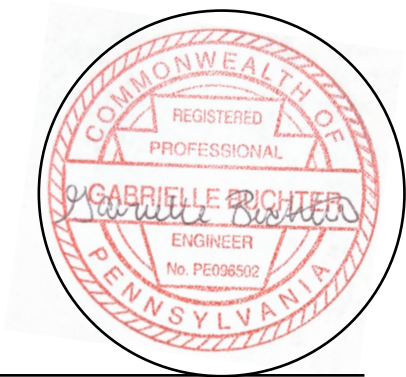
SITE/CIVIL ENGINEER



4/28/2025

Signature

Date



END OF SECTION 000107

DIVISION 0 - PROCUREMENT AND CONTRACTING REQUIREMENTS

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| 000101 | PROJECT TITLE PAGE |
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| 000115 | LIST OF DRAWING SHEETS |
| 000120 | LIST OF SCHEDULES |
| 001113 | ADVERTISEMENT FOR BIDS |
| 001115 | ADVERTISEMENT FOR PREQUALIFICATIONS OF BIDDERS |
| 001116 | INVITATION TO BID |
| 001153 | REQUEST FOR QUALIFICATIONS |
| 002113 | INSTRUCTONS TO BIDDERS |
| 002213 | SUPPLEMENTARY INSTRUCTIONS TO BIDDERS |
| 002513 | PRE-BID MEETINGS |
| 002600 | PROCUREMENT SUBSTITUTION PROCEDURES |
| 003113 | PRELIMINARY SCHEDULE |
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| 004113 | BID FORM-STIPULATED SUM (SINGLE-PRIME CONTRACT) |
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| 004373 | PROPOSED SCHEDULE OF VALUES FORM |
| 004393 | BID SUBMITTAL CHECKLIST |
| 004519 | NON-COLLUSION AFFIDAVIT OF PRIME BIDDER |
| 005100 | NOTICE OF AWARD |
| 006000 | PROJECT FORMS |
| 007300 | SUPPLEMENTARY GENERAL CONDITIONS |
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DIVISION 1 - GENERAL REQUIREMENTS

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| 010000 | GENERAL REQUIRMENTS |
| 011000 | SUMMARY |
| 011200 | MULTIPLE CONTRACT SUMMARY |
| 011700 | LIST OF STANDARD ABBREVIATIONS |
| 012100 | ALLOWANCES |
| 012300 | ALTERNATE AND UNIT PRICES |
| 012500 | SUBSTITUTION PROCEDURES |
| 012900 | PAYMENT PROCEDURES |
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| 013100 | COORDINATION |
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| | SUBMITTAL COVER SHEET |
| 013500 | ELECTRONIC DOCUMENT TRANSFER |

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| | ELECTRONIC DOCUMENT TRANSFER AGREEMENT |
| 014100 | SPECIAL INSPECTIONS AND TESTING |
| 014100B | STATEMENT OF SPECIAL INSPECTIONS |
| 014200 | REFERENCES |
| 015000 | TEMPORARY FACILITIES AND CONTROLS |
| 015100 | TEMPORARY UTILITIES |
| 015630 | WATER CONTROL |
| 015690 | CONSTRUCTION CLEANING |
| 015700 | FINAL CLEANING |
| 017310 | CUTTING AND PATCHING |
| 017700 | CLOSEOUT PROCEDURES |
| 018000 | MAINTENANCE |
| 018010 | GEOTECHNICAL |
| | GEOTECHNICAL REPORT DATED 11/14/2024 |
| 018020 | STORM WATER POLLUTION PREVENTION PLAN |
| 019113 | GENERAL COMMISSIONING REQUIREMENTS |

DIVISION 2 – EXISITING CONDITIONS

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| 024116 | STRUCTURE DEMOLITION |
| 024119 | SELECTIVE DEMOLITION |
| 026000 | CONTAMINATED SITE MATERIAL REMOVAL |

DIVISION 3 – CONCRETE

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| 030130 | MAINTENANCE OF CAST-IN-PLACE CONCRETE |
| 031000 | CONCRETE FORMING AND ACCESSORIES |
| 032000 | CONCRETE REINFORCING |
| 033000 | CAST-IN-PLACE CONCRETE |
| 035300 | CONCRETE TOPPING |
| 035413 | GYP SUM CEMENT UNDERLAYMENT |

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| 040110 | MASONRY CLEANING |
| 042000 | UNIT MASONRY |
| 042200 | CONCRETE UNIT MASONRY |
| 042613 | MASONRY VENEER |

DIVISION 5 - METALS

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| 051000 | STRUCTURAL STEEL |
| 051200 | STRUCTURAL STEEL FRAMING |
| 054000 | COLD-FORMED METAL FRAMING |
| 055000 | METAL FABRICATIONS |
| 055213 | PIPE AND TUBE RAILINGS |

DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

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| 061000 | ROUGH CARPENTRY |
| 061053 | MISCELLANEOUS ROUGH CARPENTRY |
| 061600 | SHEATHING |

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| 061753 | SHOP FABRICATED WOOD TRUSSES |
| 062023 | INTERIOR FINISH CARPENTRY |
| 064013 | INTERIOR ARCHITECTURAL WOODWORK |
| 064116 | PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS |

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

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| 071113 | BITUMINOUS DAMPROOFING |
| 071353 | ELASTOMERIC SHEET WATERPROOFING |
| 071900 | WATER REPELLENTS |
| 072100 | THERMAL INSULATION |
| 072500 | WEATHER BARRIERS |
| 072600 | VAPOR RETARDERS |
| 074116 | INSULATED METAL ROOF PANELS |
| 074213.19 | INSULATED METAL WALL PANELS |
| 074293 | SOFFIT PANELS |
| 076200 | SHEET METAL FLASHING AND TRIM |
| 077200 | ROOF ACCESSORIES |
| 077253 | SNOW GUARDS |
| 078443 | JOINT FIRESTOPPING |
| 079200 | JOINT SEALANTS |
| 079219 | ACOUSTICAL JOINT SEALANTS |

DIVISION 8 - OPENINGS

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| 081113 | HOLLOW METAL DOORS AND FRAMES |
| 081416 | FLUSH WOOD DOORS |
| 083113 | ACCESS DOORS AND FRAMES |
| 083613 | SECTIONAL DOORS |
| 087100 | DOOR HARDWARE |
| 088000 | GLAZING |

DIVISION 9 - FINISHES

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| 092216 | NON-STRUCTURAL METAL FRAMING |
| 092900 | GYPSUM BOARD |
| 093013 | CERAMIC TILING |
| 095113 | ACOUSTICAL PANEL CEILINGS |
| 096513 | RESILIENT BASE AND ACCESSORIES |
| 096519 | RESILIENT TILE FLOORING |
| 096813 | TILE CARPETING |
| 099123 | INTERIOR PAINTING |
| 099600 | HIGH-PERFORMANCE COATINGS |

DIVISION 10 - SPECIALTIES

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| 101423.16 | ROOM IDENTIFICATION PANEL SIGNAGE |
| 102113.19 | PLASTIC TOILET COMPARTMENTS |
| 102600 | WALL AND DOOR PROTECTION |
| 102800 | TOILET, BATH, AND LAUNDRY ACCESSORIES |
| 104416 | FIRE EXTINGUISHERS |
| 105113 | METAL LOCKERS |
| 105300 | METAL CANOPIES |

DIVISION 11 - EQUIPMENT

113100 RESIDENTIAL APPLIANCES

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123661.16 SOLID SURFACING COUNTERTOPS

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142200 CRANES AND HOISTS

144500 HEAVY DUTY VEHICLE LIFTS

144510 LIGHT DUTY VEHICLE LIFTS

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210517 SLEEVES AND SLEEVE SEALS FOR FIRE SUPPRESSION PIPING

210518 ESCUTCHEONS FOR FIRE-SUPPRESSION PIPING

210523 GENERAL-DUTY VALVES FOR WATER-BASED FIRE SUPPRESSION PIPING

210529 HANGERS AND SUPPORTS FOR FIRE SUPPRESSION PIPING AND EQUIPMENT

210533 HEAT TRACING FOR FIRE-SUPPRESSION PIPING

210553 IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

211100 FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

211119 FIRE DEPARTMENT CONNECTIONS

211313 WET-PIPE SPRINKLER SYSTEMS

211316 DRY-PIPE SPRINKLER SYSTEMS

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220516 EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

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220518 ESCUTCHEONS FOR PLUMBING PIPING

220519 METERS AND GAGES FOR PLUMBING PIPING

220523.12 BALL VALVES FOR PLUMBING PIPING

220523.14 CHECK VALVES FOR PLUMBING PIPING

220523.15 GATE VALVES FOR PLUMBING PIPING

220529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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221316 SANITARY WASTE AND VENT PIPING

221513 GENERAL-SERVICE COMPRESSED AIR PIPING

221519 GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS

221623 NATURAL GAS PIPING

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| 224213.16 | COMMERCIAL URINALS |
| 224216.13 | COMMERCIAL LAVATORIES |
| 224216.16 | COMMERCIAL SINKS |
| 224223 | COMMERCIAL SHOWERS |
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| 224713 | DRINKING FOUNTAINS |

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

| | |
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| 230513 | COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT |
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| 235523.13 | LOW-INTENSITY, GAS-FIRED, RADIANT HEATERS |
| 235533.16 | GAS-FIRED UNIT HEATERS |
| 237339 | INDOOR, DIRECT-FIRED HEATING AND VENTILATING UNITS |
| 238129 | VARIABLE REFRIGERANT FLOW HVAC SYSTEMS |
| 238239.19 | WALL AND CEILING UNIT HEATERS |

DIVISION 26 - ELECTRICAL

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| 260010 | SUPPLEMENTAL REQUIREMENTS FOR ELECTRICAL |
| 260519 | LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES |
| 260526 | GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS |
| 260529 | HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS |
| 260533 | RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS |
| 260543 | UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS |
| 260544 | SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND |
| 260553 | IDENTIFICATION FOR ELECTRICAL SYSTEMS |
| 260573.13 | SHORT-CIRCUIT STUDIES |
| 260573.16 | COORDINATION STUDIES |
| 260573.19 | ARC-FLASH HAZARD ANALYSIS |
| 260923 | LIGHTING CONTROL DEVICES |
| 262213 | LOW-VOLTAGE DISTRIBUTION TRANSFORMERS |

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| 262416 | PANELBOARDS |
| 262726 | WIRING DEVICES |
| 262743 | ELECTRIC-VEHICLE SERVICE EQUIPMENT-AC LEVEL 1 & LEVEL 2 |
| 262813 | FUSES |
| 262816 | ENCLOSED SWITCHES AND CIRCUIT BREAKERS |
| 262913.03 | MANUEL AND MAGNETIC MOTOR CONTROLLERS |
| 262923 | VARIABLE-FREQUENCY MOTOR CONTROLLERS |
| 263213.13 | DIESEL EMERGENCY ENGINE GENERATORS |
| 263600 | TRANSFER SWITCHES |
| 264113 | LIGHTING PROTECTION FOR STRUCTURES |
| 264313 | SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS |
| 265119 | LED EXTERIOR LIGHTING |
| 265213 | EMERGENCY AND EXIT LIGHTING |
| 265600 | EXTERIOR LIGHTING |
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| 270528 | PATHWAYS FOR COMMUNICATIONS SYSTEMS |
| 270529 | HANGERS AND SUPPORTS FOR COMMUNICATION SYSTEMS |
| 270536 | CABLE TRAYS FOR COMMUNICATIONS SYSTEMS |
| 270544 | SLEEVES & SLEEVE SEALS FOR COMMUNICATION PATHWAYS & |
| 270553 | CABLING IDENTIFICATION FOR COMMUNICATIONS SYSTEMS |

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| 312000 | EARTHWORK |
| 312319 | DEWATERING |
| 315000 | EXCAVATION SUPPORT AND PROTECTION |
| 317000 | SLOPE PROTECTION AND EROSION CONTROL |

DIVISION 32 – EXTERIOR IMPROVEMENTS

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| 321300 | CONCRETE PAVING |
| 321373 | CONCRETE PAVING JOINT SEALANTS |
| 321623 | SIDEWALKS |
| 322000 | SIGNS AND PARKING APPURTENANCES |
| 323113 | CHAIN LINKS FENCES AND GATES |
| 329100 | SOIL PREPARATION |
| 329200 | LAWNS AND GRASSES |
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| 330513 | MANHOLES AND STRUCTURES |
| 330516.13 | PRECAST CONCRETE UTILITY STRUCTURES |
| 330517 | PRECAST CONCRETE METER BOXES |
| 331116 | SITE WATER DISTRIBUTION PIPING |
| 333100 | SANITARY UTILITY DRAINAGE PIPING |

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| 334100 | STORM UTILITY DRAINAGE PIPING |
| 334416 | UTILITY TRENCH DRAINS |
| 334713 | UNDERGROUND BASIN LINERS |

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00 -- GENERAL

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| G001 | CODE REVIEW |
| G002 | CODE COMPLIANCE AND LIFE SAFETY |

02 -- CIVIL

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| 1.0 | COVER SHEET |
| 2.0 | EXISTING CONDITIONS AND DEMOLITION PLAN |
| 3.0 | SITE PLAN |
| 4.0 | GRADING PLAN |
| 5.0 | UTILITIES PLAN |
| 5.1 | PROFILES |
| 6.0 | SOIL & EROSION & SEDIMENT CONTROL PLAN |
| 6.1 | SOIL & EROSION & SEDIMENT CONTROL DETAILS |
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| 7.0 | TRUCK MOVEMENT PLAN |
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03 -- STRUCTURAL

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| S002 | STRUCTURAL NOTES |
| S100 | FOUNDATION PLANS |
| S501 | SECTIONS & DETAILS |
| S502 | SECTIONS & DETAILS |

04 -- ARCHITECTURAL

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| A002 | SITE PLAN DETAILS |
| A101 | ARCHITECTURAL FLOOR PLAN – OVERALL |
| A102 | ARCHITECTURAL FLOOR PLAN – ENLARGED OFFICE |
| A103 | ARCHITECTURAL ROOF PLAN |
| A103A | ROOF AND MECHANICAL SCREENING DETAILS |
| A104 | REFLECTED CEILING PLAN - OVERALL |
| A105 | REFLECTED CEILING PLAN – ENLARGED OFFICE |

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| A106 | FLOOR FINISH PLAN – OVERALL (GARAGE/OFFICE & SALT SHED) |
| A107 | FLOOR FINISH PLAN – ENLARGED GARAGE & ENLARGED OFFICE |
| A108 | FINISHES SCHEDULES |
| A109 | FF&E PLAN – OVERALL (GARAGE/OFFICE & SALT SHED) |
| A110 | FF&E PLAN – ENLARGED OFFICE |
| A111 | FF&E SCHEDULE |
| A201 | EXTERIOR ELEV. – OFFICE & GARAGE |
| A202 | EXTERIOR ELEV. – SALT SHED |
| A203 | BUILDING SECTIONS |
| A204 | BUILDING SECTIONS |
| A301 | WALL SECTIONS -- GARAGE |
| A302 | WALL SECTIONS -- OFFICE |
| A303 | WALL SECTIONS – OFFICE & GARAGE |
| A401 | RESTROOM/LOCKER PLANS, ELEVATION & DETAILS |
| A403 | INTERIOR ELEVATIONS – OFFICES & CONF. ROOMS |
| A404 | INTERIOR ELEVATIONS – OPEN AREA & BREAK ROOM |
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| A406 | INTERIOR ELEVATIONS – GARAGE AREA |
| A501 | PARTITION TYPES & DETAILS |
| A502 | EXTERIOR DETAILS |
| A503 | EXTERIOR DETAILS |
| A504 | EXTERIOR DETAILS |
| A505 | INTERIOR DETAILS |
| A506 | INTERIOR DETAILS |
| A507 | MILLWORK DETAILS |
| A508 | TRANSITION DETAILS |
| A601 | DOOR TYPES, SCHEDULE & DETAILS |
| A602 | WINDOW TYPES, SCHEDULE & DETAILS |
| A801 | FINISH PLANS AND SCHEDULE |

05 -- MECHANICAL

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| M000 | MECHANICAL LEGEND SHEET |
| M001 | MECHANICAL THERMAL ZONES |
| M101 | 1 ST FLOOR HVAC PLAN |
| M120 | ROOF MECHANICAL PLAN |
| M401 | ENLARGED HVAC PLANS |
| M402 | ENLARGED HVAC PLANS |
| M403 | HVAC SECTIONS |
| M500 | MECHANICAL DETAILS |
| M501 | MECHANICAL DETAILS |
| M600 | HVAC SCHEDULES |
| M701 | MECHANICAL CONTROL DIAGRAMS |

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| P101 | PLUMBING FLOOR PLAN |
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| P401 | ENLARGED PLUMBING PLANS |
| P501 | PLUMBING DETAILS |
| P600 | PLUMBING SCHEDULES |
| P901 | SANITARY WASTE & VENT PIPING RISER DIAGRAM |
| P902 | DOMESTIC WATER PIPING & NATURAL GAS PIPING RISER DIAGRAM |

07 -- FIRE PROTECTION

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|------|---|
| F000 | FIRE PROTECTION SYMBOLS, ABBREVIATIONS, LEGEND & GENERAL NOTES |
| F101 | FIRE PROTECTION FLOOR PLAN & SCHEDULES |
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08 -- ELECTRICAL

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| ES002 | ELECTRICAL SITE PLAN |
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| E201 | LIGHTING PLAN |
| E401 | FIRE ALARM PLAN |
| E601 | DIAGRAMS |
| E701 | DETAILS |
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| E802 | SCHEDULES |

END OF SECTION 000115

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. The provisions of the Division 01 specifications apply to the entire work of the Contract.
- B. This Section describes the following in general:
 - 1. Definitions and terms.
 - 2. Background information.
 - 3. Summary of the Work.
 - 4. Supervision and construction procedures.
 - 5. Project Schedule.
 - 6. Examination of existing site conditions
 - 7. Conflicting requirements.
 - 8. Contract documents maintained on project site.
 - 9. Advertising and promotional materials.
 - 10. Specification and Drawing conventions.
 - 11. References.
- C. Related Requirements include, but are not limited to the following:
 - 1. Section 011000 "Summary" for project information, general scope of work, site restrictions, work restrictions, and coordination with occupants.
 - 2. Section 013100 "Coordination" for key staff, meetings, administrative submittals, PMIS, and Requests for Information (RFIs).
 - 3. Section 013200 "Construction Progress Documentation" for construction progress schedule, progress reporting, field reports, and requests for extension of time.
 - 4. Section 013300 "Submittal Procedures" for use of PMIS.

1.02 DEFINITIONS AND TERMS

- A. The term "Owner" as used in the Contract Documents shall mean the City of Chester or the City of Chester's Representative
- B. The term "Architect" as used in the Contract Documents shall mean the Architect of Record, Colliers Engineering and Design, Inc., or the Architect's Representative.
- C. The term "Contract Documents" includes, collectively, the Project Manual, the contract drawings and the addenda and modifications thereto, if any. These documents are not to be used separately for bid or construction as they represent the entirety of the project. Each Prime Contractor is responsible for insuring that the documents are used together.
- D. The term "Work" includes, but is not limited to, materials, labor, and manufacturer and fabrication of components.
- E. The term "Specifications" means the portion of the Contract Documents that consist of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
- F. The term "Drawings" means the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, that show the design, location and dimensions of the Work, and generally includes plans, elevations, sections, details, schedules and diagrams.

- G. “Informational Documents” include documents that are included for convenience with the Contract Documents but are not Contract Documents. They are indicated “For Information Only” and may include drawings, hazardous material reports, photographs, historic documents, and the Preservation Policy. Each Prime Contractor is expected to independently verify all information shown in informational drawings and to provide each Prime Contractor’s own surveys, testing, and verification of conditions shown therein.
- H. “Notice of Award” is the Owner’s written confirmation of an award of a contract to the successful bidder, stating the award, and award date.
- I. “Notice to Proceed” is the formal authorization to Each Prime Contractor to begin the Work. Unless specifically authorized in writing, any steps taken in connection with the performance of, or the preparation to perform, the Contract, prior to issuance of the Notice to Proceed, will be the responsibility of and at the risk of the Prime Contractor performing the work, and without any cost whatsoever to the Architect.
- J. “Substantial Completion” is defined in Section 017700 “Closeout Procedures.”
- K. “Beneficial Occupancy” is defined in Section 017700 “Closeout Procedures.”
- L. “Conditions for Final Acceptance” are specified in Section 017700 “Closeout Procedures.”
- M. The “Project Management Information System” (PMIS) is defined in Section 013100 “Coordination.”
- N. The terms “Must” and “Shall” are used interchangeably and denote the imperative. “May” denotes the permissive. However, the words “no person may...” mean that no person is required, authorized, or permitted to do the act described.
- O. Unless noted otherwise, all number of days indicated are in calendar days.

1.03 BACKGROUND INFORMATION

- A. Higher standard of care: Compared to a typical commercial project, a public project requires on the part of each Prime Contractor a higher level of attentiveness and detail, a greater amount of look-ahead and pre-planning, and a rigorous regard for security restrictions. Design guidelines emphasize building longevity, security and safety. Each Prime Contractor shall accord with these precepts by anticipating greater attention to detail and tighter coordination with stakeholders.
- B. Coordination with Other Work: Each Prime Contractor should anticipate and plan for concurrent projects with overlapping schedules and work areas. Each Prime Contractor shall fully inform himself as to conditions relating to construction and labor under work by others that may affect the Project. Each Prime Contractor shall cooperate in every way with other parties doing work and provide, to the extent their work is affected by his work, all information necessary for the proper execution of their work, without delay.

1.04 SUMMARY OF THE WORK

- A. Project/Work Identification
 - 1. General: Project name is NEW PUBLIC WORKS FACILITY. The City Bid No. is 2025-010.
 - 2. Summary by Reference: Work of the Contract can be summarized by references to the SCHEDULE, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, Official Procedure for Making Changes in Contracts, Specification Sections, Drawings, Amendments and Modifications to the contract documents issued

subsequent to the initial printing of this Project Manual and including, but not necessarily limited to, printed material referenced by any of these.

3. General scope of work and other project information are described in Section 011000 "Summary."

1.05 SUPERVISION AND CONSTRUCTION PROCEDURES

- A. Each Prime Contractor shall supervise and direct the Work and be responsible for construction means and methods. Each Prime Contractor is responsible for coordinating all portions of the Work and for jobsite safety.
- B. Comply with governing regulations and the codes and standards imposed upon the work. These requirements include the obtaining of permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

1.06 PROJECT SCHEDULE

- A. The project schedule, unless amended by Addendum, shall commence at the notice to proceed which is expected to be on or before September 1, 2025, and shall not extend past the installation dates outlined in the deliverable schedule. The schedule must assure that all construction and installations are complete by the date of substantial completion.
- B. The schedule shall be delivered to the Owner by the General Contractor for Contract 1, fifteen (15) business days after the kick-off meeting. The General Contractor shall coordinate with all other Primes to produce a complete and cohesive schedule. The schedule shall include but not be limited to the following:
 1. The installation approach, including:
 - a. The installation sequencing of major elements
 - b. When Owner or Owners Vendor's support are required
 2. Beginning event number.
 3. Description.
 4. Duration estimate.
 5. Early start date by date.
 6. Early finish date by date.
 7. Late start date by date.
 8. Late finish date by date.
 9. Actual start date by date, when applicable.
 10. Actual finish date by date, when applicable.
 11. Total float.
 12. Percent completed.
- C. The General Contractor shall also provide an annotated floor plan that distinguishes separate phases or sequencing indicated in their schedule. The floor plan shall be scaled to match the 100% CDs and submitted in Adobe.pdf format.

1.07 EXAMINATION OF EXISTING SITE CONDITIONS

- A. Execution of the Contract by each Prime Contractor is a representation that each prime Contractor has visited the Project site, become generally familiar with local conditions, and correlated personal observations with the requirements of the Contract Documents.

- B. Each Prime Contractor shall, before starting each portion of the Work, carefully review the relevant Contract Documents as well as information provided by Architect, shall take any necessary field measurements of existing conditions, and shall observe any conditions at the site affecting the Work.

1.08 CONFLICTING REQUIREMENTS

- A. Each Prime Contractor shall promptly inform Owner/Architect in writing, of any discovered errors, omissions, discrepancies, conflicts, or ambiguities in the Contract Documents before proceeding with any work affected by such factors. Failure to do so will be at the risk of the Contractor performing the work.
- B. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, promptly submit a Request for Information (RFI) to the Architect, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at the Contractor's own risk and expense. Delays necessitated by requests for interpretation shall not form the basis for a Change to the contract. The Architect's interpretation and decision shall be final.
- C. Omissions from the drawings and specifications or the mis description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or mis described details of the Work. Each Prime Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.
- D. Industry Standards: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into Contract Documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to the Customer for a decision before proceeding.

1.09 CONTRACT DOCUMENTS MAINTAINED ON PROJECT SITE

- A. Each Prime Contractor shall keep on the Project site a copy of the full-sized drawings and specifications, approved shop drawings, product data and samples, and shall at all times give the Architect access thereto.
- B. As specified in Section 013200 "Construction Progress Documents," store record documents and samples in the field office apart from the Contract Documents used for construction.

1.10 ADVERTISING AND PROMOTIONAL MATERIALS

- A. Each Prime Contractor shall not refer to the project in commercial advertising in such manner as to state or imply that the product or service provided is endorsed or preferred by the Owner or is considered by the Owner to be superior to other products and services. Submit to the Owner for approval any proposed advertising or promotional copy connected in any manner with this Contract.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by the Prime Contractor responsible for the work unless specifically stated otherwise.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.
- C. Drawing Symbols: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Ninth edition.
 - 1. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding
- C. Bolding and Underscoring in the Specifications: Are used strictly to assist reader of specification text in scanning text for key words (for quick recall). No emphasis on or relative importance is intended where bolding and underscoring are used.
- D. Abbreviations: Actual word abbreviations of a self-explanatory nature have been included in texts. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.
- E. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances) or may surpass the quality of that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimum or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- F. Definitions: The following definitions are general for the work and may have more specific meanings in other parts of the Contract Documents:
 - 1. Installer: The entity (person or firm) engaged by the Prime Contractor, its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. Such entities (installers) shall be expert in the operations they are engaged to perform.

2. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the Work, either at the Project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.
3. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate cross-reference, and no limitation is intended except as specifically noted.
4. Furnish: Except as otherwise defined in greater detail, the term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
5. Install: Except as otherwise defined in greater detail, the term "install" describes operations at the Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
6. Provide: Except as otherwise defined in greater detail, the term "provide" means to furnish and install, complete and ready for intended use, as applicable in each instance.
7. Exposed: Describes an item or surface, exterior or interior, which can be seen by a person outside the building or a person inside a usable space within the building during normal activity.
 - a. Mechanical and electrical rooms, air handling rooms, storage rooms and penthouses shall be considered to have exposed surfaces, as shall the mechanical and electrical construction within them.
 - b. The interiors of closets and alcoves shall be considered exposed surfaces and shall be finished to match the finish of the adjoining room or space, unless another finish is otherwise indicated.
 - c. The interiors of cabinets shall be considered exposed, but a finish different from that of the exterior may be permitted or required by other sections.
8. Concealed: Describes an item or space not normally seen, occupied or used by building occupants or staff, such as shafts, hoistways, tunnels, ceiling plenums, attics, and crawls spaces.
9. Finished Space: Space normally used by the public, building occupants or staff for primary functions of the building, but does not include mechanical, electrical and elevator equipment rooms, hoistways, tunnels or mechanical penthouses, unless otherwise indicated.
10. Specialist: An individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specification requires installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.12 REFERENCES

A. Industry Standards

1. General: Except to the extent that more explicit or more stringent requirements are written directly into contract documents, applicable standards of the construction industry have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herein, subject to the order of precedence previously stated.
2. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, conform to the standard in effect on the date of the Invitation for Bids, or, if referred to in any Amendments, at the date of such Amendments.
3. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change but are believed to be accurate as of the date of contract documents:
 - a. AIA - American Institute of Architects (The); www.aia.org; (202) 626-7300.
 - b. AISC - American Institute of Steel Construction; www.aisc.org; (800) 644-2400.
 - c. ANSI - American National Standards Institute; www.ansi.org; (202) 293-8020.
 - d. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org; (800) 527-4723.
 - e. ASTM - American Society for Testing and Materials International; www.astm.org; (610) 832-9585.
 - f. AWI - Architectural Woodwork Institute; www.awinet.org; (800) 449-8811.
 - g. AWS - American Welding Society; www.aws.org; (800) 443-9353.
 - h. CDA - Copper Development Association Inc.; www.copper.org; (800) 232-3282.
 - i. FMG - FM Global (formerly FM - Factory Mutual System); www.fmgglobal.com; (401) 275-3000.
 - j. IEEE - Institute of Electrical and Electronics Engineers; www.ieee.org; (212) 419-7900.
 - k. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org; (301) 657-3110.
 - l. NECA - National Electrical Contractors Association; www.necanet.org; (301) 657-3110.
 - m. NEMA - National Electrical Manufacturers Association; www.nema.org; (703) 841-3200.
 - n. NFPA - National Fire Protection Association; www.nfpa.org; (800) 344-3555.
 - o. NRCA - National Roofing Contractors Association; www.nrca.net; (800) 323-9545.
 - p. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.sspc.org; (877) 281-7772.
 - q. SSPC - The Society for Protective Coatings; www.sspc.org; (877) 281-7772.
 - r. UL - Underwriters Laboratories Inc.; www.ul.com; (800) 704-4050.

- s. WWPA - Western Wood Products Association; www.wwpa.org; (503) 224-3930.

B. Federal Government Agencies

1. Abbreviations and names: The following acronyms or abbreviations referenced in the Contract Documents indicate names of Standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be accurate and as of the date of the Contract Documents:

- a. CFR - Code of Federal Regulations; www.access.gpo.gov/nara/cfr; (202) 512-1530.
- b. EPA - Environmental Protection Agency; www.epa.gov; (800) 438-2474.
- c. FS - Federal Specification: Available from the following:
 - 1) Defense Automated Printing Service:
www.astimage.daps.dla.mil/online; (215) 697-6257.
 - 2) General Services Administration:
www.fss.gsa.gov/pub/fed-specs.cfm; (202) 619-8925.
 - 3) National Institute of Building Sciences: www.nibs.org; (202) 289-7800.
- d. OSHA - Occupational Safety and Health Administration;
www.osha.gov; (800) 321-OSHA.
- e. ARPA – American Rescue Plan Act; Reference UHY for additional info
- f. UHY – UHY Consulting Inc., uhy-us.com: 410-720-5220

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF 010000 – GENERAL REQUIREMENTS

SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection

4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*
- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*
- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
- *Exterior Building Mounted Signs or Monument Signs*
- *Interior and/or Exterior Wayfinding signs of any kind.*
- *Interior Office name plate sign placards.*
- *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:

1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.
- C. Arrange use of site and premises to allow:
 1. Work by Others.
 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.

9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.
 11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.

2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.
 5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:
 - 1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 - 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 - 3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
 - 4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
 - 5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
 - 6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
 - 7. Contractor must comply with all applicable OSHA standards.
 - 8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
 - 9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
 - 10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
 - 11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
 - 12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
 - 13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.

14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.
16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:

- a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
12. Contractor must comply with all applicable OSHA standards.
13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.
 30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 – General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or

necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.

2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.

18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
 36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
 1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
 1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.

2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:

- a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
- 14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
- 15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 16. Contractor must comply with all applicable OSHA standards.
- 17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
- 21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
- 22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
- 23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
- 25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
- 26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
- 27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
- 28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
- 29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.

30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard practices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
 32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
 - 1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 - 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 - 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 - 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 - 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork

- 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
11. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.

25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
 26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades. Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:

1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.
2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 11. Contractor must comply with all applicable OSHA standards.
- 12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
- 17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
- 18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
- 19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
- 20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
- 21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
- 22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
- 23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
- 24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
- 25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
- 26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.

27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 28. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection
 - 4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*

- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*

- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
 - *Exterior Building Mounted Signs or Monument Signs*
 - *Interior and/or Exterior Wayfinding signs of any kind.*
 - *Interior Office name plate sign placards.*
 - *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:
 - 1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as

pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

- C. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 - 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 - 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 - 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 - 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.
 9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous

communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.

11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.

5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:

1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
7. Contractor must comply with all applicable OSHA standards.
8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.
14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.

16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 12. Contractor must comply with all applicable OSHA standards.
- 13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
- 16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
- 18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
- 19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
- 20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
- 21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
- 22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
- 27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
- 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall

be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.

30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.

3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and

cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.

21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trad General Trades, Earthwork & Site Work es.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contact 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
 1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
 1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.
 2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
 3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection

- 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.

15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
16. Contractor must comply with all applicable OSHA standards.
17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.
30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard prac

- tices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.

- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 11. Other Documents List:

- a. Geotechnical Report.
- b. Stormwater Infiltration Exploration Report
- c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.
25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)

26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:
 1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.

2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
11. Contractor must comply with all applicable OSHA standards.

12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.
27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
28. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.

29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

LIST OF STANDARD ABBREVIATIONS

PART 1 – GENERAL

1.1 GENERAL

- A. Where, in the Contract Documents, abbreviations are used, they shall be defined as indicated in the following list.
- B. Should contractor find abbreviations that are not indicated in list, or shall a question arise relative to an abbreviation, he shall notify Architect in writing and a clarifying addendum shall be issued.

1.2 INDEX OF STANDARD ABBREVIATIONS:

- A. The following is a list of abbreviations used in these contract documents and their meaning:

| | | |
|-----|-------------------------|-----------------|
| 1. | Above finished floor | A.F.F. |
| 2. | Acoustic tile | ACT. T. or A.T. |
| 3. | Addition | ADD. |
| 4. | Adjustable | ADJ. |
| 5. | Air condition | A.C. |
| 6. | Alteration or alternate | ALT. |
| 7. | Aluminum | ALUM. |
| 8. | Ampere | A. |
| 9. | Angle | > |
| 10. | Annunciator | ANNC. |
| 11. | Architect | ARCH. |
| 12. | At | @ |
| 13. | Auditorium | AUD. |
| 13. | Avenue | AVE. |
| 14. | Basement | BSMT. |

| | | |
|-----|---------------------|------------------|
| 15. | Bearing | BRG. |
| 16. | Bench mark | B.M. |
| 17. | Bent | BT. |
| 18. | Bituminous | BIT. |
| 19. | Block or blocking | BLK. or BLKG. |
| 20. | Board | BD. |
| 21. | Bottom | BOTT. OR BTM. |
| 22. | Bracket | BRKT. |
| 23. | Building | BLDG. |
| 24. | Built-up roof | B.U.R. |
| 25. | Cabinet | CAB. |
| 26. | Carpet | CARP. or CPT |
| 27. | Cast iron | C.I. |
| 28. | Catch basin | C.B. |
| 29. | Ceiling | CLG. |
| 30. | Cement plaster | C. PLAS. |
| 31. | Center line | CL |
| 32. | Ceramic mosaic tile | C.M.T. |
| 33. | Ceramic tile | C.T. |
| 34. | Chalkboard | CHK. BD. or C.B. |
| 53. | Classroom | CR. |
| 35. | Cleanout | C.O. |
| 36. | Clear | CLR. |
| 37. | Column | COL. |

| | | |
|-----|-------------------------|-----------------------|
| 38. | Concrete | CONC. |
| 39. | Concrete block lintel | C.B.L. |
| 40. | Concrete masonry unit | C.M.U. |
| 41. | Conduit | C. |
| 42. | Conference | CONF. |
| 42. | Connection | CONN. |
| 43. | Construction | CONST. |
| 44. | Construction joint | CONST. JT. |
| 45. | Continuous | CONT. |
| 46. | Contractor | CONTR. |
| 47. | Control joint | C.J. |
| 48. | Convactor | CONV. |
| 49. | Corrugated steel pipe | C.S.P. |
| 50. | Counter | CTR. |
| 51. | Course (brick or block) | CRS. |
| 52. | Cubic foot | CU. FT. |
| 53. | Cubic foot per minute | CFM |
| 54. | Cubic inch | CU. IN. |
| 55. | Cubic yard | CU. YD. |
| 56. | Department | DEPT. |
| 57. | Detail | DET. |
| 58. | Diameter | DIAM., D., DIA., or Ø |
| 59. | Dimension | DIM. |
| 60. | Dispenser or disposal | DISP. |
| 61. | Double | DBL. |

| | | |
|-----|---------------------------|---------------|
| 62. | Dowels | DWLS. |
| 63. | Down | DN. |
| 64. | Downspout | D.S. |
| 65. | Drawing | DWG. or DRWG. |
| 66. | Drinking fountain | D.F. |
| 67. | Each | EA. |
| 68. | Each face | E.F. |
| 69. | Each way | E.W. |
| 69. | Electric | ELEC. |
| 70. | Electrical Contractor | E.C. |
| 71. | Elevation | ELEV. OR EL. |
| 72. | Epoxy | EP. |
| 73. | Equipment | EQUIP. |
| 74. | Equipment supplier | E.S. |
| 75. | Existing | EXIST. or EX. |
| 76. | Expansion joint | EXP. JT. |
| 77. | Exposed | EXP. |
| 78. | Exterior | EXT. |
| 79. | Feet | FT. or (') |
| 80. | Fiber | FIB. |
| 81. | Finish | FIN. |
| 82. | Fire extinguisher | F.E. |
| 82. | Fire extinguisher cabinet | F.E.C. |
| 83. | Fire hose | F.H. |

| | | |
|------|-----------------------------|-------------------|
| 84. | Fire rated | F.R. |
| 85. | Fixture | FIX. |
| 86. | Floor | FL. or FLR. |
| 87. | Floor drain | F.D. |
| 88. | Fluorescent | FLUOR. |
| 89. | Foot | FT. (') |
| 90. | Footing | FTG. |
| 91. | Foundation | FDN. |
| 92. | Fresh air intake (or inlet) | FAI |
| 93. | Gallon | GAL. |
| 94. | Galvanized | GALV. |
| 95. | Gauge | GA. |
| 96. | General Contractor | G.C. |
| 97. | Glass | GL. |
| 98. | Grab bar | G.B. |
| 99. | Grade | GR. or GRD. |
| 100. | Gymnasium | GYM. |
| 100. | Gypsum | GYP. |
| 101. | Gypsum board | GYP. BD. |
| 102. | Hard | HD. |
| 103. | Hardner | HARD. |
| 104. | Heating Contractor | H.C. |
| 105. | Height | HGT. or HT. or H. |
| 106. | Hollow metal | H.M. |
| 107. | Horizontal | HORIZ. |

| | |
|------------------------|-----------------------|
| 108. Horsepower | HP |
| 109. Hour | HR. |
| 110. Inch | IN. or (") |
| 111. Inside diameter | I.D. |
| 112. Inside pipe size | I.P.S. |
| 113. Insulation | INSUL. |
| 114. Interior | INT. |
| 115. Invert | INV. |
| 116. Joint | JT. |
| 117. Kilo volt ampere | K.V.A. |
| 118. Kilowatt | K.W. |
| 119. KIP (1,000 lb.) | K. |
| 120. Laboratory | LAB. |
| 121. Laminated plastic | LAM. PLAS. or L.P. |
| 122. Lavatory | LAV. |
| 123. Left hand | L.H. |
| 124. Lighting panel | L.P. |
| 125. Linear feet | LIN. FT. |
| 126. Lockers | LKRS. |
| 127. Machine | MACH. |
| 128. Magnetic | MAG. |
| 129. Manhole | M.H. |
| 130. Manufacturer | MFG. or MFGR. or MFR. |
| 131. Marker Board | M.B. |

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|-------------------------|---------------|
| 131. Masonry | MAS. |
| 132. Masonry opening | M.O. |
| 133. Material | MAT'L. |
| 134. Maximum | MAX. |
| 135. Mechanical. | MECH. |
| 136. Medicine cabinet | MED. CAB. |
| 137. Metal | MET. or MTL. |
| 138. Minimum | MIN. |
| 139. Mirror | MIR. |
| 139. Miscellaneous | MISC. |
| 140. Moisture resistant | M.R. |
| 141. Not in contract | N.I.C. |
| 142. Not to scale | N.T.S. |
| 143. Number | NO. or # |
| 144. Office | OFF. |
| 144. On center | O.C. |
| 145. Opening | OPG. or OPNG. |
| 146. Operator | OPER. |
| 147. Opposite | OPP. |
| 148. Outside diameter | O.D. |
| 149. Overall | O.A. |
| 150. Overhead | O.H. |
| 151. Paint | PT. |
| 151. Painted | PTD. |
| 152. Pair | PR. |

| | |
|------------------------------|-----------------|
| 153. Panel | PNL. |
| 154. Pavement | PVMT. |
| 155. Percent | % |
| 156. Perimeter | PERIM. |
| 157. Piece | PC. |
| 158. Plaster | PLAS. |
| 159. Plastic drain pipe | P.D.P. |
| 160. Plastic laminate | P.L. or P. LAM. |
| 161. Plastic underdrain pipe | P.U.P. |
| 162. Plate | P _L |
| 163. Plumbing | PLBG. or PLMB. |
| 164. Plumbing Contractor | P.C. |
| 165. Plywood | PLYW. or PLYWD. |
| 166. Poly vinyl chloride | P.V.C. |
| 167. Pound | LB. or # |
| 168. Pounds per cubic foot | #/CU. FT. |
| 169. Pounds per square foot | #/SQ. FT., PSF |
| 170. Pounds per square inch | #/SQ. IN., PSI |
| 171. Power panel | P.P. |
| 172. Pressure treated | P.T. |
| 173. Principal | PRINC. |
| 174. Projection | PROJ. |
| 173. Quarry tile | Q.T. |
| 174. Radius | R. or RAD. |

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|-------------------------------|------------------|
| 175. Rain leader | R.L. or R.W.L. |
| 176. Receptacle | REC. |
| 177. Refrigerator | REFRIG. |
| 178. Reinforce or reinforcing | REINF. |
| 179. Required | REQ'D. |
| 180. Revolution per minute | R.P.M. |
| 181. Right hand | R.H. |
| 182. Roof drain | R.D. |
| 183. Room | RM. |
| 184. Rough opening | R.O. |
| 185. Rubber | RUB. |
| 186. Sanitary | SAN. |
| 187. Schedule | SCHED. |
| 188. Science | SCI. |
| 188. Section | SECT. |
| 189. Sheet | SHT. |
| 190. Sheet vinyl | SHT. V. |
| 191. Shelving | SHLVG. |
| 192. Similar | SIM. |
| 193. Sound transmission glass | S.T.G. |
| 194. Specifications | SPEC. |
| 195. Square | SQ. |
| 196. Square foot | SQ. FT. |
| 197. Square inch | SQ. IN. |
| 198. Stainless steel | S.S. or ST. STL. |

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|------------------------------------|-----------------|
| 199. Standard | STD. |
| 200. Steel | STL. |
| 201. Stone | STN. |
| 202. Street | ST. |
| 203. Structural | STRUC. |
| 204. Structural glazed facing tile | S.G.F.T. |
| 205. Surfaced four sides | S4S |
| 206. Suspend | SUSP. |
| 207. Switch | SW. |
| 208. Tack board | TK. BD. or T.B. |
| 209. Temperature | TEMP. |
| 210. Terrazzo | TERR. |
| 211. Thermostat | THERMO. |
| 212. Thick | THK. |
| 213. Thousand pounds | KIP or K |
| 214. Threshold | THRES. |
| 215. Tile | T. |
| 216. Tile-like coating | T.L.C. |
| 217. Toilet | TLT. |
| 217. Toilet tissue | T.T. |
| 218. Tongue and groove | T & G |
| 219. Towel bar | T.B. |
| 220. Typical | TYP. |
| 221. Unit heater | U.H. |

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|-----------------------------|--------|
| 222. Unit ventilator | U.V. |
| 223. Vent Stack | V.S. |
| 224. Vent through roof | V.T.R. |
| 223. Verify in field | V.I.F. |
| 224. Vertical | VERT. |
| 225. Vinyl asbestos tile | V.A.T. |
| 226. Vinyl composition tile | V.C.T. |
| 227. Vinyl wallcovering | V.W.C. |
| 228. Vitrified clay pipe | V.C.P. |
| 229. Volume | VOL. |
| 230. Wainscot | WAINS. |
| 231. Water closet | W.C. |
| 232. Weatherproof | WP. |
| 233. Welded wire mesh | W.W.M. |
| 234. Wide flange (steel) | W.F. |
| 235. With | W/ |
| 236. Without | W/O |
| 237. Wood | WD. |
| 238. Yard | YD. |
| 239. Yard panel | Y.P. |

END OF SECTION 011700

ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowance.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 CONTINGENCY ALLOWANCE

- A. Use the contingency allowance only as directed by Construction Manager or Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- C. Funds will be drawn from the Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance for Contract 1, General Trades, Earthwork & Site Work: Include the sum of \$(155,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- B. Allowance No. 2: Contingency Allowance for the Contract 2, Electrical work: Include the sum of \$(39,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- C. Allowance No. 3: Contingency Allowance for the Contract 3, Plumbing & Fire Protection: Include the sum of \$(15,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- D. Allowance No. 4: Contingency Allowance for Contract 4, HVAC: Include the sum of \$(17,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.

- E. Allowance No. 5: Temporary Heating Allowance for Contract 4, HVAC: Include the sum of \$(9,000.00).
 - 1. This allowance includes all temporary heating requirements as specified in Section 01 50 00 - Temporary Facilities and Controls.

END OF SECTION 012100

ALTERNATE AND UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates and unit prices

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the unit price.
- C. Notification: Immediately following award of the Contract, the Construction Manager shall notify each prime contractor, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- F. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.4 PROCEDURES FOR UNIT PRICES

- A. Unit prices include all necessary material, labor, equipment, services and incidentals, plus cost for the delivery, installation, insurance, overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurements and payment for unit prices are specified in those Sections. Quantities indicated in the documents in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount. Payment will not be made on the following: Products wasted or disposed of in a manner that is not acceptable; Products determined as unacceptable before or after placement; Products not completely unloaded from the transporting vehicle; Products placed beyond the lines and levels of the required work; Products remaining on hand after the completion of the Work, Loading, hauling, and disposing of rejected products.
- C. Owner/Construction Manager reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit prices: A schedule of unit prices is included in part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Salt Shed Structure and Prefab Roof system.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations, protective bollards, and all other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed as shown on the drawings in its entirety, including but not limited to foundations with associated earthwork and site work, Concrete walls, protective bollards, prefab membrane roof structure, finishes, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed.

B. Alternate No. 1A: Salt Shed Structure, Excluding Prefb Roof System.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations and all

other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed walls, foundations and footings, with associated earthwork and site work, concrete finishes and striping, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed. Omit the procurement and installation of the prefab fabric membrane roof system.

C. Alternate No. 2: Parking Canopy.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy as shown on the contract drawings in its entirety, including but not limited to foundations and footings, concrete piers, prefabricated roof structure, finishes and associated electrical components for lighting systems.

D. Alternate No. 2A: Parking Canopy Footings & Foundations.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy footings and foundations as shown on the contract drawings, including concrete piers, finishes and associated electrical components for lighting systems. Omit the prefabricated steel parking canopy structure.

E. Alternate No. 3: Commercial EV Charging Stations.

Basis of Design: Omit all work associated with the EV Charging stations, as indicated in the drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit).

Alternate: Provide the cost to construct the commercial grade electrical vehicle (EV) charging stations in their entirety, as shown on the contract drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit). All work must be completed in compliance with the EPA grant, provided by the owner, within the timeframe indicated in the grant requirements.

F. Alternate No. 4: Sealed Concrete In Breakroom & Locker Rooms.

Basis of Design: Provide and install tile and laminate flooring as indicated on the contract drawings in the Men's Locker room, Women's Locker rooms and Break room respectively.

Alternate: Provide the deduct cost to omit the tile and/or laminate flooring, prep and underlayment in the locker rooms and breakroom and seal the concrete slab in these rooms with Conc-1 as the final finish (3 coats). Omit extension kits required to set floor drains level with applied flooring systems.

G. Alternate No. 5: Eliminate HVLS Fans (Big Ass Fans).

Basis of Design: Provide and install HVLS fans and all associated utilities and support structure as indicated on the contract drawings.

Alternate: Provide the deduct cost to omit the HVLS fans only. The associated electrical utilities and structural support components are to remain as part of the base bid and shall be constructed with or without the procurement and installation of the fans.

H. Alternate No. 6: Radiant Heaters and Heat Trace.

Basis of Design: Provide and install Unit Heaters as indicated on the contract drawings. Provide all electrical, structural and mechanical components necessary for a complete installation of the unit heaters. (Do not include cost for procurement and installation of radiant heaters, heat trace, electrical, support from bent frames, plumbing, and mechanical components necessary for radiant and heat trace systems).

Alternate: Provide the cost to omit the unit heaters and all associated electrical, plumbing and mechanical components and structural support from main frame and in lieu of unit heaters, procure and install radiant heaters and heat trace as shown on the contract drawings with all electrical, structural and mechanical components necessary for a complete installation.

I. Alternate No 7: Heavy Duty Vehicle Lift.

Basis of design: Contractors to provide and install Vehicle Lift and make all final connections per trade as indicated in contract drawings and specifications. Contractors to provide all accessory elements required for fully functional equipment system including but not limited to concrete footings, power and final connections, compressed air and final connections.

Alternate: Contractors to provide deduct cost to omit procurement and installation of the Heavy Duty Vehicle Lift Equipment. Contractors shall still provide all accessory elements required for a fully functional equipment system including but not limited to concrete footings, power, compressed air. Owner to provide and install the heavy duty vehicle lift equipment and make final connections through co-operative vender.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of potential unforeseen building foundation. The General Contractor shall provide the Contract Unit Price per cubic yard for removal and disposal of any existing concrete footings, stone or masonry foundations unforeseen on the surface.
- B. Unit Price No. 2: Trench Rock. The General Contractor shall provide the Contract Unit Price per cubic yard for rock excavation by ram hammer
- C. Unit Price No. 3: Disposal of Contaminated Soils with high levels of Manganese. Removal of the soils and stock piling is to be as indicated in the contract documents. The General Contractor shall provide the Contract Unit Price per cubic yard for disposing of contaminated soils as identified in section "026000 CONTAMINATED SITE MATERIAL REMOVAL & SOIL CAPPING." Contractor shall coordinate with Colliers Engineering and Design's environmental soils team for threshold requirements on site to determine what/if soils need to be disposed.
- D. Unit Price No. 4: Replacement of Contaminated Soils. It is assumed that the amount of removal and disposal of contaminated soils may differ from the amount of replacement fill needed in areas where new construction occurs. The General Contractor shall provide the Contract Unit Price per cubic yard for replacing contaminated soils with #2 crusher run stone structural fill materials.
- E. Unit Price No. 5: Unsuitable Soils Removal and Replacement with Stone. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of unsuitable soils as determined by the geotechnical engineer on site during excavation, and replaced with #2 crusher run stone structural fill materials
- F. Unit Price No. 6: Installation of Underground Conduit for EV stations. The Electrical Contractor shall provide the Contract Unit Price per linear foot for trenching, installation of (2) 2-1/2" conduits with pull strings for the EV Charging Stations and back filling as required by the contract documents. Reference electrical specifications for allowable conduit type.

END OF SECTION 012300

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed after award of the Contract are considered requests for substitutions. The following are not requests for substitutions:
1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract.
 2. Revisions to the Contract Documents requested by the Owner.
 3. Specified options included in the Contract Documents.
 4. Contractor's compliance with regulations issued by governing authorities.

1.2 SUBSTITUTION REQUEST SUBMITTAL

- A. The Architect will consider requests for substitution received within 30 days after Notice of Award.
1. Submit three (3) copies of each request for substitution. Submit requests according to procedures required for change-order proposals.
 2. Identify the product or method to be replaced in each request. Include related Specification Section and Drawing numbers.
 3. Provide documentation showing compliance with the requirements for substitutions and the following information:
 - a. Coordination information, including a list of changes needed to other Work that will be necessary to accommodate the substitution.
 - b. A comparison of the substitution with the Work specified, including performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the effect on the Construction Manager's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the substitution on Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification that the substitution conforms to the Contract Documents and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may become necessary because of the failure of the substitution to perform adequately.
 4. Architect's Action: If necessary, the Architect will request additional information within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection within 2 weeks of receipt of the request. Acceptance will be in the form of a change order.

- a. Use the product specified if the Architect cannot make a decision within the time allocated.

PART 2 - PRODUCTS

2.1 CONDITIONS

- A. The Architect will receive and consider a request for substitution when one or more of the following conditions are satisfied. Otherwise, the Architect will return the requests without action except to record noncompliance with these requirements.
 1. Extensive revisions to the Contract Documents are not required.
 2. Changes are in keeping with the intent of the Contract Documents.
 3. The specified product cannot be provided within the Contract Time. The Architect will not consider the request if the specified product cannot be provided as a result of failure to pursue the Work promptly.
 4. The request is related to an "or-equal" clause.
 5. The substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deducting compensation to the Architect for redesign and increased cost of other construction.
 6. The specified product cannot receive approval by a governing authority, and the substitution can be approved.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction not complying with the Contract Documents do not constitute an acceptable request for substitution, nor do they constitute approval.

PART 3 - EXECUTION - Not Applicable

END OF SECTION 012500

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Alternates & Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment. Substitutions to this form are allowed only by approval of Architect and Construction Manager.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. Two copies shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 012900

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- J. Requests for Interpretation (RFI) procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: General product requirements.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.
- D. CSI/CSC Form 13.2A - Request for Interpretation; Current Edition.

1.4 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punch list, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 - 1. Newforma Project Cloud: www.newformaprojectcloud.com.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 SITE MOBILIZATION MEETING

- A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and occupancy prior to completion.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Meetings will occur on a weekly basis at a specified time and day to be determined after contract award.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Special consultants.
 - 5. Contractor's superintendent.
 - 6. Major subcontractors.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.

- E. Project Coordinator will prepare complete Construction Schedule incorporating all contractor's notations and values. Schedule will be published and updated when appropriate.

3.6 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect and Construction Manager.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Completion of site clearing.
 - 2. Excavations in progress.
 - 3. Foundations in progress and upon completion.
 - 4. Structural framing in progress and upon completion.
 - 5. Enclosure of building, upon completion.
 - 6. Final completion, minimum of ten (10) photos.
- E. Views:
 - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 - 2. Consult with Architect for instructions on views required.
 - 3. Provide factual presentation.
 - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 - 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Via email or TBD file sharing medium.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 - 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.7 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.
- C. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - 1) Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - 2) Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - 3) Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

D. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
3. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
4. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
5. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
6. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
7. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

E. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

2. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

3.8 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 2. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Discrete and consecutive RFI number, and descriptive subject/title.
 - 3. Issue date, and requested reply date.
 - 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION 013000

COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittal Procedures" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 1 Section "Closeout Procedures" for coordinating contract closeout.
 - 3. Division 1 Section "Administrative Requirements" for project specific requirements.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
 - 4. Each Contractor is required to coordinate with the Other Trades and be on site as walls are being built to lay out all penetrations to walls under construction.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals Procedures."

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.
2. Each Contractor shall prepare and publish this list.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining, and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High-speed operation.
 - 21. Improper lubrication.
 - 22. Unusual wear or other misuse.
 - 23. Contact between incompatible materials.

- 24. Destructive testing.
- 25. Misalignment.
- 26. Excessive weathering.
- 27. Unprotected storage.
- 28. Improper shipping or handling.
- 29. Theft.
- 30. Vandalism.

END OF SECTION 013100

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule. (All Prime Contractors)
 - 2. Daily construction reports. (All Prime Contractors)
 - 3. Field condition reports. (All Prime Contractors)

1.2 SUBMITTALS

- A. Contractor's Construction Schedule: The Contractor will provide printed copies to Construction Manager of initial and updated schedule, large enough to show entire schedule for entire construction period.
- B. Daily Construction Reports: Submit two (2) copies at weekly intervals.

1.3 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate prime contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Gantt-Chart Schedule: Contractors shall submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within ten (10) days of date established for the Notice to Proceed.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. High and low temperatures and general weather conditions.
 4. Accidents.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. Emergency procedures.
 9. Orders and requests of authorities having jurisdiction.
 10. Change Orders received and implemented.
 11. Construction Change Directives received.
 12. Services connected and disconnected.
 13. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, Construction Manager shall generate and update master schedule to reflect actual construction progress and activities. Prime Contractors shall submit weekly updates of their construction schedules to Construction Manager. Distribution: General Construction Contractor will coordinate and update master construction schedule and distribute copies of approved schedule to Architect, Owner, and other Prime Contractors, and other parties identified with a need-to-know schedule responsibility.
1. Schedules will be posted in project meeting rooms and temporary field offices.

END OF SECTION 013200

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CADD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals. Cost shall be \$200 per CADD file. Check payable to Bergmann Associates shall be submitted prior to file transfer. Contractors requesting electronic files will be required to execute a "CADD/Electronic File Transfer Agreement" which will indemnify the Architect – Refer to Section 013500 "Electronic Document Transfer" for information.
- B. Electronic Submittals: With the exception of samples and color charts, or as otherwise approved by the Design Builder, all submittals shall be electronic PDF images which shall be submitted for review and approval via the electronic project management web site or email. For submittals and/or shop drawings larger than 11" x 17", subcontractors are to submit hard copies in accordance with this section.
- C. Process: All submittals will be processed in/out by the Architect.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Review: Allow ten (10) working days for review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Contractor.
 - d. Name and address of subcontractor.
 - e. Name of manufacturer.
 - f. Number and title of appropriate Specification Section.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Remarks.
 - i. Signature of transmitter.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit five (5) copies of any non-electronic submittal to the Architect and Construction Manager. Architect will return two (2) copies, except shop drawings as required below.
 - 2. Shop Drawings: Submit two (2) non-reproducible copies of any non-electronic shop drawing to the Architect and Construction Manager. Architect will return two (2) copies to the contractor.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:

- a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 4. Number of Samples for Verification: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.

- a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Construction Manager/Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. No Exception Taken
 - 2. Revise and Resubmit
 - 3. Furnish as Corrected
 - 4. Rejected
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

| | | |
|-------------------------|-----------------|---------------|
| Submittal # | SUBMITTAL COVER | |
| Review no. | | |
| For Contractor Use Only | | Date Returned |

| |
|---------------------------|
| CITY OF CHESTER |
| PUBLIC WORKS FACILITIES |
| CED Project No: COCD0004A |

| | |
|--|-------------|
| Architect: | Contractor: |
| Colliers Engineering & Design | |
| 1500 JFK Blvd, 2 Penn Center Suite 700 | |
| Philadelphia, PA 19102 | |
| Phone: (215) 735-1524 | |

| | |
|-------------------|--------------|
| Prime Contractor: | Sub./Vendor: |
| Address: | Address: |
| Phone/Fax: | Phone/Fax: |

| | |
|--|---------------------|
| Type of Submittal: (please check) | Date of Submittal: |
| <input type="checkbox"/> Product Data | |
| <input type="checkbox"/> Sample | Resubmitted: |
| <input type="checkbox"/> Color Selection | |
| <input type="checkbox"/> Other | Number of Attached: |
| <input type="checkbox"/> Test Report | |
| <input type="checkbox"/> Certification | |
| <input type="checkbox"/> Shop Drawing | |
| <input type="checkbox"/> Record Document | |

| | | |
|---------------------------------------|----------------|---|
| SUBSTITUTION (see general conditions) | (X) YES () NO | PRIME CONTRACTOR APPROVAL |
| Spec. Section No: | Dwg. No.: | By submission of this submittal, the Undersigned hereby certifies that review, verification of Product required, field dimensions, adjacent construction work and coordination of information has been completed and is in accordance with the requirements of the Work and the Contract Documents. |
| Part/ Paragraph: | Detail Ref: | |
| Product Name: | | |
| Manufacturer: | | |
| | | Name: date: |

| |
|-----------------------------------|
| DEVIATION FROM CONTRACT DOCUMENTS |
|-----------------------------------|

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|----------------------|
| CONTRACTOR COMMENTS: |
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| | |
|---------------------|----------------------|
| ARCHITECT COMMENTS: | ADDITIONAL COMMENTS: |
| | |
| | RECEIVED STAMP |
| | |
| By: | Date: |

ELECTRONIC DOCUMENT TRANSFER

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for the request and transfer of electronic documents from the Architect/Engineer to the Contractor, Subcontractors and the associated Equipment Vendors.
- B. Electronic Documents include, but are not limited to, the following:
 - 1. Floor Plan drawings.
 - 2. Detail drawings.
 - 3. Tables and charts.
- C. Transfer of documents includes, but is limited to, the following:
 - 1. Computer disks and CDs.
 - 2. E-mail attachments.
- D. All drawings, specifications or other documents of any kind prepared by the Architect/Engineer or its sub-consultants, whether in hard copy or any electronic or machine-readable format, including Electronic Documents are, and shall remain, instruments of their services. These Instruments of Services were prepared solely for use in connection with this Project. The Architect/Engineer and its sub consultants retain all common law, statutory and other reserved rights, including the copyright.
- E. The Electronic Documents are provided as a convenience to the Contractor for informational purposes only in connection with the Contractor's performance of its responsibilities and obligations relating to the Project. The Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications, which are, and remain, the Contract Documents for the Project or the paper copies of any other document prepared by the Architect/Engineer or its sub consultants.
- F. If any differences exist between printed Instruments of Services and the Electronic Documents, the information contained in the printed documents shall be presumed to be correct and shall take precedence over the Electronic Documents.
- G. Contractor agrees and understands that field conditions may alter or modify the configuration, products, materials, and installation of the information shown on the electronic documents. Contractor shall be fully responsible to verify all field conditions and if applicable to modify the electronic documents to the actual conditions prior to use of the documents. These documents are provided as a convenience only, and do not change the responsibility of the Contractor as outlined in the Drawings and Specifications.

- H. Architect/Engineer will not be responsible for, or required to assist the Contractor in the plotting or printing of any documents.

1.3 ELECTRONIC DOCUMENT TRANSFER PROCEDURES

- A Coordination: Coordinate transfer requests with performance of construction activities. Transmit each request to the CM and A/E sufficiently in advance of scheduled needs to avoid delay.
1. Processing: To avoid the need to delay installation as a result of the time required to process document transfers:
 - a. Allow 10 working days for the A/E's processing of each request, after receipt of a written request and the required processing fee.
 - b. The A/E will not authorize an extension of time because of the Contractor's failure to transmit requests and fees to the A/E sufficiently in advance of the Work to permit processing.
- B. Electronic Document Transfer Requests: Contractor shall submit a written request for any transfer consisting of the following:
1. Signed, completed copy of the attached "Electronic Document Transfer Agreement".
 2. List of drawing numbers and titles requested.
 3. A check in the proper amount for each drawing to cover the cost of processing the request. Refer to Section 013300 "Submittal Procedures."
 4. Statement of the requested software format. Drawings are only available in AutoCAD 2013 format.
 5. Statement clarifying the document format, i.e. either a CD copy or issue as an e-mail attachment.

PART 2 - PRODUCTS (Not applicable)

PART 3-EXECUTION (Not applicable)

END OF SECTION 013500

(CADD/ELECTRONIC FILE TRANSFER AGREEMENT – ATTACHED)

CADD/ELECTRONIC FILE TRANSFER TO CONTRACTOR

Dear **Contractor Name**:

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to **City of Chester – Public Works Facilities** and subject to the following terms and conditions:

We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instrument of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawing sheets: _____

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us and we make no warranties, either express or implied of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss or profit or any consequential damages as a result of your use or reuse of these electronic files.

XXX
Colliers Engineering & Design

Contractor Name:

signature

SPECIAL INSPECTIONS AND TESTING

PART 1 – GENERAL

- 1.1 The Owner shall employ the services of an independent testing agency/laboratory to perform specified field inspections and laboratory testing, (special inspection) and to make and cure compression test specimens as specified in Section 033000. Laboratory testing and preparation of concrete test specimens shall be paid for by Owner. Refer to respective sections for contractor's and Owner's requirements.
 - A. Contractor shall cooperate with laboratory to facilitate execution of its required services.
 - B. Employment of laboratory shall in no way relieve contractor's obligation to perform work of contract.
- 1.2 SPECIAL INSPECTION
 - A. Owner will employ services of an independent approved testing agency to perform special inspections during construction as required by the Pennsylvania Uniform Construction Code and authorities having jurisdiction. Inspections shall include but not limited to the following:
 - 1. Verification and inspection of steel construction per section 1705.2 and Table 1705.2.1 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 2. Verification and inspection of concrete construction per section 1705.3 and Table 1705.3 of 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 3. Inspection for masonry design per paragraph 1705.4 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 4. Inspection for seismic resistance per section 1705 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
- 1.3 RELATED REQUIREMENTS IN OTHER PARTS OF PROJECT MANUAL
 - A. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: Conditions of the contract.
- 1.4 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
 - A. Certification of products: Respective sections of specifications.
 - B. Test, adjust and balance of equipment: Respective sections of specifications.
 - C. Laboratory tests required and standards for testing: Each specification section listed.

PART 2 - PRODUCTS

2.1 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or expand the requirements of the Contract Documents
 - 2. Approve or accept any portion of work
 - 3. Perform any duties of contractor

2.2 NOTIFICATION OF TEST FAILURE

- A. Testing Laboratory shall notify the Architect/Construction Manager/Owner via telephone and in written form of any tests performed failing to meet specifications. Notification shall take place the same day the test results are obtained.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to work, to manufacturer's operations.
- B. Secure and deliver to laboratory, adequate quantities of representational samples of materials proposed to be used which require testing.
- C. Provide to laboratory, preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested
 - 2. To obtain and handle samples at project site or at source of product to be tested
 - 3. To facilitate inspections and tests
 - 4. For storage and curing of test samples
- F. Notify Construction Manager sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to contractor's negligence.
- G. Make arrangements with laboratory and pay for additional samples and tests required for contractor's convenience.
- H. When directed by Architect, employ and pay for services of a separate, equally qualified independent testing laboratory acceptable to Architect to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.

- I. Refer to respective sections of specifications for additional contractor responsibilities.
- J. Refer to STATEMENT OF SPECIAL INSPECTIONS following this section.

END OF SECTION 014100

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Connect" is to mean the labor and materials necessary to join or attach equipment, materials or systems to perform the function intended.
- G. "Product" includes materials, systems and equipment.
- H. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- I. "Supplier" is any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design.
- J. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- L. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- M. "Experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

- N. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- O. "Utility" is considered to mean any gas, steam, water, sanitary sewer, storm sewer, electrical or other such service.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section 012100 - Allowances
- C. Section 015100 - Temporary Utilities

1.2 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.3 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. All temporary utility usage charged will be incurred by the owner.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Verizon or Comcast Internet Service: Internet Service will be established for use of the General Contractors Field Office for Project Meetings and On-Site Activities, a fee of \$100 per month shall be carried by contractors from project start to finish. Service will need to be maintained from September 1, 2025 until project completion.

2. Printer/Copier: "All-in-on" unit, Toshiba e-Studio 2508a or equal printer server, combining color printing, photocopying, and scanning. Capability of letter, legal, and 11x17 paper. Provide paper, toner, and service for the duration of the project. Maintain service until project completion.
3. Conference Call Speaker: Provide one (1) Harmon/Kardon – Onyk Mini Portable Wireless Speakers for use by the CM / AE for project conference calls and meetings in CM trailer.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain portable facilities and enclosures. Provide at time of project mobilization. Provide a minimum of 4 portable toilets and provide additional as required by project.
- B. Provide bladder and cleaning service for CM office trailer restroom for project duration.
- C. Maintain daily in clean and sanitary condition.
- D. When necessary provide equipment to hold facilities upright and prevent them from tipping over.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around entrance to construction site and field office areas; equip with vehicular and pedestrian gates with locks.
- C. Fencing and gate locations to be coordinated with Owner. Gate entrances along 2nd street (route 13) are strongly discouraged.
- D. Vehicle access gate on Lloyd Street to be post driven, heavy duty swing gate, and operable. Minimum Gate Opening to be 25' Wide by 6' High. Provide chain and combination lock on each gate. Approval by Owner is required before installation of entrance gate.
- E. Quantity of fencing will be approximately 1200 Lineal Feet. Provide provisions for at least 3 swing gates in main site fencing.
- F. Fencing to be maintained through project completion and removed from the project by Contract 1 – General Trades, Earthwork & Site Work.

1.8 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.9 SECURITY

- A. Provide security and facilities to protect own Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Site Security Systems: Maintain existing Site Security systems.
 - 1. Web Based security camera system.
 - 2. Site Security Lighting.
- C. When such a time is deemed appropriate by Construction Manager and Architect, provide secure building enclosure of permanent structure. Either provide temporary door cylinders with keys and cores to Construction Manager or provide adequate other means of lockable doors for egress.

1.10 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner / Construction Manager.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets at all gates. A minimum of one Truck Drive Off Areas will be required along Llyod Street. Placement is at discretion of Construction Manager/Owner. Contractor will be responsible for maintenance of Drive Off Areas throughout the duration of the Project.
- E. ALL CONTRACTS - Temporary Contractor parking can occur along Lloyd street to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Provide snow and ice removal as required to minimize accumulations. Accumulation of 3 or more inches will require plowing and or salting to create passable entrance for vehicles and workers entering the site and building. Removal limits are site work area, building pad areas, entrances and walkways. Should snow begin to incumber work provide for off-site removal of snow. All entrances are to remain accessible and free of ice and snow throughout the work day.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition for the duration of the project.
 - 1. Provide minimum of (1) one container service to be used by all contractors. Size determined by contractor.
 - 2. Provide (1) one 6yd or 8yd container service with lid to be placed next to field office and contractor parking area.
 - 3. Provide additional container services as project necessitates.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Containers provided are to be utilized by all contracts included Construction Manager, Architect, and Owner.

1.12 PROJECT IDENTIFICATION / SIGNAGE

- A. Provide (1) one "Project Identification Sign" of minimum size 48"x96", design and construction indicated after contract award. Erect on site at location established by Architect or Construction Manager.
- B. Provide (4) four "Field Office Identification Signs" of minimum size 48"x96", design to be provided after contract award. Erect on site at location established by Construction Manager
- C. Temporary Signs: Provide and erect other signs as indicated and as required to inform public and individuals seeking entrance to Project. Minimum temporary signage as indicated below to be placed at direction of Construction Manager.
 - 1. Provide temporary, directional signs for construction personnel and visitors at East Ridge Road project entrance.
 - 2. Provide safety signage on site fencing and at every entrance gate both vehicular and pedestrian.
 - a. Provide "Hard Hats & Safety Glasses Required", "No Smoking", Authorized Personnel Only" signage every 100' along temporary fencing.
 - b. Provide 36"x48" Site Entrance Sign at main vehicle gate along North South Access Road. Design to be provided after contract award. Erect sign at main gate by direction of Construction Manager.
 - c. Provide 24"x36" Site Compliance/Security Signs at main vehicle gate, along temporary fencing, and inside building enclosure. Design to be provided after contract award. Erect sign by direction of Construction Manager. Include a minimum of twenty (25) signs to be provided by contract.
 - 3. Provide temporary signage along North South Access Road to direct both trucks, and personnel to field office or parking areas.

4. Provide (30) thirty 28" traffic cones to Construction Manager for use during project and traffic flow.
- D. Maintain and touch up signs so they are legible at all times.
- E. No other signs are allowed without Owner/ Construction Manager permission except those required by law.

1.13 FIELD OFFICES

- A. Field Offices: With approval by Construction Manager, each contractor may provide for its own use the following; Storage and Fabrication sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- B. Construction Manager's Field Office: Construction Manager has provided a field office of sufficient size to accommodate needs of Construction Manager and Architect and to accommodate project meetings specified in other Division 01 sections. Contract 1 shall equip the office as follows.
 1. Office supplies and office equipment as required for duration of the project to meet needs of project team to be billed against Allowance No. 1. See Section 01 21 00 – Allowances for further details.
 2. Telecommunications Equipment as specified in Section 1.04 of this document
- C. Portable Storage Containers: Owner / Construction Manager will have materials arriving that need to be stored on site throughout the duration of the project. Provide and maintain until project completion (2) two 40' storage containers on site. Provide locks on both and furnish keys to construction manager.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

- B. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- C. Pest Control: Engage pest-control services to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 2. Indicate sequencing work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure by prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written installation instructions for temperature, relative humidity, and exposure to water limits.

END OF SECTION 015000

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.

1.3 USE CHARGES

- A. General: Installation and removal of temporary facilities shall be included in the Contract Sum. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Usage Charges: All temporary utility usage charges will be incurred by owner.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installers of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 TEMPORARY ELECTRICITY

- A. Provide Temporary Electrical Service for the building and site during construction operations. Electrical service will be fed from the existing Temp Service Meter Panel. Service will be required to run underground following the direction of Construction Manager. Service may be picked up near CM trailer and be direct bury underground from existing panel board to board

mounted panel and disconnect near existing CM Office Trailer. Provide necessary distribution and safety equipment and panel board. Service should be sized adequately for the loads specified in this Section 015100 - Temporary Utilities and Section 015000 - Temporary Facilities and Controls and based on square footage and size of the project. Coordination may need to be had with RG&E if existing service is not adequately sized for new construction loads.

- B. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each major work area. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- G. Temporary Trailers: Electrical contractor to include hookup of up to (4) four office / storage trailers of other Prime Contractors. Any one (1) disconnect of existing CM office trailer following the completion of the project. Hookup location will be from existing or new panel board located next to CM Office Trailer.

1.7 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. When required by CM provide exterior building lights for safety and security purposes.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

1.8 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- C. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic controls.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide

and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.9 TEMPORARY WATER SERVICE

- A. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- B. Provide running water service to CM office trailer restroom to allow use of restroom inside the office trailer.

1.10 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

- E. Electric Power Service: Provide electric power service and distribution of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service underground unless otherwise indicated.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

END OF SECTION 015100

WATER CONTROLS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compliance with Air and Water Laws and Regulations.
- B. Each contractor and any and all tier level subcontractors agree as follows:
 - 1. The contractor, and his subcontractors warrant that any facility to be utilized in the performance of any non-exempt Contract or Subcontract is not listed on the List of Violating Facilities issued by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20. A condition for the award of the Contract is that prompt notice will be given to the City of any notification received from the Director, Office of Federal Activities, and EPA, indicating that a facility utilized or to be utilized for the Project is under consideration to be listed on the EPA List of Violating Facilities.
 - 2. The contractor warrants that he has not been convicted under Section 113(c) (1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.
 - 3. The contractor promises to comply with all the requirements of Sections 144 of the Clean Air Act, as amended (47 USC 1857C-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC 1318) relating to the inspection, monitoring, entry, reports and information as well as all other requirements specified in Section 144 and Section 308, and all regulations and guidelines issued thereunder.
 - 4. Air Pollution Abatement. All contractors are put on notice that there will be no burning of trees, rubbish or other material by any contractor during this Agreement. Normal burning of fuels in operation of construction equipment is exempt here except as the construction work is affected by the requirements of the Public Health Law (Air Pollution Control) and Chapter IV, Air Pollution Control of the Official Compilation of Codes, Rules and Regulations of the State of New York, Title 10, and local regulations, which are to be met.
 - 5. Soil Erosion and Water Pollution Abatement. Each contractor shall schedule and conduct his operations to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems, existing sanitary systems, impoundments (lakes, reservoirs, etc.) and lands adjacent to or affected by the work. Construction of drainage facilities and performance of other work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon there-after as practicable. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum. All contractors will comply with the Storm Water Pollution Prevent Plan (SWPP) Published in Division 1.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 METHODS

- A. Whenever a contractor's operations, carried out in accordance with the approved schedule, result in a situation where temporary erosion control measures must be taken, these measures are to follow the requirements set forth herein and be approved by the Architect or Owner.
- B. In carrying out erosion control measures, the contractor will be guided by, but not limited to, the following controls:
 - 1. Dewater for all conditions encountered. The site shall be controlled both during and after completion of the work so that erosion will be minimized. Waste or disposal areas shall be located and constructed in a manner that will keep the site free of standing water.
 - 2. All areas shall be cleared as soon as it is practicable during construction operations. Ditches which are filled or partly inoperative shall be cleaned and made operative before the Contractor stops work for any day, and shall be maintained in a condition satisfactory to the Owner or Architect for the duration of the Construction.
 - 3. Water from aggregate washing or other operations containing sediment shall be treated by filtration, settling basin or other means sufficient to reduce the sediment content.
 - 4. Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged into sanitary or storm systems or into natural or man made channels. Wash water or waste from concrete mixing operations shall not be allowed to enter sanitary or storm systems.

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3.2 COSTS

- A. The costs for performing this work shall be the responsibility of the contractor(s) performing work in conjunction with this specification.

END OF SECTION 015630

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Construction Contractor shall provide dumpsters as required for entire work of the project. Dumpsters shall be located on site. Each contractor may legally load acceptable construction debris into the Dumpsters (from this project only). Cost of all dumpsters and disposal fees shall be by the General Construction Contractor. Dumpsters shall remain on the project until project completion, or as directed by Construction Manager, Owner or Architect. See section 015000 - Temporary Facilities for specific requirements.
- B. Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.2 CLEANING NOTICE

- A. Each contractor is responsible for clean-up and disposal of waste materials, debris, and rubbish on a daily basis.
- B. The Owner/Architect/Construction Manager may issue written notification of insufficient cleaning relative to the requirements of this section. Upon issuance of the cleaning notice:
 - 1. All waste and accumulation of trash containing the contractor's debris shall be removed from the Owner's premises within 24 hours of notification.
 - 2. All designated project areas containing the contractor's debris or requiring general housekeeping shall be left fine broom clean (interior) or raked clean (exterior or rough surface). Sweeping compound shall be used for all interior broom cleaning to control dust.
- C. Failure by the contractor to comply with the 24-hour requirement of the notice to the satisfaction of the Owner/Architect/Construction Manager will result in a cleaning program directed by the Construction Manager at the expense of the contractor. Cost of clean-up performed for the Owner will be deducted from the contractor's request for payment.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 CLEANING

- A. Maintain areas under contractor's control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
- C. Daily clean interior areas to provide suitable conditions for work.

- D. Broom clean interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.
- E. Control cleaning operations so that dust and other particles will not adhere to wet or newly-coated surfaces.

3.2 DISPOSAL

- A. On a daily basis, remove waste materials, debris, and rubbish from site or to a dumpster supplied by the General Construction Contractor.

END OF SECTION 015690

FINAL CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Final cleaning of interior and exterior of project will be the responsibility of the General Construction Contractor.

1.2 DESCRIPTION

- A. Execute cleaning prior to inspection for substantial completion of each designated portion of the work and again at final completion before owner occupancy.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 - EXECUTION

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces. Remove all cleaning materials upon completion of cleaning.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a clear shine condition; remove foreign substances.
- E. Vacuum clean, shampoo carpeted and similar soft surfaces.
- F. Clean, damp mop, wax (3 coats), and polish resilient and hard-surface floor as recommended by the manufacturer.
- G. Clean surfaces of equipment; remove excess lubrication.
- H. Clean plumbing fixtures and toilet rooms to a sanitary condition.
- I. Clean light fixtures and lamps.
- J. Clean all interior and exterior windows, both sides.

END OF SECTION 015700

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Requirements in this Section apply to all Prime Contractors. See Division 21- 28 Sections for additional requirements and limitations applicable to cutting and patching mechanical and electrical installations.
- C. Each Prime Contractor is responsible for determining the scope of and performing all cutting, patching, trenching, backfill, bedding and compaction required by its own Work necessary to complete the project. Each Prime Contractor is responsible for infilling, finishing and fire stopping the annular spaces for its own Work.

1.2 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete, Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of Owner's personnel.
 6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 7. Complete startup testing of systems.
 8. Submit test/adjust/balance records.
 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 10. Advise Owner of changeover in heat and other utilities.
 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 12. Complete final cleaning requirements, including touchup painting.
 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or

will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 1. Submit a final Application for Payment.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit **three (3) copies** of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit **one (1) copy** of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties within ten (10) days of Substantial Completion or on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner with at least **seven (7)** days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Sweep concrete floors broom clean in unoccupied spaces.
 - g. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - n. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

MAINTENANCE

PART 1 – GENERAL

1.1 SUMMARY

- A. Contractor shall compile product data and related information appropriate for Owner's operating and maintenance of products furnished under his contract.
 - 1. Prepare operating and maintenance data specified in this section and as referenced in other pertinent sections of specifications.
- B. Instruct Owner's personnel in operating and maintenance of products.
- C. Related Requirements Specified in Other Sections:
 - 1. SUBMITTAL PROCEDURES - Section 013300
 - 2. CLOSEOUT PROCEDURES - Section 017700
 - 3. CONSTRUCTION PROGRESS DOCUMENTATION - Section 013200
 - 4. Respective sections of specifications.

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel
 - 1. Trained and experienced in operating and maintenance of described products
 - 2. Completely familiar with requirements of this section
 - 3. Skilled as a technical writer to extent required to communicate essential data
 - 4. Skilled as a draftsman competent to prepare required drawings

1.3 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8-1/2" X 11"
 - 2. Paper: 20 lb. minimum, white, for typed pages
 - 3. Text: Manufacturer's printed data, or neatly typewritten
 - 4. Drawings:
 - a. Provide reinforced punched binder tab; bind in with text
 - b. Fold larger drawings to size of text pages
 - 5. Provide fly-leaf for each separate product or each piece of operating equipment
 - a. Provide typed description of product and major component parts
 - b. Provide indexed tabs

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

- a. Title of project
- b. Identity of separate structure as applicable
- c. Identity of general subject matter covered in manual

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers
2. Maximum ring size: 1 inch
3. When multiple binders are used, correlate data into related consistent groupings

1.4 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of volume.
3. List, with each product, name, address and telephone number of -
 - a. Subcontractor or installer
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement
4. Identify each product by product name and other identifying symbols as set forth in contract documents.

B. Product Data:

1. Include only those sheets which are pertinent to specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed
 - b. Clearly identify data applicable to installation
 - c. Delete references to inapplicable information

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of system
2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
3. Do not use project record documents as maintenance drawings

D. Written text, as required to supplement product data for particular Installation:

1. Organize in a consistent format under separate headings for different procedures
 2. Provide a logical sequence of instructions for each procedure
- E. Copy of each warranty, bond and service contract issued
1. Provide information sheet for Owner's personnel giving:
 - a. Proper procedures in event of failure
 - b. Instances which might affect validity of warranties or bonds

1.5 MANUAL FOR MATERIALS AND FINISHES

- A. Submit three (3) copies of complete manual in final form.
- B. Content for moisture protection and weather-exposed products
 1. Manufacturer's data giving full information on products
 - a. Applicable standards
 - b. Chemical composition
 - c. Details of installation
 2. Instructions for care, inspection, maintenance and repair.
- C. Additional requirements for maintenance data: Respective sections of specifications.

1.6 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents prior to start of work.
 1. Architect will review draft and return one copy with comments.
- B. Submit one copy of completed data in final form fifteen (15) days prior to final inspection or acceptance.
 1. Copy will be returned after final inspection or acceptance with comments.
- C. Submit specified number of copies of approved data in final form ten (10) days after final inspection or acceptance.

1.7 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in care and maintenance of all products and systems.
- B. Operation and maintenance manual shall constitute basis of instruction:

1. Review content of manual with personnel in full detail to explain all aspects of operation and maintenance.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 018000

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 OVERVIEW

A. Abbreviations

The following are common abbreviations used in this document.

| | | | |
|-----------------|-----------------------------|-------------|-----------------------|
| A/E- | Architect/Engineers | FT- | Functional Test |
| CA- | Commissioning Authority | GC- | General Contractor |
| CM- | Construction Manager | PM- | Project Manager |
| Cx- | Commissioning | TAB- | Testing and Balancing |
| Cx Plan- | Commissioning Plan document | | |

B. Definitions

Acceptance Phase - Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

Architect / Engineer (A/E) - the prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

Commissioning Coordinator - the member of the contractor's firm that is responsible for carrying out the contractor's commissioning tasks for the project. The Commissioning Coordinator is responsible for scheduling commissioning tests, coordination, ensuring start-up documents are completed, checklists are completed, correction of deficiencies and all other tasks defined in the responsibilities section of this document. The Commissioning Coordinator does not use a sampling strategy for checking equipment but rather checks 100% of the equipment included in the commissioning scope.

Commissioning Authority (CA) - an independent authority, not otherwise associated with the A/E design team members or the Contractor. The CA directs and coordinates the commissioning activities. The CA does not take an oversight role. The CA is part of the Owner's team and shall report directly to the Owner.

Commissioning Plan - an overall plan, developed before bidding that provides the structure, schedule and coordination planning for the commissioning process.

Construction Manager – shall refer to the person or company that is hired directly by the owner to coordinate trades, schedule work and other similar construction planning activities. For projects that do not have a construction manager hired directly by the owner, Construction Manager (CM) shall refer to the member of the general contractor that is responsible for coordinating trades and scheduling construction activities, usually the site superintendent.

Contract Documents - the documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, *Cx Plan*, etc.).

Contractor - General Contractor or authorized representative.

Control System - the central building energy management control system.

Data logging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data loggers separate from the control system.

Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed prior to substantial completion.

Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

Design Narrative or Design Documentation - sections of either the Owner's Project Requirements or Basis of Design or additional narrative as needed to comply with reporting requirements.

Direct Indicators - visually observing a system's response to a given condition or event.

Factory Testing - testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.

Functional Performance Tests (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed *after prefunctional checklists and startups are complete*.

General Contractor (GC) - See Contractor.

Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.

Manual Test - using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").

Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

Non-Compliance - see Deficiency.

Non-Conformance - see Deficiency.

Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50F to 75F to verify economizer operation). See also "Simulated Signal."

Owner (PM) – State University Construction Fund.

Phased Commissioning - commissioning that is completed in phases (by building or by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.

Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

Seasonal Performance Tests - FT's that are deferred until the system(s) will experience conditions closer to their design conditions.

Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.

Specifications - the construction specifications of the Contract Documents.

Startup - the initial starting or activating of dynamic equipment, including executing prefunctional checklists.

Test Procedures - the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CA.

Test Requirements - requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

Vendor - supplier of equipment.

Warranty Period - warranty period for entire project, including equipment components.

Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

C. Commissioning Definition

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction of this project is intended to achieve the following specific objectives:

1. Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.

D. Commissioned Systems

The following systems will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

HVAC Systems (and all integral equipment controls)

Variable Speed Drives

Air Handling Units

Makeup Air Units

Exhaust Fans

Unit Heaters

Infrared Heaters

Building Automation System - control sequences

HVAC Fire Mode - verify interface

Emergency Power Mode - verify restart transition

Plumbing Systems

Domestic Water Heaters
Domestic Hot Water Recirculation Pumps

Lighting Controls

Occupancy Sensors
Vacancy Sensors
Networked Low Voltage Lighting Control System

1.2 ROLES AND RESPONSIBILITIES

A. Responsibilities

1. All Parties
 - a. Follow the Commissioning Plan.
 - b. Attend commissioning scoping meeting and additional meetings, as necessary.
2. Contractor

Construction and Acceptance Phase
 - a. Assign a Commissioning Coordinator to oversee, plan and schedule commissioning tasks for all trades.
 - b. Coordinate the commissioning work to ensure that commissioning activities are being included in the schedule.
 - c. Include all costs of commissioning related work in the total contract price.
 - d. Review, become familiar and approve the final Commissioning Plan.
 - e. Ensure that all commissioning responsibilities are executed according to the Contract Documents and schedule.
 - f. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
 - g. Perform functional performance testing and operation of commissioned equipment in the presence of the CA.
 - h. Provide review of the commissioning progress and timely responses to the deficiency reports. Remedy the deficiencies.
 - i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.

- j. Provide all special tools, hardware, software and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CA.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- c. Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
- d. If deficiencies are not corrected in a timely manner such that seasonal or deferred retesting can not occur within the warranty period, the warranty period for the deficient item shall be extended until such time that the deficiency can be retested and approved.

3. Contractor (Mechanical Trade)

- a. Provide startup for all HVAC equipment, except for the building automation control system.
- b. Provide technical representatives to assist in equipment testing.
- c. Review test procedures for equipment installed by factory representatives.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

4. Contractor (Controls Trade)

- a. Assist and cooperate with the CA in the following manner:
 - 1. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system as specified. Assist in the functional testing of all equipment.

1.3 COMMISSIONING PROCESS

A. Brief Overview of Tasks

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. The CA develops specific equipment and system functional performance test procedures. The contractor reviews the procedures.
4. The procedures are executed by the contractor, under the direction of, and documented by the CA.
5. Items of non-compliance in material, installation or setup are corrected at the contractor's expense and the system retested.
6. Deferred testing is conducted, as specified or required.

1.4 COMMISSIONING SCOPING MEETING

A. Overview

A commissioning scoping meeting is planned and conducted by the CA within 90 days of the beginning of construction. In attendance are the CA, PM, assigned members of the CM, GC, A/E (particularly the mechanical and electrical engineers), the mechanical trade, electrical trade, TAB trade, plumbing trade, controls trade, any other installing trades or suppliers of equipment. At the meeting commissioning parties are introduced and the commissioning process reviewed, management and reporting lines determined. The Cx Plan is reviewed, process questions are addressed, lines of reporting and communications determined and the work products list discussed. Also covered are the general list of each party's responsibilities, who is responsible to develop the startup plan for each piece of equipment and the proposed commissioning schedule. The outcome of the meeting is increased understanding by all parties of the commissioning process and their respective responsibilities. The meeting provides the CA additional information needed to finalize the Cx Plan, including the commissioning schedule.

B. Construction Schedule Delivery

Prior to this meeting the CA is given, by the GC, the construction schedule by trade.

C. Meeting Minutes

The CA keeps notes from the meeting and distributes them to each team member.

1.5 MEETINGS

A. Commissioning Meetings

Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the contractor as required. These meetings will be used to review:

1. A log of all commissioning-related issues that require current or future attention using a Commissioning Issues Log.
2. Overall commissioning progress.

1.6 PROGRESS REPORTING AND LOGS

A. Issues Log

An updated commissioning issues log will be distributed to all parties each time changes are made to it. This log will be distributed showing open items only. Any party can receive a complete issues log showing both open and closed items at any time by requesting the complete log from the CA in writing.

1.7 DEVELOPMENT OF FUNCTIONAL TEST AND VERIFICATION PROCEDURES

A. Overview

Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is performed by the contractor.

B. Scope of Testing

The specifications provide a specific functional testing scope for each piece of commissioned equipment. If specific testing requirements were not included in the bid documents and original specifications, they will be developed for this project for each piece of commissioned equipment by the CA after the submittal phase of the project.

1.8 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

A. Overview and Process

The CA schedules functional tests through the contractor. The CA oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The contractor executes the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is

completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

B. Acceptance Criteria

In order for systems to be considered acceptable the following conditions must be met:

1. All sequences of operation must work per contract documents
2. Water flows are +/- 10% of the reported value
3. Water temperatures are +/- 10% of the reported value
4. Air flows are +/- 10% of the reported value
5. Air temperatures are +/- 10% of the reported value

C. Deficiencies and Retesting

1. The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported on the issues log. The contractor corrects deficiencies and notifies the CA when they are corrected. The CA schedules retesting through the contractor. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA and the installing technician. The CA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the contractor and A/E. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the owner. The owner gives final approval on each test.
2. The cost for the Contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the CA and PM will direct the retesting of the equipment once at no "charge" to the GC for their time. However, the CA's and PM's time for a second (and subsequent) retest will be charged to the GC. The time for the CA and PM to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back-charged to the GC.
3. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the PM. In such case, the Contractor shall provide the Owner with the following:
 - a. Within one week of notification from the PM, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the PM within two weeks of the original notice.

- b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
- c. The PM will determine whether a replacement of all identical units or a repair is acceptable.
- d. Two examples of the proposed solution will be installed by the Contractor and will test the installations for up to one week, upon which the PM will decide whether to accept the solution.
- e. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Facility Staff Participation

The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The owner will coordinate their attendance directly with the CA if desired.

E. Sampling

Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. If any type of equipment is functionally tested using a sampling strategy, all pieces of equipment that are not physically tested shall have their operation documented using trend logging and the logs reviewed for anomalies. The trend logs shall be submitted to the commissioning authority after review. The commissioning authority shall verify tests using the same sampling quantities as specified in section 1.19 of this specification.

F. Deferred Testing

- 1. Unforeseen Deferred Tests: Testing shall occur when environmental and building conditions allow for operation of any commissioned systems and allow observation of all specified functions. If any part of the sequence of operation cannot be observed for any reason (weather, partially occupied building, etc...) then the testing shall be deferred to a season in which the equipment can be operated through all sequences of operation. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. The contractor is responsible for determining the need for deferred testing based on the construction schedule, ability to put false loading on the system, and phasing shown in the contract documents. Any required deferred testing shall be provided to the owner at no additional cost.

2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as specified in this contract. The CA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the contractor, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builds due to the testing will be made.

1.9 WARRANTY PERIOD

A. Requirements

During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. The CA coordinates this activity. Tests are executed and deficiencies corrected by the contractor, witnessed by facilities staff and the CA. Any final adjustments to the O&M manuals and as-builds due to the testing are made. Refer to specification for seasonal testing details for this project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 019113

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. The provisions of the Division 01 specifications apply to the entire work of the Contract.
- B. This Section describes the following in general:
 - 1. Definitions and terms.
 - 2. Background information.
 - 3. Summary of the Work.
 - 4. Supervision and construction procedures.
 - 5. Project Schedule.
 - 6. Examination of existing site conditions
 - 7. Conflicting requirements.
 - 8. Contract documents maintained on project site.
 - 9. Advertising and promotional materials.
 - 10. Specification and Drawing conventions.
 - 11. References.
- C. Related Requirements include, but are not limited to the following:
 - 1. Section 011000 "Summary" for project information, general scope of work, site restrictions, work restrictions, and coordination with occupants.
 - 2. Section 013100 "Coordination" for key staff, meetings, administrative submittals, PMIS, and Requests for Information (RFIs).
 - 3. Section 013200 "Construction Progress Documentation" for construction progress schedule, progress reporting, field reports, and requests for extension of time.
 - 4. Section 013300 "Submittal Procedures" for use of PMIS.

1.02 DEFINITIONS AND TERMS

- A. The term "Owner" as used in the Contract Documents shall mean the City of Chester or the City of Chester's Representative
- B. The term "Architect" as used in the Contract Documents shall mean the Architect of Record, Colliers Engineering and Design, Inc., or the Architect's Representative.
- C. The term "Contract Documents" includes, collectively, the Project Manual, the contract drawings and the addenda and modifications thereto, if any. These documents are not to be used separately for bid or construction as they represent the entirety of the project. Each Prime Contractor is responsible for insuring that the documents are used together.
- D. The term "Work" includes, but is not limited to, materials, labor, and manufacturer and fabrication of components.
- E. The term "Specifications" means the portion of the Contract Documents that consist of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
- F. The term "Drawings" means the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, that show the design, location and dimensions of the Work, and generally includes plans, elevations, sections, details, schedules and diagrams.

- G. “Informational Documents” include documents that are included for convenience with the Contract Documents but are not Contract Documents. They are indicated “For Information Only” and may include drawings, hazardous material reports, photographs, historic documents, and the Preservation Policy. Each Prime Contractor is expected to independently verify all information shown in informational drawings and to provide each Prime Contractor’s own surveys, testing, and verification of conditions shown therein.
- H. “Notice of Award” is the Owner’s written confirmation of an award of a contract to the successful bidder, stating the award, and award date.
- I. “Notice to Proceed” is the formal authorization to Each Prime Contractor to begin the Work. Unless specifically authorized in writing, any steps taken in connection with the performance of, or the preparation to perform, the Contract, prior to issuance of the Notice to Proceed, will be the responsibility of and at the risk of the Prime Contractor performing the work, and without any cost whatsoever to the Architect.
- J. “Substantial Completion” is defined in Section 017700 “Closeout Procedures.”
- K. “Beneficial Occupancy” is defined in Section 017700 “Closeout Procedures.”
- L. “Conditions for Final Acceptance” are specified in Section 017700 “Closeout Procedures.”
- M. The “Project Management Information System” (PMIS) is defined in Section 013100 “Coordination.”
- N. The terms “Must” and “Shall” are used interchangeably and denote the imperative. “May” denotes the permissive. However, the words “no person may...” mean that no person is required, authorized, or permitted to do the act described.
- O. Unless noted otherwise, all number of days indicated are in calendar days.

1.03 BACKGROUND INFORMATION

- A. Higher standard of care: Compared to a typical commercial project, a public project requires on the part of each Prime Contractor a higher level of attentiveness and detail, a greater amount of look-ahead and pre-planning, and a rigorous regard for security restrictions. Design guidelines emphasize building longevity, security and safety. Each Prime Contractor shall accord with these precepts by anticipating greater attention to detail and tighter coordination with stakeholders.
- B. Coordination with Other Work: Each Prime Contractor should anticipate and plan for concurrent projects with overlapping schedules and work areas. Each Prime Contractor shall fully inform himself as to conditions relating to construction and labor under work by others that may affect the Project. Each Prime Contractor shall cooperate in every way with other parties doing work and provide, to the extent their work is affected by his work, all information necessary for the proper execution of their work, without delay.

1.04 SUMMARY OF THE WORK

- A. Project/Work Identification
 - 1. General: Project name is NEW PUBLIC WORKS FACILITY. The City Bid No. is 2025-010.
 - 2. Summary by Reference: Work of the Contract can be summarized by references to the SCHEDULE, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, Official Procedure for Making Changes in Contracts, Specification Sections, Drawings, Amendments and Modifications to the contract documents issued

subsequent to the initial printing of this Project Manual and including, but not necessarily limited to, printed material referenced by any of these.

3. General scope of work and other project information are described in Section 011000 "Summary."

1.05 SUPERVISION AND CONSTRUCTION PROCEDURES

- A. Each Prime Contractor shall supervise and direct the Work and be responsible for construction means and methods. Each Prime Contractor is responsible for coordinating all portions of the Work and for jobsite safety.
- B. Comply with governing regulations and the codes and standards imposed upon the work. These requirements include the obtaining of permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

1.06 PROJECT SCHEDULE

- A. The project schedule, unless amended by Addendum, shall commence at the notice to proceed which is expected to be on or before September 1, 2025, and shall not extend past the installation dates outlined in the deliverable schedule. The schedule must assure that all construction and installations are complete by the date of substantial completion.
- B. The schedule shall be delivered to the Owner by the General Contractor for Contract 1, fifteen (15) business days after the kick-off meeting. The General Contractor shall coordinate with all other Primes to produce a complete and cohesive schedule. The schedule shall include but not be limited to the following:
 1. The installation approach, including:
 - a. The installation sequencing of major elements
 - b. When Owner or Owners Vendor's support are required
 2. Beginning event number.
 3. Description.
 4. Duration estimate.
 5. Early start date by date.
 6. Early finish date by date.
 7. Late start date by date.
 8. Late finish date by date.
 9. Actual start date by date, when applicable.
 10. Actual finish date by date, when applicable.
 11. Total float.
 12. Percent completed.
- C. The General Contractor shall also provide an annotated floor plan that distinguishes separate phases or sequencing indicated in their schedule. The floor plan shall be scaled to match the 100% CDs and submitted in Adobe.pdf format.

1.07 EXAMINATION OF EXISTING SITE CONDITIONS

- A. Execution of the Contract by each Prime Contractor is a representation that each prime Contractor has visited the Project site, become generally familiar with local conditions, and correlated personal observations with the requirements of the Contract Documents.

- B. Each Prime Contractor shall, before starting each portion of the Work, carefully review the relevant Contract Documents as well as information provided by Architect, shall take any necessary field measurements of existing conditions, and shall observe any conditions at the site affecting the Work.

1.08 CONFLICTING REQUIREMENTS

- A. Each Prime Contractor shall promptly inform Owner/Architect in writing, of any discovered errors, omissions, discrepancies, conflicts, or ambiguities in the Contract Documents before proceeding with any work affected by such factors. Failure to do so will be at the risk of the Contractor performing the work.
- B. Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, promptly submit a Request for Information (RFI) to the Architect, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at the Contractor's own risk and expense. Delays necessitated by requests for interpretation shall not form the basis for a Change to the contract. The Architect's interpretation and decision shall be final.
- C. Omissions from the drawings and specifications or the mis description of details of work that are manifestly necessary to carry out the intent of the drawings and specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted or mis described details of the Work. Each Prime Contractor shall perform such details as if fully and correctly set forth and described in the drawings and specifications.
- D. Industry Standards: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed language written into Contract Documents clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to the Customer for a decision before proceeding.

1.09 CONTRACT DOCUMENTS MAINTAINED ON PROJECT SITE

- A. Each Prime Contractor shall keep on the Project site a copy of the full-sized drawings and specifications, approved shop drawings, product data and samples, and shall at all times give the Architect access thereto.
- B. As specified in Section 013200 "Construction Progress Documents," store record documents and samples in the field office apart from the Contract Documents used for construction.

1.10 ADVERTISING AND PROMOTIONAL MATERIALS

- A. Each Prime Contractor shall not refer to the project in commercial advertising in such manner as to state or imply that the product or service provided is endorsed or preferred by the Owner or is considered by the Owner to be superior to other products and services. Submit to the Owner for approval any proposed advertising or promotional copy connected in any manner with this Contract.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by the Prime Contractor responsible for the work unless specifically stated otherwise.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.
- C. Drawing Symbols: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Ninth edition.
 - 1. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding
- C. Bolding and Underscoring in the Specifications: Are used strictly to assist reader of specification text in scanning text for key words (for quick recall). No emphasis on or relative importance is intended where bolding and underscoring are used.
- D. Abbreviations: Actual word abbreviations of a self-explanatory nature have been included in texts. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.
- E. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances) or may surpass the quality of that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimum or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- F. Definitions: The following definitions are general for the work and may have more specific meanings in other parts of the Contract Documents:
 - 1. Installer: The entity (person or firm) engaged by the Prime Contractor, its subcontractor or sub-subcontractor for performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. Such entities (installers) shall be expert in the operations they are engaged to perform.

2. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the Work, either at the Project site or elsewhere, and to report, and (if required) interpret results of those inspections or tests.
3. Indicated: The term "indicated" is a cross-reference to graphic representations, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate cross-reference, and no limitation is intended except as specifically noted.
4. Furnish: Except as otherwise defined in greater detail, the term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
5. Install: Except as otherwise defined in greater detail, the term "install" describes operations at the Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
6. Provide: Except as otherwise defined in greater detail, the term "provide" means to furnish and install, complete and ready for intended use, as applicable in each instance.
7. Exposed: Describes an item or surface, exterior or interior, which can be seen by a person outside the building or a person inside a usable space within the building during normal activity.
 - a. Mechanical and electrical rooms, air handling rooms, storage rooms and penthouses shall be considered to have exposed surfaces, as shall the mechanical and electrical construction within them.
 - b. The interiors of closets and alcoves shall be considered exposed surfaces and shall be finished to match the finish of the adjoining room or space, unless another finish is otherwise indicated.
 - c. The interiors of cabinets shall be considered exposed, but a finish different from that of the exterior may be permitted or required by other sections.
8. Concealed: Describes an item or space not normally seen, occupied or used by building occupants or staff, such as shafts, hoistways, tunnels, ceiling plenums, attics, and crawls spaces.
9. Finished Space: Space normally used by the public, building occupants or staff for primary functions of the building, but does not include mechanical, electrical and elevator equipment rooms, hoistways, tunnels or mechanical penthouses, unless otherwise indicated.
10. Specialist: An individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specification requires installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.12 REFERENCES

A. Industry Standards

1. General: Except to the extent that more explicit or more stringent requirements are written directly into contract documents, applicable standards of the construction industry have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the contract documents, or as if published copies were bound herein, subject to the order of precedence previously stated.
2. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, conform to the standard in effect on the date of the Invitation for Bids, or, if referred to in any Amendments, at the date of such Amendments.
3. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change but are believed to be accurate as of the date of contract documents:
 - a. AIA - American Institute of Architects (The); www.aia.org; (202) 626-7300.
 - b. AISC - American Institute of Steel Construction; www.aisc.org; (800) 644-2400.
 - c. ANSI - American National Standards Institute; www.ansi.org; (202) 293-8020.
 - d. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org; (800) 527-4723.
 - e. ASTM - American Society for Testing and Materials International; www.astm.org; (610) 832-9585.
 - f. AWI - Architectural Woodwork Institute; www.awinet.org; (800) 449-8811.
 - g. AWS - American Welding Society; www.aws.org; (800) 443-9353.
 - h. CDA - Copper Development Association Inc.; www.copper.org; (800) 232-3282.
 - i. FMG - FM Global (formerly FM - Factory Mutual System); www.fmgglobal.com; (401) 275-3000.
 - j. IEEE - Institute of Electrical and Electronics Engineers; www.ieee.org; (212) 419-7900.
 - k. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org; (301) 657-3110.
 - l. NECA - National Electrical Contractors Association; www.necanet.org; (301) 657-3110.
 - m. NEMA - National Electrical Manufacturers Association; www.nema.org; (703) 841-3200.
 - n. NFPA - National Fire Protection Association; www.nfpa.org; (800) 344-3555.
 - o. NRCA - National Roofing Contractors Association; www.nrca.net; (800) 323-9545.
 - p. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.sspc.org; (877) 281-7772.
 - q. SSPC - The Society for Protective Coatings; www.sspc.org; (877) 281-7772.
 - r. UL - Underwriters Laboratories Inc.; www.ul.com; (800) 704-4050.

- s. WWPA - Western Wood Products Association; www.wwpa.org; (503) 224-3930.

B. Federal Government Agencies

1. Abbreviations and names: The following acronyms or abbreviations referenced in the Contract Documents indicate names of Standard- or Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be accurate and as of the date of the Contract Documents:

- a. CFR - Code of Federal Regulations; www.access.gpo.gov/nara/cfr; (202) 512-1530.
- b. EPA - Environmental Protection Agency; www.epa.gov; (800) 438-2474.
- c. FS - Federal Specification: Available from the following:
 - 1) Defense Automated Printing Service:
www.astimage.daps.dla.mil/online; (215) 697-6257.
 - 2) General Services Administration:
www.fss.gsa.gov/pub/fed-specs.cfm; (202) 619-8925.
 - 3) National Institute of Building Sciences: www.nibs.org; (202) 289-7800.
- d. OSHA - Occupational Safety and Health Administration;
www.osha.gov; (800) 321-OSHA.
- e. ARPA – American Rescue Plan Act; Reference UHY for additional info
- f. UHY – UHY Consulting Inc., uhy-us.com: 410-720-5220

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF 010000 – GENERAL REQUIREMENTS

SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection

4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*
- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*
- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
- *Exterior Building Mounted Signs or Monument Signs*
- *Interior and/or Exterior Wayfinding signs of any kind.*
- *Interior Office name plate sign placards.*
- *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:

1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.
- C. Arrange use of site and premises to allow:
 1. Work by Others.
 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.

9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.
 11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.

2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.
 5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:
 - 1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 - 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 - 3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
 - 4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
 - 5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
 - 6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
 - 7. Contractor must comply with all applicable OSHA standards.
 - 8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
 - 9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
 - 10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
 - 11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
 - 12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
 - 13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.

14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.
16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:

- a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
12. Contractor must comply with all applicable OSHA standards.
13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.
 30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 – General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or

necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.

2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.

18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
 36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
 1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
 1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.

2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:

- a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
- 14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
- 15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 16. Contractor must comply with all applicable OSHA standards.
- 17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
- 21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
- 22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
- 23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
- 25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
- 26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
- 27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
- 28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
- 29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.

30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard practices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
 32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
 - 1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 - 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 - 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 - 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 - 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork

- 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
11. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.

25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
 26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades. Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:

1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.
2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 11. Contractor must comply with all applicable OSHA standards.
- 12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
- 17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
- 18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
- 19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
- 20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
- 21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
- 22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
- 23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
- 24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
- 25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
- 26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.

27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 28. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection
 - 4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*

- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*

- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
 - *Exterior Building Mounted Signs or Monument Signs*
 - *Interior and/or Exterior Wayfinding signs of any kind.*
 - *Interior Office name plate sign placards.*
 - *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:
 - 1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as

pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

- C. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 - 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 - 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 - 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 - 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.
 9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous

communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.

11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.

5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:

1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
7. Contractor must comply with all applicable OSHA standards.
8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.
14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.

16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 12. Contractor must comply with all applicable OSHA standards.
- 13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
- 16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
- 18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
- 19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
- 20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
- 21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
- 22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
- 27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
- 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall

be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.

30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.

3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and

cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.

21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trad General Trades, Earthwork & Site Work es.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contact 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.
 2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
 3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection

- 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.

15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
16. Contractor must comply with all applicable OSHA standards.
17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.
30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard prac

- tices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.

- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 11. Other Documents List:

- a. Geotechnical Report.
- b. Stormwater Infiltration Exploration Report
- c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.
25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)

26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:
 1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.

2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
11. Contractor must comply with all applicable OSHA standards.

12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.
27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
28. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.

29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

LIST OF STANDARD ABBREVIATIONS

PART 1 – GENERAL

1.1 GENERAL

- A. Where, in the Contract Documents, abbreviations are used, they shall be defined as indicated in the following list.
- B. Should contractor find abbreviations that are not indicated in list, or shall a question arise relative to an abbreviation, he shall notify Architect in writing and a clarifying addendum shall be issued.

1.2 INDEX OF STANDARD ABBREVIATIONS:

- A. The following is a list of abbreviations used in these contract documents and their meaning:

| | | |
|-----|-------------------------|-----------------|
| 1. | Above finished floor | A.F.F. |
| 2. | Acoustic tile | ACT. T. or A.T. |
| 3. | Addition | ADD. |
| 4. | Adjustable | ADJ. |
| 5. | Air condition | A.C. |
| 6. | Alteration or alternate | ALT. |
| 7. | Aluminum | ALUM. |
| 8. | Ampere | A. |
| 9. | Angle | > |
| 10. | Annunciator | ANNC. |
| 11. | Architect | ARCH. |
| 12. | At | @ |
| 13. | Auditorium | AUD. |
| 13. | Avenue | AVE. |
| 14. | Basement | BSMT. |

| | | |
|-----|---------------------|------------------|
| 15. | Bearing | BRG. |
| 16. | Bench mark | B.M. |
| 17. | Bent | BT. |
| 18. | Bituminous | BIT. |
| 19. | Block or blocking | BLK. or BLKG. |
| 20. | Board | BD. |
| 21. | Bottom | BOTT. OR BTM. |
| 22. | Bracket | BRKT. |
| 23. | Building | BLDG. |
| 24. | Built-up roof | B.U.R. |
| 25. | Cabinet | CAB. |
| 26. | Carpet | CARP. or CPT |
| 27. | Cast iron | C.I. |
| 28. | Catch basin | C.B. |
| 29. | Ceiling | CLG. |
| 30. | Cement plaster | C. PLAS. |
| 31. | Center line | CL |
| 32. | Ceramic mosaic tile | C.M.T. |
| 33. | Ceramic tile | C.T. |
| 34. | Chalkboard | CHK. BD. or C.B. |
| 53. | Classroom | CR. |
| 35. | Cleanout | C.O. |
| 36. | Clear | CLR. |
| 37. | Column | COL. |

| | | |
|-----|-------------------------|-----------------------|
| 38. | Concrete | CONC. |
| 39. | Concrete block lintel | C.B.L. |
| 40. | Concrete masonry unit | C.M.U. |
| 41. | Conduit | C. |
| 42. | Conference | CONF. |
| 42. | Connection | CONN. |
| 43. | Construction | CONST. |
| 44. | Construction joint | CONST. JT. |
| 45. | Continuous | CONT. |
| 46. | Contractor | CONTR. |
| 47. | Control joint | C.J. |
| 48. | Convactor | CONV. |
| 49. | Corrugated steel pipe | C.S.P. |
| 50. | Counter | CTR. |
| 51. | Course (brick or block) | CRS. |
| 52. | Cubic foot | CU. FT. |
| 53. | Cubic foot per minute | CFM |
| 54. | Cubic inch | CU. IN. |
| 55. | Cubic yard | CU. YD. |
| 56. | Department | DEPT. |
| 57. | Detail | DET. |
| 58. | Diameter | DIAM., D., DIA., or Ø |
| 59. | Dimension | DIM. |
| 60. | Dispenser or disposal | DISP. |
| 61. | Double | DBL. |

| | | |
|-----|---------------------------|---------------|
| 62. | Dowels | DWLS. |
| 63. | Down | DN. |
| 64. | Downspout | D.S. |
| 65. | Drawing | DWG. or DRWG. |
| 66. | Drinking fountain | D.F. |
| 67. | Each | EA. |
| 68. | Each face | E.F. |
| 69. | Each way | E.W. |
| 69. | Electric | ELEC. |
| 70. | Electrical Contractor | E.C. |
| 71. | Elevation | ELEV. OR EL. |
| 72. | Epoxy | EP. |
| 73. | Equipment | EQUIP. |
| 74. | Equipment supplier | E.S. |
| 75. | Existing | EXIST. or EX. |
| 76. | Expansion joint | EXP. JT. |
| 77. | Exposed | EXP. |
| 78. | Exterior | EXT. |
| 79. | Feet | FT. or (') |
| 80. | Fiber | FIB. |
| 81. | Finish | FIN. |
| 82. | Fire extinguisher | F.E. |
| 82. | Fire extinguisher cabinet | F.E.C. |
| 83. | Fire hose | F.H. |

| | | |
|------|-----------------------------|-------------------|
| 84. | Fire rated | F.R. |
| 85. | Fixture | FIX. |
| 86. | Floor | FL. or FLR. |
| 87. | Floor drain | F.D. |
| 88. | Fluorescent | FLUOR. |
| 89. | Foot | FT. (') |
| 90. | Footing | FTG. |
| 91. | Foundation | FDN. |
| 92. | Fresh air intake (or inlet) | FAI |
| 93. | Gallon | GAL. |
| 94. | Galvanized | GALV. |
| 95. | Gauge | GA. |
| 96. | General Contractor | G.C. |
| 97. | Glass | GL. |
| 98. | Grab bar | G.B. |
| 99. | Grade | GR. or GRD. |
| 100. | Gymnasium | GYM. |
| 100. | Gypsum | GYP. |
| 101. | Gypsum board | GYP. BD. |
| 102. | Hard | HD. |
| 103. | Hardner | HARD. |
| 104. | Heating Contractor | H.C. |
| 105. | Height | HGT. or HT. or H. |
| 106. | Hollow metal | H.M. |
| 107. | Horizontal | HORIZ. |

| | |
|------------------------|-----------------------|
| 108. Horsepower | HP |
| 109. Hour | HR. |
| 110. Inch | IN. or (") |
| 111. Inside diameter | I.D. |
| 112. Inside pipe size | I.P.S. |
| 113. Insulation | INSUL. |
| 114. Interior | INT. |
| 115. Invert | INV. |
| 116. Joint | JT. |
| 117. Kilo volt ampere | K.V.A. |
| 118. Kilowatt | K.W. |
| 119. KIP (1,000 lb.) | K. |
| 120. Laboratory | LAB. |
| 121. Laminated plastic | LAM. PLAS. or L.P. |
| 122. Lavatory | LAV. |
| 123. Left hand | L.H. |
| 124. Lighting panel | L.P. |
| 125. Linear feet | LIN. FT. |
| 126. Lockers | LKRS. |
| 127. Machine | MACH. |
| 128. Magnetic | MAG. |
| 129. Manhole | M.H. |
| 130. Manufacturer | MFG. or MFGR. or MFR. |
| 131. Marker Board | M.B. |

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|-------------------------|---------------|
| 131. Masonry | MAS. |
| 132. Masonry opening | M.O. |
| 133. Material | MAT'L. |
| 134. Maximum | MAX. |
| 135. Mechanical. | MECH. |
| 136. Medicine cabinet | MED. CAB. |
| 137. Metal | MET. or MTL. |
| 138. Minimum | MIN. |
| 139. Mirror | MIR. |
| 139. Miscellaneous | MISC. |
| 140. Moisture resistant | M.R. |
| 141. Not in contract | N.I.C. |
| 142. Not to scale | N.T.S. |
| 143. Number | NO. or # |
| 144. Office | OFF. |
| 144. On center | O.C. |
| 145. Opening | OPG. or OPNG. |
| 146. Operator | OPER. |
| 147. Opposite | OPP. |
| 148. Outside diameter | O.D. |
| 149. Overall | O.A. |
| 150. Overhead | O.H. |
| 151. Paint | PT. |
| 151. Painted | PTD. |
| 152. Pair | PR. |

| | |
|------------------------------|-----------------|
| 153. Panel | PNL. |
| 154. Pavement | PVMT. |
| 155. Percent | % |
| 156. Perimeter | PERIM. |
| 157. Piece | PC. |
| 158. Plaster | PLAS. |
| 159. Plastic drain pipe | P.D.P. |
| 160. Plastic laminate | P.L. or P. LAM. |
| 161. Plastic underdrain pipe | P.U.P. |
| 162. Plate | P _L |
| 163. Plumbing | PLBG. or PLMB. |
| 164. Plumbing Contractor | P.C. |
| 165. Plywood | PLYW. or PLYWD. |
| 166. Poly vinyl chloride | P.V.C. |
| 167. Pound | LB. or # |
| 168. Pounds per cubic foot | #/CU. FT. |
| 169. Pounds per square foot | #/SQ. FT., PSF |
| 170. Pounds per square inch | #/SQ. IN., PSI |
| 171. Power panel | P.P. |
| 172. Pressure treated | P.T. |
| 173. Principal | PRINC. |
| 174. Projection | PROJ. |
| 173. Quarry tile | Q.T. |
| 174. Radius | R. or RAD. |

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|-------------------------------|------------------|
| 175. Rain leader | R.L. or R.W.L. |
| 176. Receptacle | REC. |
| 177. Refrigerator | REFRIG. |
| 178. Reinforce or reinforcing | REINF. |
| 179. Required | REQ'D. |
| 180. Revolution per minute | R.P.M. |
| 181. Right hand | R.H. |
| 182. Roof drain | R.D. |
| 183. Room | RM. |
| 184. Rough opening | R.O. |
| 185. Rubber | RUB. |
| 186. Sanitary | SAN. |
| 187. Schedule | SCHED. |
| 188. Science | SCI. |
| 188. Section | SECT. |
| 189. Sheet | SHT. |
| 190. Sheet vinyl | SHT. V. |
| 191. Shelving | SHLVG. |
| 192. Similar | SIM. |
| 193. Sound transmission glass | S.T.G. |
| 194. Specifications | SPEC. |
| 195. Square | SQ. |
| 196. Square foot | SQ. FT. |
| 197. Square inch | SQ. IN. |
| 198. Stainless steel | S.S. or ST. STL. |

| | |
|------------------------------------|-----------------|
| 199. Standard | STD. |
| 200. Steel | STL. |
| 201. Stone | STN. |
| 202. Street | ST. |
| 203. Structural | STRUC. |
| 204. Structural glazed facing tile | S.G.F.T. |
| 205. Surfaced four sides | S4S |
| 206. Suspend | SUSP. |
| 207. Switch | SW. |
| 208. Tack board | TK. BD. or T.B. |
| 209. Temperature | TEMP. |
| 210. Terrazzo | TERR. |
| 211. Thermostat | THERMO. |
| 212. Thick | THK. |
| 213. Thousand pounds | KIP or K |
| 214. Threshold | THRES. |
| 215. Tile | T. |
| 216. Tile-like coating | T.L.C. |
| 217. Toilet | TLT. |
| 217. Toilet tissue | T.T. |
| 218. Tongue and groove | T & G |
| 219. Towel bar | T.B. |
| 220. Typical | TYP. |
| 221. Unit heater | U.H. |

| | |
|-----------------------------|--------|
| 222. Unit ventilator | U.V. |
| 223. Vent Stack | V.S. |
| 224. Vent through roof | V.T.R. |
| 223. Verify in field | V.I.F. |
| 224. Vertical | VERT. |
| 225. Vinyl asbestos tile | V.A.T. |
| 226. Vinyl composition tile | V.C.T. |
| 227. Vinyl wallcovering | V.W.C. |
| 228. Vitrified clay pipe | V.C.P. |
| 229. Volume | VOL. |
| 230. Wainscot | WAINS. |
| 231. Water closet | W.C. |
| 232. Weatherproof | WP. |
| 233. Welded wire mesh | W.W.M. |
| 234. Wide flange (steel) | W.F. |
| 235. With | W/ |
| 236. Without | W/O |
| 237. Wood | WD. |
| 238. Yard | YD. |
| 239. Yard panel | Y.P. |

END OF SECTION 011700

ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowance.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 CONTINGENCY ALLOWANCE

- A. Use the contingency allowance only as directed by Construction Manager or Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- C. Funds will be drawn from the Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance for Contract 1, General Trades, Earthwork & Site Work: Include the sum of \$(155,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- B. Allowance No. 2: Contingency Allowance for the Contract 2, Electrical work: Include the sum of \$(39,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- C. Allowance No. 3: Contingency Allowance for the Contract 3, Plumbing & Fire Protection: Include the sum of \$(15,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- D. Allowance No. 4: Contingency Allowance for Contract 4, HVAC: Include the sum of \$(17,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.

- E. Allowance No. 5: Temporary Heating Allowance for Contract 4, HVAC: Include the sum of \$(9,000.00).
 - 1. This allowance includes all temporary heating requirements as specified in Section 01 50 00 - Temporary Facilities and Controls.

END OF SECTION 012100

ALTERNATE AND UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates and unit prices

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the unit price.
- C. Notification: Immediately following award of the Contract, the Construction Manager shall notify each prime contractor, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- F. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.4 PROCEDURES FOR UNIT PRICES

- A. Unit prices include all necessary material, labor, equipment, services and incidentals, plus cost for the delivery, installation, insurance, overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurements and payment for unit prices are specified in those Sections. Quantities indicated in the documents in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount. Payment will not be made on the following: Products wasted or disposed of in a manner that is not acceptable; Products determined as unacceptable before or after placement; Products not completely unloaded from the transporting vehicle; Products placed beyond the lines and levels of the required work; Products remaining on hand after the completion of the Work, Loading, hauling, and disposing of rejected products.
- C. Owner/Construction Manager reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit prices: A schedule of unit prices is included in part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Salt Shed Structure and Prefab Roof system.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations, protective bollards, and all other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed as shown on the drawings in its entirety, including but not limited to foundations with associated earthwork and site work, Concrete walls, protective bollards, prefab membrane roof structure, finishes, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed.

B. Alternate No. 1A: Salt Shed Structure, Excluding Prefb Roof System.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations and all

other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed walls, foundations and footings, with associated earthwork and site work, concrete finishes and striping, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed. Omit the procurement and installation of the prefab fabric membrane roof system.

C. Alternate No. 2: Parking Canopy.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy as shown on the contract drawings in its entirety, including but not limited to foundations and footings, concrete piers, prefabricated roof structure, finishes and associated electrical components for lighting systems.

D. Alternate No. 2A: Parking Canopy Footings & Foundations.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy footings and foundations as shown on the contract drawings, including concrete piers, finishes and associated electrical components for lighting systems. Omit the prefabricated steel parking canopy structure.

E. Alternate No. 3: Commercial EV Charging Stations.

Basis of Design: Omit all work associated with the EV Charging stations, as indicated in the drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit).

Alternate: Provide the cost to construct the commercial grade electrical vehicle (EV) charging stations in their entirety, as shown on the contract drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit). All work must be completed in compliance with the EPA grant, provided by the owner, within the timeframe indicated in the grant requirements.

F. Alternate No. 4: Sealed Concrete In Breakroom & Locker Rooms.

Basis of Design: Provide and install tile and laminate flooring as indicated on the contract drawings in the Men's Locker room, Women's Locker rooms and Break room respectively.

Alternate: Provide the deduct cost to omit the tile and/or laminate flooring, prep and underlayment in the locker rooms and breakroom and seal the concrete slab in these rooms with Conc-1 as the final finish (3 coats). Omit extension kits required to set floor drains level with applied flooring systems.

G. Alternate No. 5: Eliminate HVLS Fans (Big Ass Fans).

Basis of Design: Provide and install HVLS fans and all associated utilities and support structure as indicated on the contract drawings.

Alternate: Provide the deduct cost to omit the HVLS fans only. The associated electrical utilities and structural support components are to remain as part of the base bid and shall be constructed with or without the procurement and installation of the fans.

H. Alternate No. 6: Radiant Heaters and Heat Trace.

Basis of Design: Provide and install Unit Heaters as indicated on the contract drawings. Provide all electrical, structural and mechanical components necessary for a complete installation of the unit heaters. (Do not include cost for procurement and installation of radiant heaters, heat trace, electrical, support from bent frames, plumbing, and mechanical components necessary for radiant and heat trace systems).

Alternate: Provide the cost to omit the unit heaters and all associated electrical, plumbing and mechanical components and structural support from main frame and in lieu of unit heaters, procure and install radiant heaters and heat trace as shown on the contract drawings with all electrical, structural and mechanical components necessary for a complete installation.

I. Alternate No 7: Heavy Duty Vehicle Lift.

Basis of design: Contractors to provide and install Vehicle Lift and make all final connections per trade as indicated in contract drawings and specifications. Contractors to provide all accessory elements required for fully functional equipment system including but not limited to concrete footings, power and final connections, compressed air and final connections.

Alternate: Contractors to provide deduct cost to omit procurement and installation of the Heavy Duty Vehicle Lift Equipment. Contractors shall still provide all accessory elements required for a fully functional equipment system including but not limited to concrete footings, power, compressed air. Owner to provide and install the heavy duty vehicle lift equipment and make final connections through co-operative vender.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of potential unforeseen building foundation. The General Contractor shall provide the Contract Unit Price per cubic yard for removal and disposal of any existing concrete footings, stone or masonry foundations unforeseen on the surface.
- B. Unit Price No. 2: Trench Rock. The General Contractor shall provide the Contract Unit Price per cubic yard for rock excavation by ram hammer
- C. Unit Price No. 3: Disposal of Contaminated Soils with high levels of Magnesium. Removal of the soils and stock piling is to be as indicated in the contract documents. The General Contractor shall provide the Contract Unit Price per cubic yard for disposing of contaminated soils as identified in section "026000 CONTAMINATED SITE MATERIAL REMOVAL & SOIL CAPPING." Contractor shall coordinate with Colliers Engineering and Design's environmental soils team for threshold requirements on site to determine what/if soils need to be disposed.
- D. Unit Price No. 4: Replacement of Contaminated Soils. It is assumed that the amount of removal and disposal of contaminated soils may differ from the amount of replacement fill needed in areas where new construction occurs. The General Contractor shall provide the Contract Unit Price per cubic yard for replacing contaminated soils with #2 crusher run stone structural fill materials.
- E. Unit Price No. 5: Unsuitable Soils Removal and Replacement with Stone. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of unsuitable soils as determined by the geotechnical engineer on site during excavation, and replaced with #2 crusher run stone structural fill materials
- F. Unit Price No. 6: Installation of Underground Conduit for EV stations. The Electrical Contractor shall provide the Contract Unit Price per linear foot for trenching, installation of (2) 2-1/2" conduits with pull strings for the EV Charging Stations and back filling as required by the contract documents. Reference electrical specifications for allowable conduit type.

END OF SECTION 012300

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed after award of the Contract are considered requests for substitutions. The following are not requests for substitutions:
1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract.
 2. Revisions to the Contract Documents requested by the Owner.
 3. Specified options included in the Contract Documents.
 4. Contractor's compliance with regulations issued by governing authorities.

1.2 SUBSTITUTION REQUEST SUBMITTAL

- A. The Architect will consider requests for substitution received within 30 days after Notice of Award.
1. Submit three (3) copies of each request for substitution. Submit requests according to procedures required for change-order proposals.
 2. Identify the product or method to be replaced in each request. Include related Specification Section and Drawing numbers.
 3. Provide documentation showing compliance with the requirements for substitutions and the following information:
 - a. Coordination information, including a list of changes needed to other Work that will be necessary to accommodate the substitution.
 - b. A comparison of the substitution with the Work specified, including performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the effect on the Construction Manager's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the substitution on Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification that the substitution conforms to the Contract Documents and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may become necessary because of the failure of the substitution to perform adequately.
 4. Architect's Action: If necessary, the Architect will request additional information within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection within 2 weeks of receipt of the request. Acceptance will be in the form of a change order.

- a. Use the product specified if the Architect cannot make a decision within the time allocated.

PART 2 - PRODUCTS

2.1 CONDITIONS

- A. The Architect will receive and consider a request for substitution when one or more of the following conditions are satisfied. Otherwise, the Architect will return the requests without action except to record noncompliance with these requirements.
 1. Extensive revisions to the Contract Documents are not required.
 2. Changes are in keeping with the intent of the Contract Documents.
 3. The specified product cannot be provided within the Contract Time. The Architect will not consider the request if the specified product cannot be provided as a result of failure to pursue the Work promptly.
 4. The request is related to an "or-equal" clause.
 5. The substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deducting compensation to the Architect for redesign and increased cost of other construction.
 6. The specified product cannot receive approval by a governing authority, and the substitution can be approved.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction not complying with the Contract Documents do not constitute an acceptable request for substitution, nor do they constitute approval.

PART 3 - EXECUTION - Not Applicable

END OF SECTION 012500

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Alternates & Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment. Substitutions to this form are allowed only by approval of Architect and Construction Manager.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. Two copies shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 012900

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- J. Requests for Interpretation (RFI) procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: General product requirements.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.
- D. CSI/CSC Form 13.2A - Request for Interpretation; Current Edition.

1.4 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punch list, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 - 1. Newforma Project Cloud: www.newformaprojectcloud.com.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 SITE MOBILIZATION MEETING

- A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and occupancy prior to completion.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Meetings will occur on a weekly basis at a specified time and day to be determined after contract award.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Special consultants.
 - 5. Contractor's superintendent.
 - 6. Major subcontractors.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.

- E. Project Coordinator will prepare complete Construction Schedule incorporating all contractor's notations and values. Schedule will be published and updated when appropriate.

3.6 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect and Construction Manager.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Completion of site clearing.
 - 2. Excavations in progress.
 - 3. Foundations in progress and upon completion.
 - 4. Structural framing in progress and upon completion.
 - 5. Enclosure of building, upon completion.
 - 6. Final completion, minimum of ten (10) photos.
- E. Views:
 - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 - 2. Consult with Architect for instructions on views required.
 - 3. Provide factual presentation.
 - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 - 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Via email or TBD file sharing medium.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 - 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.7 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.
- C. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - 1) Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - 2) Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - 3) Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

D. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
3. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
4. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
5. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
6. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
7. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

E. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

2. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

3.8 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 2. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Discrete and consecutive RFI number, and descriptive subject/title.
 - 3. Issue date, and requested reply date.
 - 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION 013000

COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittal Procedures" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 1 Section "Closeout Procedures" for coordinating contract closeout.
 - 3. Division 1 Section "Administrative Requirements" for project specific requirements.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
 - 4. Each Contractor is required to coordinate with the Other Trades and be on site as walls are being built to lay out all penetrations to walls under construction.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals Procedures."

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.
2. Each Contractor shall prepare and publish this list.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining, and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High-speed operation.
 - 21. Improper lubrication.
 - 22. Unusual wear or other misuse.
 - 23. Contact between incompatible materials.

- 24. Destructive testing.
- 25. Misalignment.
- 26. Excessive weathering.
- 27. Unprotected storage.
- 28. Improper shipping or handling.
- 29. Theft.
- 30. Vandalism.

END OF SECTION 013100

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule. (All Prime Contractors)
 - 2. Daily construction reports. (All Prime Contractors)
 - 3. Field condition reports. (All Prime Contractors)

1.2 SUBMITTALS

- A. Contractor's Construction Schedule: The Contractor will provide printed copies to Construction Manager of initial and updated schedule, large enough to show entire schedule for entire construction period.
- B. Daily Construction Reports: Submit two (2) copies at weekly intervals.

1.3 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate prime contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Gantt-Chart Schedule: Contractors shall submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within ten (10) days of date established for the Notice to Proceed.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. High and low temperatures and general weather conditions.
 4. Accidents.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. Emergency procedures.
 9. Orders and requests of authorities having jurisdiction.
 10. Change Orders received and implemented.
 11. Construction Change Directives received.
 12. Services connected and disconnected.
 13. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, Construction Manager shall generate and update master schedule to reflect actual construction progress and activities. Prime Contractors shall submit weekly updates of their construction schedules to Construction Manager. Distribution: General Construction Contractor will coordinate and update master construction schedule and distribute copies of approved schedule to Architect, Owner, and other Prime Contractors, and other parties identified with a need-to-know schedule responsibility.
1. Schedules will be posted in project meeting rooms and temporary field offices.

END OF SECTION 013200

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CADD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals. Cost shall be \$200 per CADD file. Check payable to Bergmann Associates shall be submitted prior to file transfer. Contractors requesting electronic files will be required to execute a "CADD/Electronic File Transfer Agreement" which will indemnify the Architect – Refer to Section 013500 "Electronic Document Transfer" for information.
- B. Electronic Submittals: With the exception of samples and color charts, or as otherwise approved by the Design Builder, all submittals shall be electronic PDF images which shall be submitted for review and approval via the electronic project management web site or email. For submittals and/or shop drawings larger than 11" x 17", subcontractors are to submit hard copies in accordance with this section.
- C. Process: All submittals will be processed in/out by the Architect.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Review: Allow ten (10) working days for review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Contractor.
 - d. Name and address of subcontractor.
 - e. Name of manufacturer.
 - f. Number and title of appropriate Specification Section.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Remarks.
 - i. Signature of transmitter.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit five (5) copies of any non-electronic submittal to the Architect and Construction Manager. Architect will return two (2) copies, except shop drawings as required below.
 - 2. Shop Drawings: Submit two (2) non-reproducible copies of any non-electronic shop drawing to the Architect and Construction Manager. Architect will return two (2) copies to the contractor.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:

- a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 4. Number of Samples for Verification: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.

- a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Construction Manager/Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. No Exception Taken
 - 2. Revise and Resubmit
 - 3. Furnish as Corrected
 - 4. Rejected
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

| | | |
|-------------------------|-----------------|---------------|
| Submittal # | SUBMITTAL COVER | |
| Review no. | | |
| For Contractor Use Only | | Date Returned |

| |
|---------------------------|
| CITY OF CHESTER |
| PUBLIC WORKS FACILITIES |
| CED Project No: COCD0004A |

| | |
|--|-------------|
| Architect: | Contractor: |
| Colliers Engineering & Design | |
| 1500 JFK Blvd, 2 Penn Center Suite 700 | |
| Philadelphia, PA 19102 | |
| Phone: (215) 735-1524 | |

| | |
|-------------------|--------------|
| Prime Contractor: | Sub./Vendor: |
| Address: | Address: |
| Phone/Fax: | Phone/Fax: |

| | |
|--|---------------------|
| Type of Submittal: (please check) | Date of Submittal: |
| <input type="checkbox"/> Product Data | |
| <input type="checkbox"/> Sample | Resubmitted: |
| <input type="checkbox"/> Color Selection | |
| <input type="checkbox"/> Other | Number of Attached: |
| <input type="checkbox"/> Test Report | |
| <input type="checkbox"/> Certification | |
| <input type="checkbox"/> Shop Drawing | |
| <input type="checkbox"/> Record Document | |

| | | |
|---------------------------------------|----------------|---|
| SUBSTITUTION (see general conditions) | (X) YES () NO | PRIME CONTRACTOR APPROVAL |
| Spec. Section No: | Dwg. No.: | By submission of this submittal, the Undersigned hereby certifies that review, verification of Product required, field dimensions, adjacent construction work and coordination of information has been completed and is in accordance with the requirements of the Work and the Contract Documents. |
| Part/ Paragraph: | Detail Ref: | |
| Product Name: | | |
| Manufacturer: | | |
| | | Name: date: |

| |
|-----------------------------------|
| DEVIATION FROM CONTRACT DOCUMENTS |
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|----------------------|
| CONTRACTOR COMMENTS: |
|----------------------|

| | |
|---------------------|----------------------|
| ARCHITECT COMMENTS: | ADDITIONAL COMMENTS: |
| | |
| | RECEIVED STAMP |
| | |
| By: | Date: |

ELECTRONIC DOCUMENT TRANSFER

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for the request and transfer of electronic documents from the Architect/Engineer to the Contractor, Subcontractors and the associated Equipment Vendors.
- B. Electronic Documents include, but are not limited to, the following:
 - 1. Floor Plan drawings.
 - 2. Detail drawings.
 - 3. Tables and charts.
- C. Transfer of documents includes, but is limited to, the following:
 - 1. Computer disks and CDs.
 - 2. E-mail attachments.
- D. All drawings, specifications or other documents of any kind prepared by the Architect/Engineer or its sub-consultants, whether in hard copy or any electronic or machine-readable format, including Electronic Documents are, and shall remain, instruments of their services. These Instruments of Services were prepared solely for use in connection with this Project. The Architect/Engineer and its sub consultants retain all common law, statutory and other reserved rights, including the copyright.
- E. The Electronic Documents are provided as a convenience to the Contractor for informational purposes only in connection with the Contractor's performance of its responsibilities and obligations relating to the Project. The Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications, which are, and remain, the Contract Documents for the Project or the paper copies of any other document prepared by the Architect/Engineer or its sub consultants.
- F. If any differences exist between printed Instruments of Services and the Electronic Documents, the information contained in the printed documents shall be presumed to be correct and shall take precedence over the Electronic Documents.
- G. Contractor agrees and understands that field conditions may alter or modify the configuration, products, materials, and installation of the information shown on the electronic documents. Contractor shall be fully responsible to verify all field conditions and if applicable to modify the electronic documents to the actual conditions prior to use of the documents. These documents are provided as a convenience only, and do not change the responsibility of the Contractor as outlined in the Drawings and Specifications.

- H. Architect/Engineer will not be responsible for, or required to assist the Contractor in the plotting or printing of any documents.

1.3 ELECTRONIC DOCUMENT TRANSFER PROCEDURES

- A Coordination: Coordinate transfer requests with performance of construction activities. Transmit each request to the CM and A/E sufficiently in advance of scheduled needs to avoid delay.
1. Processing: To avoid the need to delay installation as a result of the time required to process document transfers:
 - a. Allow 10 working days for the A/E's processing of each request, after receipt of a written request and the required processing fee.
 - b. The A/E will not authorize an extension of time because of the Contractor's failure to transmit requests and fees to the A/E sufficiently in advance of the Work to permit processing.
- B. Electronic Document Transfer Requests: Contractor shall submit a written request for any transfer consisting of the following:
1. Signed, completed copy of the attached "Electronic Document Transfer Agreement".
 2. List of drawing numbers and titles requested.
 3. A check in the proper amount for each drawing to cover the cost of processing the request. Refer to Section 013300 "Submittal Procedures."
 4. Statement of the requested software format. Drawings are only available in AutoCAD 2013 format.
 5. Statement clarifying the document format, i.e. either a CD copy or issue as an e-mail attachment.

PART 2 - PRODUCTS (Not applicable)

PART 3-EXECUTION (Not applicable)

END OF SECTION 013500

(CADD/ELECTRONIC FILE TRANSFER AGREEMENT – ATTACHED)

CADD/ELECTRONIC FILE TRANSFER TO CONTRACTOR

Dear **Contractor Name**:

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to **City of Chester – Public Works Facilities** and subject to the following terms and conditions:

We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instrument of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawing sheets: _____

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us and we make no warranties, either express or implied of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss or profit or any consequential damages as a result of your use or reuse of these electronic files.

XXX
Colliers Engineering & Design

Contractor Name:

signature

SPECIAL INSPECTIONS AND TESTING

PART 1 – GENERAL

- 1.1 The Owner shall employ the services of an independent testing agency/laboratory to perform specified field inspections and laboratory testing, (special inspection) and to make and cure compression test specimens as specified in Section 033000. Laboratory testing and preparation of concrete test specimens shall be paid for by Owner. Refer to respective sections for contractor's and Owner's requirements.
 - A. Contractor shall cooperate with laboratory to facilitate execution of its required services.
 - B. Employment of laboratory shall in no way relieve contractor's obligation to perform work of contract.
- 1.2 SPECIAL INSPECTION
 - A. Owner will employ services of an independent approved testing agency to perform special inspections during construction as required by the Pennsylvania Uniform Construction Code and authorities having jurisdiction. Inspections shall include but not limited to the following:
 - 1. Verification and inspection of steel construction per section 1705.2 and Table 1705.2.1 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 2. Verification and inspection of concrete construction per section 1705.3 and Table 1705.3 of 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 3. Inspection for masonry design per paragraph 1705.4 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 4. Inspection for seismic resistance per section 1705 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
- 1.3 RELATED REQUIREMENTS IN OTHER PARTS OF PROJECT MANUAL
 - A. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: Conditions of the contract.
- 1.4 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
 - A. Certification of products: Respective sections of specifications.
 - B. Test, adjust and balance of equipment: Respective sections of specifications.
 - C. Laboratory tests required and standards for testing: Each specification section listed.

PART 2 - PRODUCTS

2.1 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or expand the requirements of the Contract Documents
 - 2. Approve or accept any portion of work
 - 3. Perform any duties of contractor

2.2 NOTIFICATION OF TEST FAILURE

- A. Testing Laboratory shall notify the Architect/Construction Manager/Owner via telephone and in written form of any tests performed failing to meet specifications. Notification shall take place the same day the test results are obtained.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to work, to manufacturer's operations.
- B. Secure and deliver to laboratory, adequate quantities of representational samples of materials proposed to be used which require testing.
- C. Provide to laboratory, preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested
 - 2. To obtain and handle samples at project site or at source of product to be tested
 - 3. To facilitate inspections and tests
 - 4. For storage and curing of test samples
- F. Notify Construction Manager sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to contractor's negligence.
- G. Make arrangements with laboratory and pay for additional samples and tests required for contractor's convenience.
- H. When directed by Architect, employ and pay for services of a separate, equally qualified independent testing laboratory acceptable to Architect to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.

- I. Refer to respective sections of specifications for additional contractor responsibilities.
- J. Refer to STATEMENT OF SPECIAL INSPECTIONS following this section.

END OF SECTION 014100

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Connect" is to mean the labor and materials necessary to join or attach equipment, materials or systems to perform the function intended.
- G. "Product" includes materials, systems and equipment.
- H. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- I. "Supplier" is any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design.
- J. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- L. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- M. "Experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

- N. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- O. "Utility" is considered to mean any gas, steam, water, sanitary sewer, storm sewer, electrical or other such service.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section 012100 - Allowances
- C. Section 015100 - Temporary Utilities

1.2 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.3 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. All temporary utility usage charged will be incurred by the owner.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Verizon or Comcast Internet Service: Internet Service will be established for use of the General Contractors Field Office for Project Meetings and On-Site Activities, a fee of \$100 per month shall be carried by contractors from project start to finish. Service will need to be maintained from September 1, 2025 until project completion.

2. Printer/Copier: "All-in-on" unit, Toshiba e-Studio 2508a or equal printer server, combining color printing, photocopying, and scanning. Capability of letter, legal, and 11x17 paper. Provide paper, toner, and service for the duration of the project. Maintain service until project completion.
3. Conference Call Speaker: Provide one (1) Harmon/Kardon – Onyk Mini Portable Wireless Speakers for use by the CM / AE for project conference calls and meetings in CM trailer.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain portable facilities and enclosures. Provide at time of project mobilization. Provide a minimum of 4 portable toilets and provide additional as required by project.
- B. Provide bladder and cleaning service for CM office trailer restroom for project duration.
- C. Maintain daily in clean and sanitary condition.
- D. When necessary provide equipment to hold facilities upright and prevent them from tipping over.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around entrance to construction site and field office areas; equip with vehicular and pedestrian gates with locks.
- C. Fencing and gate locations to be coordinated with Owner. Gate entrances along 2nd street (route 13) are strongly discouraged.
- D. Vehicle access gate on Lloyd Street to be post driven, heavy duty swing gate, and operable. Minimum Gate Opening to be 25' Wide by 6' High. Provide chain and combination lock on each gate. Approval by Owner is required before installation of entrance gate.
- E. Quantity of fencing will be approximately 1200 Lineal Feet. Provide provisions for at least 3 swing gates in main site fencing.
- F. Fencing to be maintained through project completion and removed from the project by Contract 1 – General Trades, Earthwork & Site Work.

1.8 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.9 SECURITY

- A. Provide security and facilities to protect own Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Site Security Systems: Maintain existing Site Security systems.
 - 1. Web Based security camera system.
 - 2. Site Security Lighting.
- C. When such a time is deemed appropriate by Construction Manager and Architect, provide secure building enclosure of permanent structure. Either provide temporary door cylinders with keys and cores to Construction Manager or provide adequate other means of lockable doors for egress.

1.10 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner / Construction Manager.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets at all gates. A minimum of one Truck Drive Off Areas will be required along Llyod Street. Placement is at discretion of Construction Manager/Owner. Contractor will be responsible for maintenance of Drive Off Areas throughout the duration of the Project.
- E. ALL CONTRACTS - Temporary Contractor parking can occur along Lloyd street to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Provide snow and ice removal as required to minimize accumulations. Accumulation of 3 or more inches will require plowing and or salting to create passable entrance for vehicles and workers entering the site and building. Removal limits are site work area, building pad areas, entrances and walkways. Should snow begin to incumber work provide for off-site removal of snow. All entrances are to remain accessible and free of ice and snow throughout the work day.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition for the duration of the project.
 - 1. Provide minimum of (1) one container service to be used by all contractors. Size determined by contractor.
 - 2. Provide (1) one 6yd or 8yd container service with lid to be placed next to field office and contractor parking area.
 - 3. Provide additional container services as project necessitates.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Containers provided are to be utilized by all contracts included Construction Manager, Architect, and Owner.

1.12 PROJECT IDENTIFICATION / SIGNAGE

- A. Provide (1) one "Project Identification Sign" of minimum size 48"x96", design and construction indicated after contract award. Erect on site at location established by Architect or Construction Manager.
- B. Provide (4) four "Field Office Identification Signs" of minimum size 48"x96", design to be provided after contract award. Erect on site at location established by Construction Manager
- C. Temporary Signs: Provide and erect other signs as indicated and as required to inform public and individuals seeking entrance to Project. Minimum temporary signage as indicated below to be placed at direction of Construction Manager.
 - 1. Provide temporary, directional signs for construction personnel and visitors at East Ridge Road project entrance.
 - 2. Provide safety signage on site fencing and at every entrance gate both vehicular and pedestrian.
 - a. Provide "Hard Hats & Safety Glasses Required", "No Smoking", Authorized Personnel Only" signage every 100' along temporary fencing.
 - b. Provide 36"x48" Site Entrance Sign at main vehicle gate along North South Access Road. Design to be provided after contract award. Erect sign at main gate by direction of Construction Manager.
 - c. Provide 24"x36" Site Compliance/Security Signs at main vehicle gate, along temporary fencing, and inside building enclosure. Design to be provided after contract award. Erect sign by direction of Construction Manager. Include a minimum of twenty (25) signs to be provided by contract.
 - 3. Provide temporary signage along North South Access Road to direct both trucks, and personnel to field office or parking areas.

4. Provide (30) thirty 28" traffic cones to Construction Manager for use during project and traffic flow.
- D. Maintain and touch up signs so they are legible at all times.
- E. No other signs are allowed without Owner/ Construction Manager permission except those required by law.

1.13 FIELD OFFICES

- A. Field Offices: With approval by Construction Manager, each contractor may provide for its own use the following; Storage and Fabrication sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- B. Construction Manager's Field Office: Construction Manager has provided a field office of sufficient size to accommodate needs of Construction Manager and Architect and to accommodate project meetings specified in other Division 01 sections. Contract 1 shall equip the office as follows.
 1. Office supplies and office equipment as required for duration of the project to meet needs of project team to be billed against Allowance No. 1. See Section 01 21 00 – Allowances for further details.
 2. Telecommunications Equipment as specified in Section 1.04 of this document
- C. Portable Storage Containers: Owner / Construction Manager will have materials arriving that need to be stored on site throughout the duration of the project. Provide and maintain until project completion (2) two 40' storage containers on site. Provide locks on both and furnish keys to construction manager.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

- B. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- C. Pest Control: Engage pest-control services to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 2. Indicate sequencing work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure by prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written installation instructions for temperature, relative humidity, and exposure to water limits.

END OF SECTION 015000

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.

1.3 USE CHARGES

- A. General: Installation and removal of temporary facilities shall be included in the Contract Sum. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Usage Charges: All temporary utility usage charges will be incurred by owner.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installers of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 TEMPORARY ELECTRICITY

- A. Provide Temporary Electrical Service for the building and site during construction operations. Electrical service will be fed from the existing Temp Service Meter Panel. Service will be required to run underground following the direction of Construction Manager. Service may be picked up near CM trailer and be direct bury underground from existing panel board to board

mounted panel and disconnect near existing CM Office Trailer. Provide necessary distribution and safety equipment and panel board. Service should be sized adequately for the loads specified in this Section 015100 - Temporary Utilities and Section 015000 - Temporary Facilities and Controls and based on square footage and size of the project. Coordination may need to be had with RG&E if existing service is not adequately sized for new construction loads.

- B. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each major work area. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- G. Temporary Trailers: Electrical contractor to include hookup of up to (4) four office / storage trailers of other Prime Contractors. Any one (1) disconnect of existing CM office trailer following the completion of the project. Hookup location will be from existing or new panel board located next to CM Office Trailer.

1.7 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. When required by CM provide exterior building lights for safety and security purposes.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

1.8 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- C. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic controls.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide

and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.9 TEMPORARY WATER SERVICE

- A. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- B. Provide running water service to CM office trailer restroom to allow use of restroom inside the office trailer.

1.10 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

- E. Electric Power Service: Provide electric power service and distribution of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service underground unless otherwise indicated.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

END OF SECTION 015100

WATER CONTROLS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compliance with Air and Water Laws and Regulations.
- B. Each contractor and any and all tier level subcontractors agree as follows:
 - 1. The contractor, and his subcontractors warrant that any facility to be utilized in the performance of any non-exempt Contract or Subcontract is not listed on the List of Violating Facilities issued by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20. A condition for the award of the Contract is that prompt notice will be given to the City of any notification received from the Director, Office of Federal Activities, and EPA, indicating that a facility utilized or to be utilized for the Project is under consideration to be listed on the EPA List of Violating Facilities.
 - 2. The contractor warrants that he has not been convicted under Section 113(c) (1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.
 - 3. The contractor promises to comply with all the requirements of Sections 144 of the Clean Air Act, as amended (47 USC 1857C-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC 1318) relating to the inspection, monitoring, entry, reports and information as well as all other requirements specified in Section 144 and Section 308, and all regulations and guidelines issued thereunder.
 - 4. Air Pollution Abatement. All contractors are put on notice that there will be no burning of trees, rubbish or other material by any contractor during this Agreement. Normal burning of fuels in operation of construction equipment is exempt here except as the construction work is affected by the requirements of the Public Health Law (Air Pollution Control) and Chapter IV, Air Pollution Control of the Official Compilation of Codes, Rules and Regulations of the State of New York, Title 10, and local regulations, which are to be met.
 - 5. Soil Erosion and Water Pollution Abatement. Each contractor shall schedule and conduct his operations to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems, existing sanitary systems, impoundments (lakes, reservoirs, etc.) and lands adjacent to or affected by the work. Construction of drainage facilities and performance of other work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon there-after as practicable. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum. All contractors will comply with the Storm Water Pollution Prevent Plan (SWPP) Published in Division 1.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 METHODS

- A. Whenever a contractor's operations, carried out in accordance with the approved schedule, result in a situation where temporary erosion control measures must be taken, these measures are to follow the requirements set forth herein and be approved by the Architect or Owner.
- B. In carrying out erosion control measures, the contractor will be guided by, but not limited to, the following controls:
 - 1. Dewater for all conditions encountered. The site shall be controlled both during and after completion of the work so that erosion will be minimized. Waste or disposal areas shall be located and constructed in a manner that will keep the site free of standing water.
 - 2. All areas shall be cleared as soon as it is practicable during construction operations. Ditches which are filled or partly inoperative shall be cleaned and made operative before the Contractor stops work for any day, and shall be maintained in a condition satisfactory to the Owner or Architect for the duration of the Construction.
 - 3. Water from aggregate washing or other operations containing sediment shall be treated by filtration, settling basin or other means sufficient to reduce the sediment content.
 - 4. Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged into sanitary or storm systems or into natural or man made channels. Wash water or waste from concrete mixing operations shall not be allowed to enter sanitary or storm systems.

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3.2 COSTS

- A. The costs for performing this work shall be the responsibility of the contractor(s) performing work in conjunction with this specification.

END OF SECTION 015630

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Construction Contractor shall provide dumpsters as required for entire work of the project. Dumpsters shall be located on site. Each contractor may legally load acceptable construction debris into the Dumpsters (from this project only). Cost of all dumpsters and disposal fees shall be by the General Construction Contractor. Dumpsters shall remain on the project until project completion, or as directed by Construction Manager, Owner or Architect. See section 015000 - Temporary Facilities for specific requirements.
- B. Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.2 CLEANING NOTICE

- A. Each contractor is responsible for clean-up and disposal of waste materials, debris, and rubbish on a daily basis.
- B. The Owner/Architect/Construction Manager may issue written notification of insufficient cleaning relative to the requirements of this section. Upon issuance of the cleaning notice:
 - 1. All waste and accumulation of trash containing the contractor's debris shall be removed from the Owner's premises within 24 hours of notification.
 - 2. All designated project areas containing the contractor's debris or requiring general housekeeping shall be left fine broom clean (interior) or raked clean (exterior or rough surface). Sweeping compound shall be used for all interior broom cleaning to control dust.
- C. Failure by the contractor to comply with the 24-hour requirement of the notice to the satisfaction of the Owner/Architect/Construction Manager will result in a cleaning program directed by the Construction Manager at the expense of the contractor. Cost of clean-up performed for the Owner will be deducted from the contractor's request for payment.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 CLEANING

- A. Maintain areas under contractor's control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
- C. Daily clean interior areas to provide suitable conditions for work.

- D. Broom clean interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.
- E. Control cleaning operations so that dust and other particles will not adhere to wet or newly-coated surfaces.

3.2 DISPOSAL

- A. On a daily basis, remove waste materials, debris, and rubbish from site or to a dumpster supplied by the General Construction Contractor.

END OF SECTION 015690

FINAL CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Final cleaning of interior and exterior of project will be the responsibility of the General Construction Contractor.

1.2 DESCRIPTION

- A. Execute cleaning prior to inspection for substantial completion of each designated portion of the work and again at final completion before owner occupancy.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 - EXECUTION

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces. Remove all cleaning materials upon completion of cleaning.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a clear shine condition; remove foreign substances.
- E. Vacuum clean, shampoo carpeted and similar soft surfaces.
- F. Clean, damp mop, wax (3 coats), and polish resilient and hard-surface floor as recommended by the manufacturer.
- G. Clean surfaces of equipment; remove excess lubrication.
- H. Clean plumbing fixtures and toilet rooms to a sanitary condition.
- I. Clean light fixtures and lamps.
- J. Clean all interior and exterior windows, both sides.

END OF SECTION 015700

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Requirements in this Section apply to all Prime Contractors. See Division 21- 28 Sections for additional requirements and limitations applicable to cutting and patching mechanical and electrical installations.
- C. Each Prime Contractor is responsible for determining the scope of and performing all cutting, patching, trenching, backfill, bedding and compaction required by its own Work necessary to complete the project. Each Prime Contractor is responsible for infilling, finishing and fire stopping the annular spaces for its own Work.

1.2 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete, Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of Owner's personnel.
 6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 7. Complete startup testing of systems.
 8. Submit test/adjust/balance records.
 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 10. Advise Owner of changeover in heat and other utilities.
 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 12. Complete final cleaning requirements, including touchup painting.
 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or

will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 1. Submit a final Application for Payment.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit **three (3) copies** of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit **one (1) copy** of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties within ten (10) days of Substantial Completion or on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner with at least **seven (7)** days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Sweep concrete floors broom clean in unoccupied spaces.
 - g. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - n. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

MAINTENANCE

PART 1 – GENERAL

1.1 SUMMARY

- A. Contractor shall compile product data and related information appropriate for Owner's operating and maintenance of products furnished under his contract.
 - 1. Prepare operating and maintenance data specified in this section and as referenced in other pertinent sections of specifications.
- B. Instruct Owner's personnel in operating and maintenance of products.
- C. Related Requirements Specified in Other Sections:
 - 1. SUBMITTAL PROCEDURES - Section 013300
 - 2. CLOSEOUT PROCEDURES - Section 017700
 - 3. CONSTRUCTION PROGRESS DOCUMENTATION - Section 013200
 - 4. Respective sections of specifications.

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel
 - 1. Trained and experienced in operating and maintenance of described products
 - 2. Completely familiar with requirements of this section
 - 3. Skilled as a technical writer to extent required to communicate essential data
 - 4. Skilled as a draftsman competent to prepare required drawings

1.3 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8-1/2" X 11"
 - 2. Paper: 20 lb. minimum, white, for typed pages
 - 3. Text: Manufacturer's printed data, or neatly typewritten
 - 4. Drawings:
 - a. Provide reinforced punched binder tab; bind in with text
 - b. Fold larger drawings to size of text pages
 - 5. Provide fly-leaf for each separate product or each piece of operating equipment
 - a. Provide typed description of product and major component parts
 - b. Provide indexed tabs

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

- a. Title of project
- b. Identity of separate structure as applicable
- c. Identity of general subject matter covered in manual

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers
2. Maximum ring size: 1 inch
3. When multiple binders are used, correlate data into related consistent groupings

1.4 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of volume.
3. List, with each product, name, address and telephone number of -
 - a. Subcontractor or installer
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement
4. Identify each product by product name and other identifying symbols as set forth in contract documents.

B. Product Data:

1. Include only those sheets which are pertinent to specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed
 - b. Clearly identify data applicable to installation
 - c. Delete references to inapplicable information

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of system
2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
3. Do not use project record documents as maintenance drawings

D. Written text, as required to supplement product data for particular Installation:

1. Organize in a consistent format under separate headings for different procedures
 2. Provide a logical sequence of instructions for each procedure
- E. Copy of each warranty, bond and service contract issued
1. Provide information sheet for Owner's personnel giving:
 - a. Proper procedures in event of failure
 - b. Instances which might affect validity of warranties or bonds

1.5 MANUAL FOR MATERIALS AND FINISHES

- A. Submit three (3) copies of complete manual in final form.
- B. Content for moisture protection and weather-exposed products
 1. Manufacturer's data giving full information on products
 - a. Applicable standards
 - b. Chemical composition
 - c. Details of installation
 2. Instructions for care, inspection, maintenance and repair.
- C. Additional requirements for maintenance data: Respective sections of specifications.

1.6 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents prior to start of work.
 1. Architect will review draft and return one copy with comments.
- B. Submit one copy of completed data in final form fifteen (15) days prior to final inspection or acceptance.
 1. Copy will be returned after final inspection or acceptance with comments.
- C. Submit specified number of copies of approved data in final form ten (10) days after final inspection or acceptance.

1.7 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in care and maintenance of all products and systems.
- B. Operation and maintenance manual shall constitute basis of instruction:

1. Review content of manual with personnel in full detail to explain all aspects of operation and maintenance.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 018000

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 OVERVIEW

A. Abbreviations

The following are common abbreviations used in this document.

| | | | |
|-----------------|-----------------------------|-------------|-----------------------|
| A/E- | Architect/Engineers | FT- | Functional Test |
| CA- | Commissioning Authority | GC- | General Contractor |
| CM- | Construction Manager | PM- | Project Manager |
| Cx- | Commissioning | TAB- | Testing and Balancing |
| Cx Plan- | Commissioning Plan document | | |

B. Definitions

Acceptance Phase - Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

Architect / Engineer (A/E) - the prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

Commissioning Coordinator - the member of the contractor's firm that is responsible for carrying out the contractor's commissioning tasks for the project. The Commissioning Coordinator is responsible for scheduling commissioning tests, coordination, ensuring start-up documents are completed, checklists are completed, correction of deficiencies and all other tasks defined in the responsibilities section of this document. The Commissioning Coordinator does not use a sampling strategy for checking equipment but rather checks 100% of the equipment included in the commissioning scope.

Commissioning Authority (CA) - an independent authority, not otherwise associated with the A/E design team members or the Contractor. The CA directs and coordinates the commissioning activities. The CA does not take an oversight role. The CA is part of the Owner's team and shall report directly to the Owner.

Commissioning Plan - an overall plan, developed before bidding that provides the structure, schedule and coordination planning for the commissioning process.

Construction Manager – shall refer to the person or company that is hired directly by the owner to coordinate trades, schedule work and other similar construction planning activities. For projects that do not have a construction manager hired directly by the owner, Construction Manager (CM) shall refer to the member of the general contractor that is responsible for coordinating trades and scheduling construction activities, usually the site superintendent.

Contract Documents - the documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, *Cx Plan*, etc.).

Contractor - General Contractor or authorized representative.

Control System - the central building energy management control system.

Data logging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data loggers separate from the control system.

Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed prior to substantial completion.

Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

Design Narrative or Design Documentation - sections of either the Owner's Project Requirements or Basis of Design or additional narrative as needed to comply with reporting requirements.

Direct Indicators - visually observing a system's response to a given condition or event.

Factory Testing - testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.

Functional Performance Tests (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed *after prefunctional checklists and startups are complete*.

General Contractor (GC) - See Contractor.

Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.

Manual Test - using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").

Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

Non-Compliance - see Deficiency.

Non-Conformance - see Deficiency.

Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50F to 75F to verify economizer operation). See also "Simulated Signal."

Owner (PM) – State University Construction Fund.

Phased Commissioning - commissioning that is completed in phases (by building or by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.

Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

Seasonal Performance Tests - FT's that are deferred until the system(s) will experience conditions closer to their design conditions.

Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.

Specifications - the construction specifications of the Contract Documents.

Startup - the initial starting or activating of dynamic equipment, including executing prefunctional checklists.

Test Procedures - the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CA.

Test Requirements - requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

Vendor - supplier of equipment.

Warranty Period - warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

C. Commissioning Definition

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction of this project is intended to achieve the following specific objectives:

1. Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.

D. Commissioned Systems

The following systems will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

HVAC Systems (and all integral equipment controls)

Variable Speed Drives

Air Handling Units

Makeup Air Units

Exhaust Fans

Unit Heaters

Infrared Heaters

Building Automation System - control sequences

HVAC Fire Mode - verify interface

Emergency Power Mode - verify restart transition

Plumbing Systems

Domestic Water Heaters
Domestic Hot Water Recirculation Pumps

Lighting Controls

Occupancy Sensors
Vacancy Sensors
Networked Low Voltage Lighting Control System

1.2 ROLES AND RESPONSIBILITIES

A. Responsibilities

1. All Parties
 - a. Follow the Commissioning Plan.
 - b. Attend commissioning scoping meeting and additional meetings, as necessary.
2. Contractor

Construction and Acceptance Phase
 - a. Assign a Commissioning Coordinator to oversee, plan and schedule commissioning tasks for all trades.
 - b. Coordinate the commissioning work to ensure that commissioning activities are being included in the schedule.
 - c. Include all costs of commissioning related work in the total contract price.
 - d. Review, become familiar and approve the final Commissioning Plan.
 - e. Ensure that all commissioning responsibilities are executed according to the Contract Documents and schedule.
 - f. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
 - g. Perform functional performance testing and operation of commissioned equipment in the presence of the CA.
 - h. Provide review of the commissioning progress and timely responses to the deficiency reports. Remedy the deficiencies.
 - i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.

- j. Provide all special tools, hardware, software and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CA.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- c. Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
- d. If deficiencies are not corrected in a timely manner such that seasonal or deferred retesting can not occur within the warranty period, the warranty period for the deficient item shall be extended until such time that the deficiency can be retested and approved.

3. Contractor (Mechanical Trade)

- a. Provide startup for all HVAC equipment, except for the building automation control system.
- b. Provide technical representatives to assist in equipment testing.
- c. Review test procedures for equipment installed by factory representatives.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

4. Contractor (Controls Trade)

- a. Assist and cooperate with the CA in the following manner:
 - 1. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system as specified. Assist in the functional testing of all equipment.

1.3 COMMISSIONING PROCESS

A. Brief Overview of Tasks

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. The CA develops specific equipment and system functional performance test procedures. The contractor reviews the procedures.
4. The procedures are executed by the contractor, under the direction of, and documented by the CA.
5. Items of non-compliance in material, installation or setup are corrected at the contractor's expense and the system retested.
6. Deferred testing is conducted, as specified or required.

1.4 COMMISSIONING SCOPING MEETING

A. Overview

A commissioning scoping meeting is planned and conducted by the CA within 90 days of the beginning of construction. In attendance are the CA, PM, assigned members of the CM, GC, A/E (particularly the mechanical and electrical engineers), the mechanical trade, electrical trade, TAB trade, plumbing trade, controls trade, any other installing trades or suppliers of equipment. At the meeting commissioning parties are introduced and the commissioning process reviewed, management and reporting lines determined. The Cx Plan is reviewed, process questions are addressed, lines of reporting and communications determined and the work products list discussed. Also covered are the general list of each party's responsibilities, who is responsible to develop the startup plan for each piece of equipment and the proposed commissioning schedule. The outcome of the meeting is increased understanding by all parties of the commissioning process and their respective responsibilities. The meeting provides the CA additional information needed to finalize the Cx Plan, including the commissioning schedule.

B. Construction Schedule Delivery

Prior to this meeting the CA is given, by the GC, the construction schedule by trade.

C. Meeting Minutes

The CA keeps notes from the meeting and distributes them to each team member.

1.5 MEETINGS

A. Commissioning Meetings

Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the contractor as required. These meetings will be used to review:

1. A log of all commissioning-related issues that require current or future attention using a Commissioning Issues Log.
2. Overall commissioning progress.

1.6 PROGRESS REPORTING AND LOGS

A. Issues Log

An updated commissioning issues log will be distributed to all parties each time changes are made to it. This log will be distributed showing open items only. Any party can receive a complete issues log showing both open and closed items at any time by requesting the complete log from the CA in writing.

1.7 DEVELOPMENT OF FUNCTIONAL TEST AND VERIFICATION PROCEDURES

A. Overview

Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is performed by the contractor.

B. Scope of Testing

The specifications provide a specific functional testing scope for each piece of commissioned equipment. If specific testing requirements were not included in the bid documents and original specifications, they will be developed for this project for each piece of commissioned equipment by the CA after the submittal phase of the project.

1.8 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

A. Overview and Process

The CA schedules functional tests through the contractor. The CA oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The contractor executes the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is

completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

B. Acceptance Criteria

In order for systems to be considered acceptable the following conditions must be met:

1. All sequences of operation must work per contract documents
2. Water flows are +/- 10% of the reported value
3. Water temperatures are +/- 10% of the reported value
4. Air flows are +/- 10% of the reported value
5. Air temperatures are +/- 10% of the reported value

C. Deficiencies and Retesting

1. The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported on the issues log. The contractor corrects deficiencies and notifies the CA when they are corrected. The CA schedules retesting through the contractor. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA and the installing technician. The CA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the contractor and A/E. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the owner. The owner gives final approval on each test.
2. The cost for the Contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the CA and PM will direct the retesting of the equipment once at no "charge" to the GC for their time. However, the CA's and PM's time for a second (and subsequent) retest will be charged to the GC. The time for the CA and PM to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back-charged to the GC.
3. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the PM. In such case, the Contractor shall provide the Owner with the following:
 - a. Within one week of notification from the PM, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the PM within two weeks of the original notice.

- b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
- c. The PM will determine whether a replacement of all identical units or a repair is acceptable.
- d. Two examples of the proposed solution will be installed by the Contractor and will test the installations for up to one week, upon which the PM will decide whether to accept the solution.
- e. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Facility Staff Participation

The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The owner will coordinate their attendance directly with the CA if desired.

E. Sampling

Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. If any type of equipment is functionally tested using a sampling strategy, all pieces of equipment that are not physically tested shall have their operation documented using trend logging and the logs reviewed for anomalies. The trend logs shall be submitted to the commissioning authority after review. The commissioning authority shall verify tests using the same sampling quantities as specified in section 1.19 of this specification.

F. Deferred Testing

- 1. Unforeseen Deferred Tests: Testing shall occur when environmental and building conditions allow for operation of any commissioned systems and allow observation of all specified functions. If any part of the sequence of operation cannot be observed for any reason (weather, partially occupied building, etc...) then the testing shall be deferred to a season in which the equipment can be operated through all sequences of operation. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. The contractor is responsible for determining the need for deferred testing based on the construction schedule, ability to put false loading on the system, and phasing shown in the contract documents. Any required deferred testing shall be provided to the owner at no additional cost.

2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as specified in this contract. The CA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the contractor, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

1.9 WARRANTY PERIOD

A. Requirements

During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. The CA coordinates this activity. Tests are executed and deficiencies corrected by the contractor, witnessed by facilities staff and the CA. Any final adjustments to the O&M manuals and as-builts due to the testing are made. Refer to specification for seasonal testing details for this project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 019113

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection
 - 4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*

- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*

- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
 - *Exterior Building Mounted Signs or Monument Signs*
 - *Interior and/or Exterior Wayfinding signs of any kind.*
 - *Interior Office name plate sign placards.*
 - *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:
 - 1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as

pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

- C. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 - 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 - 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 - 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 - 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.
 9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous

communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.

11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.

5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:

1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
7. Contractor must comply with all applicable OSHA standards.
8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.
14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.

16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 12. Contractor must comply with all applicable OSHA standards.
- 13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
- 16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
- 18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
- 19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
- 20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
- 21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
- 22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
- 27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
- 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall

be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.

30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.

3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and

cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.

21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trad General Trades, Earthwork & Site Work es.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contact 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
 1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
 1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.
 2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
 3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection

- 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.

15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
16. Contractor must comply with all applicable OSHA standards.
17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.
30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard prac

- tices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.

- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 11. Other Documents List:

- a. Geotechnical Report.
- b. Stormwater Infiltration Exploration Report
- c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.
25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)

26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:
 1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.

2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
11. Contractor must comply with all applicable OSHA standards.

12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.
27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
28. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.

29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

LIST OF STANDARD ABBREVIATIONS

PART 1 – GENERAL

1.1 GENERAL

- A. Where, in the Contract Documents, abbreviations are used, they shall be defined as indicated in the following list.
- B. Should contractor find abbreviations that are not indicated in list, or shall a question arise relative to an abbreviation, he shall notify Architect in writing and a clarifying addendum shall be issued.

1.2 INDEX OF STANDARD ABBREVIATIONS:

- A. The following is a list of abbreviations used in these contract documents and their meaning:

| | | |
|-----|-------------------------|-----------------|
| 1. | Above finished floor | A.F.F. |
| 2. | Acoustic tile | ACT. T. or A.T. |
| 3. | Addition | ADD. |
| 4. | Adjustable | ADJ. |
| 5. | Air condition | A.C. |
| 6. | Alteration or alternate | ALT. |
| 7. | Aluminum | ALUM. |
| 8. | Ampere | A. |
| 9. | Angle | > |
| 10. | Annunciator | ANNC. |
| 11. | Architect | ARCH. |
| 12. | At | @ |
| 13. | Auditorium | AUD. |
| 13. | Avenue | AVE. |
| 14. | Basement | BSMT. |

| | | |
|-----|---------------------|------------------|
| 15. | Bearing | BRG. |
| 16. | Bench mark | B.M. |
| 17. | Bent | BT. |
| 18. | Bituminous | BIT. |
| 19. | Block or blocking | BLK. or BLKG. |
| 20. | Board | BD. |
| 21. | Bottom | BOTT. OR BTM. |
| 22. | Bracket | BRKT. |
| 23. | Building | BLDG. |
| 24. | Built-up roof | B.U.R. |
| 25. | Cabinet | CAB. |
| 26. | Carpet | CARP. or CPT |
| 27. | Cast iron | C.I. |
| 28. | Catch basin | C.B. |
| 29. | Ceiling | CLG. |
| 30. | Cement plaster | C. PLAS. |
| 31. | Center line | CL |
| 32. | Ceramic mosaic tile | C.M.T. |
| 33. | Ceramic tile | C.T. |
| 34. | Chalkboard | CHK. BD. or C.B. |
| 53. | Classroom | CR. |
| 35. | Cleanout | C.O. |
| 36. | Clear | CLR. |
| 37. | Column | COL. |

| | | |
|-----|-------------------------|-----------------------|
| 38. | Concrete | CONC. |
| 39. | Concrete block lintel | C.B.L. |
| 40. | Concrete masonry unit | C.M.U. |
| 41. | Conduit | C. |
| 42. | Conference | CONF. |
| 42. | Connection | CONN. |
| 43. | Construction | CONST. |
| 44. | Construction joint | CONST. JT. |
| 45. | Continuous | CONT. |
| 46. | Contractor | CONTR. |
| 47. | Control joint | C.J. |
| 48. | Convactor | CONV. |
| 49. | Corrugated steel pipe | C.S.P. |
| 50. | Counter | CTR. |
| 51. | Course (brick or block) | CRS. |
| 52. | Cubic foot | CU. FT. |
| 53. | Cubic foot per minute | CFM |
| 54. | Cubic inch | CU. IN. |
| 55. | Cubic yard | CU. YD. |
| 56. | Department | DEPT. |
| 57. | Detail | DET. |
| 58. | Diameter | DIAM., D., DIA., or Ø |
| 59. | Dimension | DIM. |
| 60. | Dispenser or disposal | DISP. |
| 61. | Double | DBL. |

| | | |
|-----|---------------------------|---------------|
| 62. | Dowels | DWLS. |
| 63. | Down | DN. |
| 64. | Downspout | D.S. |
| 65. | Drawing | DWG. or DRWG. |
| 66. | Drinking fountain | D.F. |
| 67. | Each | EA. |
| 68. | Each face | E.F. |
| 69. | Each way | E.W. |
| 69. | Electric | ELEC. |
| 70. | Electrical Contractor | E.C. |
| 71. | Elevation | ELEV. OR EL. |
| 72. | Epoxy | EP. |
| 73. | Equipment | EQUIP. |
| 74. | Equipment supplier | E.S. |
| 75. | Existing | EXIST. or EX. |
| 76. | Expansion joint | EXP. JT. |
| 77. | Exposed | EXP. |
| 78. | Exterior | EXT. |
| 79. | Feet | FT. or (') |
| 80. | Fiber | FIB. |
| 81. | Finish | FIN. |
| 82. | Fire extinguisher | F.E. |
| 82. | Fire extinguisher cabinet | F.E.C. |
| 83. | Fire hose | F.H. |

| | | |
|------|-----------------------------|-------------------|
| 84. | Fire rated | F.R. |
| 85. | Fixture | FIX. |
| 86. | Floor | FL. or FLR. |
| 87. | Floor drain | F.D. |
| 88. | Fluorescent | FLUOR. |
| 89. | Foot | FT. (') |
| 90. | Footing | FTG. |
| 91. | Foundation | FDN. |
| 92. | Fresh air intake (or inlet) | FAI |
| 93. | Gallon | GAL. |
| 94. | Galvanized | GALV. |
| 95. | Gauge | GA. |
| 96. | General Contractor | G.C. |
| 97. | Glass | GL. |
| 98. | Grab bar | G.B. |
| 99. | Grade | GR. or GRD. |
| 100. | Gymnasium | GYM. |
| 100. | Gypsum | GYP. |
| 101. | Gypsum board | GYP. BD. |
| 102. | Hard | HD. |
| 103. | Hardner | HARD. |
| 104. | Heating Contractor | H.C. |
| 105. | Height | HGT. or HT. or H. |
| 106. | Hollow metal | H.M. |
| 107. | Horizontal | HORIZ. |

| | |
|------------------------|-----------------------|
| 108. Horsepower | HP |
| 109. Hour | HR. |
| 110. Inch | IN. or (") |
| 111. Inside diameter | I.D. |
| 112. Inside pipe size | I.P.S. |
| 113. Insulation | INSUL. |
| 114. Interior | INT. |
| 115. Invert | INV. |
| 116. Joint | JT. |
| 117. Kilo volt ampere | K.V.A. |
| 118. Kilowatt | K.W. |
| 119. KIP (1,000 lb.) | K. |
| 120. Laboratory | LAB. |
| 121. Laminated plastic | LAM. PLAS. or L.P. |
| 122. Lavatory | LAV. |
| 123. Left hand | L.H. |
| 124. Lighting panel | L.P. |
| 125. Linear feet | LIN. FT. |
| 126. Lockers | LKRS. |
| 127. Machine | MACH. |
| 128. Magnetic | MAG. |
| 129. Manhole | M.H. |
| 130. Manufacturer | MFG. or MFGR. or MFR. |
| 131. Marker Board | M.B. |

| | |
|-------------------------|---------------|
| 131. Masonry | MAS. |
| 132. Masonry opening | M.O. |
| 133. Material | MAT'L. |
| 134. Maximum | MAX. |
| 135. Mechanical. | MECH. |
| 136. Medicine cabinet | MED. CAB. |
| 137. Metal | MET. or MTL. |
| 138. Minimum | MIN. |
| 139. Mirror | MIR. |
| 139. Miscellaneous | MISC. |
| 140. Moisture resistant | M.R. |
| 141. Not in contract | N.I.C. |
| 142. Not to scale | N.T.S. |
| 143. Number | NO. or # |
| 144. Office | OFF. |
| 144. On center | O.C. |
| 145. Opening | OPG. or OPNG. |
| 146. Operator | OPER. |
| 147. Opposite | OPP. |
| 148. Outside diameter | O.D. |
| 149. Overall | O.A. |
| 150. Overhead | O.H. |
| 151. Paint | PT. |
| 151. Painted | PTD. |
| 152. Pair | PR. |

| | |
|------------------------------|-----------------|
| 153. Panel | PNL. |
| 154. Pavement | PVMT. |
| 155. Percent | % |
| 156. Perimeter | PERIM. |
| 157. Piece | PC. |
| 158. Plaster | PLAS. |
| 159. Plastic drain pipe | P.D.P. |
| 160. Plastic laminate | P.L. or P. LAM. |
| 161. Plastic underdrain pipe | P.U.P. |
| 162. Plate | P _L |
| 163. Plumbing | PLBG. or PLMB. |
| 164. Plumbing Contractor | P.C. |
| 165. Plywood | PLYW. or PLYWD. |
| 166. Poly vinyl chloride | P.V.C. |
| 167. Pound | LB. or # |
| 168. Pounds per cubic foot | #/CU. FT. |
| 169. Pounds per square foot | #/SQ. FT., PSF |
| 170. Pounds per square inch | #/SQ. IN., PSI |
| 171. Power panel | P.P. |
| 172. Pressure treated | P.T. |
| 173. Principal | PRINC. |
| 174. Projection | PROJ. |
| 173. Quarry tile | Q.T. |
| 174. Radius | R. or RAD. |

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|-------------------------------|------------------|
| 175. Rain leader | R.L. or R.W.L. |
| 176. Receptacle | REC. |
| 177. Refrigerator | REFRIG. |
| 178. Reinforce or reinforcing | REINF. |
| 179. Required | REQ'D. |
| 180. Revolution per minute | R.P.M. |
| 181. Right hand | R.H. |
| 182. Roof drain | R.D. |
| 183. Room | RM. |
| 184. Rough opening | R.O. |
| 185. Rubber | RUB. |
| 186. Sanitary | SAN. |
| 187. Schedule | SCHED. |
| 188. Science | SCI. |
| 188. Section | SECT. |
| 189. Sheet | SHT. |
| 190. Sheet vinyl | SHT. V. |
| 191. Shelving | SHLVG. |
| 192. Similar | SIM. |
| 193. Sound transmission glass | S.T.G. |
| 194. Specifications | SPEC. |
| 195. Square | SQ. |
| 196. Square foot | SQ. FT. |
| 197. Square inch | SQ. IN. |
| 198. Stainless steel | S.S. or ST. STL. |

| | |
|------------------------------------|-----------------|
| 199. Standard | STD. |
| 200. Steel | STL. |
| 201. Stone | STN. |
| 202. Street | ST. |
| 203. Structural | STRUC. |
| 204. Structural glazed facing tile | S.G.F.T. |
| 205. Surfaced four sides | S4S |
| 206. Suspend | SUSP. |
| 207. Switch | SW. |
| 208. Tack board | TK. BD. or T.B. |
| 209. Temperature | TEMP. |
| 210. Terrazzo | TERR. |
| 211. Thermostat | THERMO. |
| 212. Thick | THK. |
| 213. Thousand pounds | KIP or K |
| 214. Threshold | THRES. |
| 215. Tile | T. |
| 216. Tile-like coating | T.L.C. |
| 217. Toilet | TLT. |
| 217. Toilet tissue | T.T. |
| 218. Tongue and groove | T & G |
| 219. Towel bar | T.B. |
| 220. Typical | TYP. |
| 221. Unit heater | U.H. |

| | |
|-----------------------------|--------|
| 222. Unit ventilator | U.V. |
| 223. Vent Stack | V.S. |
| 224. Vent through roof | V.T.R. |
| 223. Verify in field | V.I.F. |
| 224. Vertical | VERT. |
| 225. Vinyl asbestos tile | V.A.T. |
| 226. Vinyl composition tile | V.C.T. |
| 227. Vinyl wallcovering | V.W.C. |
| 228. Vitrified clay pipe | V.C.P. |
| 229. Volume | VOL. |
| 230. Wainscot | WAINS. |
| 231. Water closet | W.C. |
| 232. Weatherproof | WP. |
| 233. Welded wire mesh | W.W.M. |
| 234. Wide flange (steel) | W.F. |
| 235. With | W/ |
| 236. Without | W/O |
| 237. Wood | WD. |
| 238. Yard | YD. |
| 239. Yard panel | Y.P. |

END OF SECTION 011700

ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowance.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 CONTINGENCY ALLOWANCE

- A. Use the contingency allowance only as directed by Construction Manager or Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- C. Funds will be drawn from the Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance for Contract 1, General Trades, Earthwork & Site Work: Include the sum of \$(155,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- B. Allowance No. 2: Contingency Allowance for the Contract 2, Electrical work: Include the sum of \$(39,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- C. Allowance No. 3: Contingency Allowance for the Contract 3, Plumbing & Fire Protection: Include the sum of \$(15,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- D. Allowance No. 4: Contingency Allowance for Contract 4, HVAC: Include the sum of \$(17,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.

- E. Allowance No. 5: Temporary Heating Allowance for Contract 4, HVAC: Include the sum of \$(9,000.00).
 - 1. This allowance includes all temporary heating requirements as specified in Section 01 50 00 - Temporary Facilities and Controls.

END OF SECTION 012100

ALTERNATE AND UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates and unit prices

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the unit price.
- C. Notification: Immediately following award of the Contract, the Construction Manager shall notify each prime contractor, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- F. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.4 PROCEDURES FOR UNIT PRICES

- A. Unit prices include all necessary material, labor, equipment, services and incidentals, plus cost for the delivery, installation, insurance, overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurements and payment for unit prices are specified in those Sections. Quantities indicated in the documents in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount. Payment will not be made on the following: Products wasted or disposed of in a manner that is not acceptable; Products determined as unacceptable before or after placement; Products not completely unloaded from the transporting vehicle; Products placed beyond the lines and levels of the required work; Products remaining on hand after the completion of the Work, Loading, hauling, and disposing of rejected products.
- C. Owner/Construction Manager reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit prices: A schedule of unit prices is included in part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Salt Shed Structure and Prefab Roof system.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations, protective bollards, and all other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed as shown on the drawings in its entirety, including but not limited to foundations with associated earthwork and site work, Concrete walls, protective bollards, prefab membrane roof structure, finishes, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed.

B. Alternate No. 1A: Salt Shed Structure, Excluding Prefb Roof System.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations and all

other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed walls, foundations and footings, with associated earthwork and site work, concrete finishes and striping, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed. Omit the procurement and installation of the prefab fabric membrane roof system.

C. Alternate No. 2: Parking Canopy.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy as shown on the contract drawings in its entirety, including but not limited to foundations and footings, concrete piers, prefabricated roof structure, finishes and associated electrical components for lighting systems.

D. Alternate No. 2A: Parking Canopy Footings & Foundations.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy footings and foundations as shown on the contract drawings, including concrete piers, finishes and associated electrical components for lighting systems. Omit the prefabricated steel parking canopy structure.

E. Alternate No. 3: Commercial EV Charging Stations.

Basis of Design: Omit all work associated with the EV Charging stations, as indicated in the drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit).

Alternate: Provide the cost to construct the commercial grade electrical vehicle (EV) charging stations in their entirety, as shown on the contract drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching , back filling, cutting and patching and adjacent protective bollards (2 at each unit). All work must be completed in compliance with the EPA grant, provided by the owner, within the timeframe indicated in the grant requirements.

F. Alternate No. 4: Sealed Concrete In Breakroom & Locker Rooms.

Basis of Design: Provide and install tile and laminate flooring as indicated on the contract drawings in the Men's Locker room, Women's Locker rooms and Break room respectively.

Alternate: Provide the deduct cost to omit the tile and/or laminate flooring, prep and underlayment in the locker rooms and breakroom and seal the concrete slab in these rooms with Conc-1 as the final finish (3 coats). Omit extension kits required to set floor drains level with applied flooring systems.

G. Alternate No. 5: Eliminate HVLS Fans (Big Ass Fans).

Basis of Design: Provide and install HVLS fans and all associated utilities and support structure as indicated on the contract drawings.

Alternate: Provide the deduct cost to omit the HVLS fans only. The associated electrical utilities and structural support components are to remain as part of the base bid and shall be constructed with or without the procurement and installation of the fans.

H. Alternate No. 6: Radiant Heaters and Heat Trace.

Basis of Design: Provide and install Unit Heaters as indicated on the contract drawings. Provide all electrical, structural and mechanical components necessary for a complete installation of the unit heaters. (Do not include cost for procurement and installation of radiant heaters, heat trace, electrical, support from bent frames, plumbing, and mechanical components necessary for radiant and heat trace systems).

Alternate: Provide the cost to omit the unit heaters and all associated electrical, plumbing and mechanical components and structural support from main frame and in lieu of unit heaters, procure and install radiant heaters and heat trace as shown on the contract drawings with all electrical, structural and mechanical components necessary for a complete installation.

I. Alternate No 7: Heavy Duty Vehicle Lift.

Basis of design: Contractors to provide and install Vehicle Lift and make all final connections per trade as indicated in contract drawings and specifications. Contractors to provide all accessory elements required for fully functional equipment system including but not limited to concrete footings, power and final connections, compressed air and final connections.

Alternate: Contractors to provide deduct cost to omit procurement and installation of the Heavy Duty Vehicle Lift Equipment. Contractors shall still provide all accessory elements required for a fully functional equipment system including but not limited to concrete footings, power, compressed air. Owner to provide and install the heavy duty vehicle lift equipment and make final connections through co-operative vender.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of potential unforeseen building foundation. The General Contractor shall provide the Contract Unit Price per cubic yard for removal and disposal of any existing concrete footings, stone or masonry foundations unforeseen on the surface.
- B. Unit Price No. 2: Trench Rock. The General Contractor shall provide the Contract Unit Price per cubic yard for rock excavation by ram hammer
- C. Unit Price No. 3: Removal and Disposal of Contaminated Soils with high levels of Magnesium. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of contaminated soils as identified in section "026000 CONTAMINATED SITE MATERIAL REMOVAL & SOIL CAPPING." Contractor shall reference Phase II Environmental soils report prepared by Colliers Engineering and Design's environmental team for threshold requirements.
- D. Unit Price No. 4: Replacement of Contaminated Soils. It is assumed that the amount of removal of contaminated soils may differ from the amount of replacement fill needed in areas of new construction occur. The General Contractor shall provide the Contract Unit Price per cubic yard for replacing contaminated soils with #2 crusher run stone structural fill materials.
- E. Unit Price No. 5: Unsuitable Soils Removal and Replacement with Stone. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of unsuitable soils as determined by the geotechnical engineer on site during excavation, and replaced with #2 crusher run stone structural fill materials
- F. Unit Price No. 6: Installation of Underground Conduit for EV stations. The Electrical Contractor shall provide the Contract Unit Price per linear foot for trenching, installation of (2) 2-1/2" conduits with pull strings for the EV Charging Stations and back filling as required by the contract documents. Reference electrical specifications for allowable conduit type.

END OF SECTION 012300

ALTERNATE AND UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates and unit prices

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the unit price.
- C. Notification: Immediately following award of the Contract, the Construction Manager shall notify each prime contractor, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- F. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.4 PROCEDURES FOR UNIT PRICES

- A. Unit prices include all necessary material, labor, equipment, services and incidentals, plus cost for the delivery, installation, insurance, overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurements and payment for unit prices are specified in those Sections. Quantities indicated in the documents in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount. Payment will not be made on the following: Products wasted or disposed of in a manner that is not acceptable; Products determined as unacceptable before or after placement; Products not completely unloaded from the transporting vehicle; Products placed beyond the lines and levels of the required work; Products remaining on hand after the completion of the Work, Loading, hauling, and disposing of rejected products.
- C. Owner/Construction Manager reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit prices: A schedule of unit prices is included in part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Salt Shed Structure and Prefab Roof system.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations, protective bollards, and all other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed as shown on the drawings in its entirety, including but not limited to foundations with associated earthwork and site work, Concrete walls, protective bollards, prefab membrane roof structure, finishes, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed.

B. Alternate No. 1A: Salt Shed Structure, Excluding Prefb Roof System.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations and all

other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed walls, foundations and footings, with associated earthwork and site work, concrete finishes and striping, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed. Omit the procurement and installation of the prefabricated fabric membrane roof system.

C. Alternate No. 2: Parking Canopy.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy as shown on the contract drawings in its entirety, including but not limited to foundations and footings, concrete piers, prefabricated roof structure, finishes and associated electrical components for lighting systems.

D. Alternate No. 2A: Parking Canopy Footings & Foundations.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy footings and foundations as shown on the contract drawings, including concrete piers, finishes and associated electrical components for lighting systems. Omit the prefabricated steel parking canopy structure.

E. Alternate No. 3: Commercial EV Charging Stations.

Basis of Design: Omit all work associated with the EV Charging stations, as indicated in the drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching, back filling, cutting and patching and adjacent protective bollards (2 at each unit).

Alternate: Provide the cost to construct the commercial grade electrical vehicle (EV) charging stations in their entirety, as shown on the contract drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching, back filling, cutting and patching and adjacent protective bollards (2 at each unit). All work must be completed in compliance with the EPA grant, provided by the owner, within the timeframe indicated in the grant requirements.

F. Alternate No. 4: Sealed Concrete In Breakroom & Locker Rooms.

Basis of Design: Provide and install tile and laminate flooring as indicated on the contract drawings in the Men's Locker room, Women's Locker rooms and Break room respectively.

Alternate: Provide the deduct cost to omit the tile and/or laminate flooring, prep and underlayment in the locker rooms and breakroom and seal the concrete slab in these rooms with Conc-1 as the final finish (3 coats). Omit extension kits required to set floor drains level with applied flooring systems.

G. Alternate No. 5: Eliminate HVLS Fans (Big Ass Fans).

Basis of Design: Provide and install HVLS fans and all associated utilities and support structure as indicated on the contract drawings.

Alternate: Provide the deduct cost to omit the HVLS fans only. The associated electrical utilities and structural support components are to remain as part of the base bid and shall be constructed with or without the procurement and installation of the fans.

H. Alternate No. 6: Radiant Heaters and Heat Trace.

Basis of Design: Provide and install Unit Heaters as indicated on the contract drawings. Provide all electrical, structural and mechanical components necessary for a complete installation of the unit heaters. (Do not include cost for procurement and installation of radiant heaters, heat trace, electrical, support from bent frames, plumbing, and mechanical components necessary for radiant and heat trace systems).

Alternate: Provide the cost to omit the unit heaters and all associated electrical, plumbing and mechanical components and structural support from main frame and in lieu of unit heaters, procure and install radiant heaters and heat trace as shown on the contract drawings with all electrical, structural and mechanical components necessary for a complete installation.

I. Alternate No 7: Heavy Duty Vehicle Lift.

Basis of design: Contractors to provide and install Vehicle Lift and make all final connections per trade as indicated in contract drawings and specifications. Contractors to provide all accessory elements required for fully functional equipment system including but not limited to concrete footings, power and final connections, compressed air and final connections.

Alternate: Contractors to provide deduct cost to omit procurement and installation of the Heavy Duty Vehicle Lift Equipment. Contractors shall still provide all accessory elements required for a fully functional equipment system including but not limited to concrete footings, power, compressed air. Owner to provide and install the heavy duty vehicle lift equipment and make final connections through co-operative vender.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of potential unforeseen building foundation. The General Contractor shall provide the Contract Unit Price per cubic yard for removal and disposal of any existing concrete footings, stone or masonry foundations unforeseen on the surface.
- B. Unit Price No. 2: Trench Rock. The General Contractor shall provide the Contract Unit Price per cubic yard for rock excavation by ram hammer
- C. Unit Price No. 3: Unsuitable Soils Removal and Replacement with Stone. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of unsuitable soils as determined by the geotechnical engineer, and replaced with #2 crusher run stone structural fill materials
- D. Unit Price No. 4: Installation of Underground Conduit for EV stations. Electrical Contractor to provide the Contract Unit Price per linear foot for trenching, installation of (2) 2-1/2" conduits with pull strings for the EV Charging Stations and back filling as required by the contract documents. Reference electrical specifications for allowable conduit type.

END OF SECTION 012300

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed after award of the Contract are considered requests for substitutions. The following are not requests for substitutions:
1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract.
 2. Revisions to the Contract Documents requested by the Owner.
 3. Specified options included in the Contract Documents.
 4. Contractor's compliance with regulations issued by governing authorities.

1.2 SUBSTITUTION REQUEST SUBMITTAL

- A. The Architect will consider requests for substitution received within 30 days after Notice of Award.
1. Submit three (3) copies of each request for substitution. Submit requests according to procedures required for change-order proposals.
 2. Identify the product or method to be replaced in each request. Include related Specification Section and Drawing numbers.
 3. Provide documentation showing compliance with the requirements for substitutions and the following information:
 - a. Coordination information, including a list of changes needed to other Work that will be necessary to accommodate the substitution.
 - b. A comparison of the substitution with the Work specified, including performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the effect on the Construction Manager's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the substitution on Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification that the substitution conforms to the Contract Documents and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may become necessary because of the failure of the substitution to perform adequately.
 4. Architect's Action: If necessary, the Architect will request additional information within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection within 2 weeks of receipt of the request. Acceptance will be in the form of a change order.

- a. Use the product specified if the Architect cannot make a decision within the time allocated.

PART 2 - PRODUCTS

2.1 CONDITIONS

- A. The Architect will receive and consider a request for substitution when one or more of the following conditions are satisfied. Otherwise, the Architect will return the requests without action except to record noncompliance with these requirements.
 1. Extensive revisions to the Contract Documents are not required.
 2. Changes are in keeping with the intent of the Contract Documents.
 3. The specified product cannot be provided within the Contract Time. The Architect will not consider the request if the specified product cannot be provided as a result of failure to pursue the Work promptly.
 4. The request is related to an "or-equal" clause.
 5. The substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deducting compensation to the Architect for redesign and increased cost of other construction.
 6. The specified product cannot receive approval by a governing authority, and the substitution can be approved.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction not complying with the Contract Documents do not constitute an acceptable request for substitution, nor do they constitute approval.

PART 3 - EXECUTION - Not Applicable

END OF SECTION 012500

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Alternates & Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment. Substitutions to this form are allowed only by approval of Architect and Construction Manager.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. Two copies shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 012900

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- J. Requests for Interpretation (RFI) procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: General product requirements.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.
- D. CSI/CSC Form 13.2A - Request for Interpretation; Current Edition.

1.4 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punch list, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 - 1. Newforma Project Cloud: www.newformaprojectcloud.com.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 SITE MOBILIZATION MEETING

- A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and occupancy prior to completion.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Meetings will occur on a weekly basis at a specified time and day to be determined after contract award.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Special consultants.
 - 5. Contractor's superintendent.
 - 6. Major subcontractors.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.

- E. Project Coordinator will prepare complete Construction Schedule incorporating all contractor's notations and values. Schedule will be published and updated when appropriate.

3.6 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect and Construction Manager.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Completion of site clearing.
 - 2. Excavations in progress.
 - 3. Foundations in progress and upon completion.
 - 4. Structural framing in progress and upon completion.
 - 5. Enclosure of building, upon completion.
 - 6. Final completion, minimum of ten (10) photos.
- E. Views:
 - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 - 2. Consult with Architect for instructions on views required.
 - 3. Provide factual presentation.
 - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 - 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Via email or TBD file sharing medium.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 - 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.7 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.
- C. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - 1) Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - 2) Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - 3) Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

D. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
3. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
4. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
5. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
6. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
7. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

E. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

2. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

3.8 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 2. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Discrete and consecutive RFI number, and descriptive subject/title.
 - 3. Issue date, and requested reply date.
 - 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION 013000

COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittal Procedures" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 1 Section "Closeout Procedures" for coordinating contract closeout.
 - 3. Division 1 Section "Administrative Requirements" for project specific requirements.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
 - 4. Each Contractor is required to coordinate with the Other Trades and be on site as walls are being built to lay out all penetrations to walls under construction.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals Procedures."

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.
2. Each Contractor shall prepare and publish this list.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining, and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High-speed operation.
 - 21. Improper lubrication.
 - 22. Unusual wear or other misuse.
 - 23. Contact between incompatible materials.

- 24. Destructive testing.
- 25. Misalignment.
- 26. Excessive weathering.
- 27. Unprotected storage.
- 28. Improper shipping or handling.
- 29. Theft.
- 30. Vandalism.

END OF SECTION 013100

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule. (All Prime Contractors)
 - 2. Daily construction reports. (All Prime Contractors)
 - 3. Field condition reports. (All Prime Contractors)

1.2 SUBMITTALS

- A. Contractor's Construction Schedule: The Contractor will provide printed copies to Construction Manager of initial and updated schedule, large enough to show entire schedule for entire construction period.
- B. Daily Construction Reports: Submit two (2) copies at weekly intervals.

1.3 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate prime contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Gantt-Chart Schedule: Contractors shall submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within ten (10) days of date established for the Notice to Proceed.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. High and low temperatures and general weather conditions.
 4. Accidents.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. Emergency procedures.
 9. Orders and requests of authorities having jurisdiction.
 10. Change Orders received and implemented.
 11. Construction Change Directives received.
 12. Services connected and disconnected.
 13. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, Construction Manager shall generate and update master schedule to reflect actual construction progress and activities. Prime Contractors shall submit weekly updates of their construction schedules to Construction Manager. Distribution: General Construction Contractor will coordinate and update master construction schedule and distribute copies of approved schedule to Architect, Owner, and other Prime Contractors, and other parties identified with a need-to-know schedule responsibility.
1. Schedules will be posted in project meeting rooms and temporary field offices.

END OF SECTION 013200

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CADD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals. Cost shall be \$200 per CADD file. Check payable to Bergmann Associates shall be submitted prior to file transfer. Contractors requesting electronic files will be required to execute a "CADD/Electronic File Transfer Agreement" which will indemnify the Architect – Refer to Section 013500 "Electronic Document Transfer" for information.
- B. Electronic Submittals: With the exception of samples and color charts, or as otherwise approved by the Design Builder, all submittals shall be electronic PDF images which shall be submitted for review and approval via the electronic project management web site or email. For submittals and/or shop drawings larger than 11" x 17", subcontractors are to submit hard copies in accordance with this section.
- C. Process: All submittals will be processed in/out by the Architect.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Review: Allow ten (10) working days for review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Contractor.
 - d. Name and address of subcontractor.
 - e. Name of manufacturer.
 - f. Number and title of appropriate Specification Section.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Remarks.
 - i. Signature of transmitter.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit five (5) copies of any non-electronic submittal to the Architect and Construction Manager. Architect will return two (2) copies, except shop drawings as required below.
 - 2. Shop Drawings: Submit two (2) non-reproducible copies of any non-electronic shop drawing to the Architect and Construction Manager. Architect will return two (2) copies to the contractor.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:

- a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 4. Number of Samples for Verification: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.

- a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Construction Manager/Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. No Exception Taken
 - 2. Revise and Resubmit
 - 3. Furnish as Corrected
 - 4. Rejected
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

ELECTRONIC DOCUMENT TRANSFER

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for the request and transfer of electronic documents from the Architect/Engineer to the Contractor, Subcontractors and the associated Equipment Vendors.
- B. Electronic Documents include, but are not limited to, the following:
 - 1. Floor Plan drawings.
 - 2. Detail drawings.
 - 3. Tables and charts.
- C. Transfer of documents includes, but is limited to, the following:
 - 1. Computer disks and CDs.
 - 2. E-mail attachments.
- D. All drawings, specifications or other documents of any kind prepared by the Architect/Engineer or its sub-consultants, whether in hard copy or any electronic or machine-readable format, including Electronic Documents are, and shall remain, instruments of their services. These Instruments of Services were prepared solely for use in connection with this Project. The Architect/Engineer and its sub consultants retain all common law, statutory and other reserved rights, including the copyright.
- E. The Electronic Documents are provided as a convenience to the Contractor for informational purposes only in connection with the Contractor's performance of its responsibilities and obligations relating to the Project. The Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications, which are, and remain, the Contract Documents for the Project or the paper copies of any other document prepared by the Architect/Engineer or its sub consultants.
- F. If any differences exist between printed Instruments of Services and the Electronic Documents, the information contained in the printed documents shall be presumed to be correct and shall take precedence over the Electronic Documents.
- G. Contractor agrees and understands that field conditions may alter or modify the configuration, products, materials, and installation of the information shown on the electronic documents. Contractor shall be fully responsible to verify all field conditions and if applicable to modify the electronic documents to the actual conditions prior to use of the documents. These documents are provided as a convenience only, and do not change the responsibility of the Contractor as outlined in the Drawings and Specifications.

- H. Architect/Engineer will not be responsible for, or required to assist the Contractor in the plotting or printing of any documents.

1.3 ELECTRONIC DOCUMENT TRANSFER PROCEDURES

- A Coordination: Coordinate transfer requests with performance of construction activities. Transmit each request to the CM and A/E sufficiently in advance of scheduled needs to avoid delay.
1. Processing: To avoid the need to delay installation as a result of the time required to process document transfers:
 - a. Allow 10 working days for the A/E's processing of each request, after receipt of a written request and the required processing fee.
 - b. The A/E will not authorize an extension of time because of the Contractor's failure to transmit requests and fees to the A/E sufficiently in advance of the Work to permit processing.
- B. Electronic Document Transfer Requests: Contractor shall submit a written request for any transfer consisting of the following:
1. Signed, completed copy of the attached "Electronic Document Transfer Agreement".
 2. List of drawing numbers and titles requested.
 3. A check in the proper amount for each drawing to cover the cost of processing the request. Refer to Section 013300 "Submittal Procedures."
 4. Statement of the requested software format. Drawings are only available in AutoCAD 2013 format.
 5. Statement clarifying the document format, i.e. either a CD copy or issue as an e-mail attachment.

PART 2 - PRODUCTS (Not applicable)

PART 3-EXECUTION (Not applicable)

END OF SECTION 013500

(CADD/ELECTRONIC FILE TRANSFER AGREEMENT – ATTACHED)

CADD/ELECTRONIC FILE TRANSFER TO CONTRACTOR

Dear **Contractor Name**:

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to **City of Chester – Public Works Facilities** and subject to the following terms and conditions:

We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instrument of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawing sheets: _____

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us and we make no warranties, either express or implied of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss or profit or any consequential damages as a result of your use or reuse of these electronic files.

XXX
Colliers Engineering & Design

Contractor Name:

signature

SPECIAL INSPECTIONS AND TESTING

PART 1 – GENERAL

- 1.1 The Owner shall employ the services of an independent testing agency/laboratory to perform specified field inspections and laboratory testing, (special inspection) and to make and cure compression test specimens as specified in Section 033000. Laboratory testing and preparation of concrete test specimens shall be paid for by Owner. Refer to respective sections for contractor's and Owner's requirements.
 - A. Contractor shall cooperate with laboratory to facilitate execution of its required services.
 - B. Employment of laboratory shall in no way relieve contractor's obligation to perform work of contract.
- 1.2 SPECIAL INSPECTION
 - A. Owner will employ services of an independent approved testing agency to perform special inspections during construction as required by the Pennsylvania Uniform Construction Code and authorities having jurisdiction. Inspections shall include but not limited to the following:
 - 1. Verification and inspection of steel construction per section 1705.2 and Table 1705.2.1 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 2. Verification and inspection of concrete construction per section 1705.3 and Table 1705.3 of 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 3. Inspection for masonry design per paragraph 1705.4 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 4. Inspection for seismic resistance per section 1705 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
- 1.3 RELATED REQUIREMENTS IN OTHER PARTS OF PROJECT MANUAL
 - A. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: Conditions of the contract.
- 1.4 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
 - A. Certification of products: Respective sections of specifications.
 - B. Test, adjust and balance of equipment: Respective sections of specifications.
 - C. Laboratory tests required and standards for testing: Each specification section listed.

PART 2 - PRODUCTS

2.1 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or expand the requirements of the Contract Documents
 - 2. Approve or accept any portion of work
 - 3. Perform any duties of contractor

2.2 NOTIFICATION OF TEST FAILURE

- A. Testing Laboratory shall notify the Architect/Construction Manager/Owner via telephone and in written form of any tests performed failing to meet specifications. Notification shall take place the same day the test results are obtained.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to work, to manufacturer's operations.
- B. Secure and deliver to laboratory, adequate quantities of representational samples of materials proposed to be used which require testing.
- C. Provide to laboratory, preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested
 - 2. To obtain and handle samples at project site or at source of product to be tested
 - 3. To facilitate inspections and tests
 - 4. For storage and curing of test samples
- F. Notify Construction Manager sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to contractor's negligence.
- G. Make arrangements with laboratory and pay for additional samples and tests required for contractor's convenience.
- H. When directed by Architect, employ and pay for services of a separate, equally qualified independent testing laboratory acceptable to Architect to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.

- I. Refer to respective sections of specifications for additional contractor responsibilities.
- J. Refer to STATEMENT OF SPECIAL INSPECTIONS following this section.

END OF SECTION 014100

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Connect" is to mean the labor and materials necessary to join or attach equipment, materials or systems to perform the function intended.
- G. "Product" includes materials, systems and equipment.
- H. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- I. "Supplier" is any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design.
- J. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- L. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- M. "Experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

- N. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- O. "Utility" is considered to mean any gas, steam, water, sanitary sewer, storm sewer, electrical or other such service.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section 012100 - Allowances
- C. Section 015100 - Temporary Utilities

1.2 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.3 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. All temporary utility usage charged will be incurred by the owner.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Verizon or Comcast Internet Service: Internet Service will be established for use of the General Contractors Field Office for Project Meetings and On-Site Activities, a fee of \$100 per month shall be carried by contractors from project start to finish. Service will need to be maintained from September 1, 2025 until project completion.

2. Printer/Copier: "All-in-on" unit, Toshiba e-Studio 2508a or equal printer server, combining color printing, photocopying, and scanning. Capability of letter, legal, and 11x17 paper. Provide paper, toner, and service for the duration of the project. Maintain service until project completion.
3. Conference Call Speaker: Provide one (1) Harmon/Kardon – Onyk Mini Portable Wireless Speakers for use by the CM / AE for project conference calls and meetings in CM trailer.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain portable facilities and enclosures. Provide at time of project mobilization. Provide a minimum of 4 portable toilets and provide additional as required by project.
- B. Provide bladder and cleaning service for CM office trailer restroom for project duration.
- C. Maintain daily in clean and sanitary condition.
- D. When necessary provide equipment to hold facilities upright and prevent them from tipping over.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around entrance to construction site and field office areas; equip with vehicular and pedestrian gates with locks.
- C. Fencing and gate locations to be coordinated with Owner. Gate entrances along 2nd street (route 13) are strongly discouraged.
- D. Vehicle access gate on Lloyd Street to be post driven, heavy duty swing gate, and operable. Minimum Gate Opening to be 25' Wide by 6' High. Provide chain and combination lock on each gate. Approval by Owner is required before installation of entrance gate.
- E. Quantity of fencing will be approximately 1200 Lineal Feet. Provide provisions for at least 3 swing gates in main site fencing.
- F. Fencing to be maintained through project completion and removed from the project by Contract 1 – General Trades, Earthwork & Site Work.

1.8 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.9 SECURITY

- A. Provide security and facilities to protect own Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Site Security Systems: Maintain existing Site Security systems.
 - 1. Web Based security camera system.
 - 2. Site Security Lighting.
- C. When such a time is deemed appropriate by Construction Manager and Architect, provide secure building enclosure of permanent structure. Either provide temporary door cylinders with keys and cores to Construction Manager or provide adequate other means of lockable doors for egress.

1.10 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner / Construction Manager.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets at all gates. A minimum of one Truck Drive Off Areas will be required along Llyod Street. Placement is at discretion of Construction Manager/Owner. Contractor will be responsible for maintenance of Drive Off Areas throughout the duration of the Project.
- E. ALL CONTRACTS - Temporary Contractor parking can occur along Lloyd street to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Provide snow and ice removal as required to minimize accumulations. Accumulation of 3 or more inches will require plowing and or salting to create passable entrance for vehicles and workers entering the site and building. Removal limits are site work area, building pad areas, entrances and walkways. Should snow begin to incumber work provide for off-site removal of snow. All entrances are to remain accessible and free of ice and snow throughout the work day.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition for the duration of the project.
 - 1. Provide minimum of (1) one container service to be used by all contractors. Size determined by contractor.
 - 2. Provide (1) one 6yd or 8yd container service with lid to be placed next to field office and contractor parking area.
 - 3. Provide additional container services as project necessitates.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Containers provided are to be utilized by all contracts included Construction Manager, Architect, and Owner.

1.12 PROJECT IDENTIFICATION / SIGNAGE

- A. Provide (1) one "Project Identification Sign" of minimum size 48"x96", design and construction indicated after contract award. Erect on site at location established by Architect or Construction Manager.
- B. Provide (4) four "Field Office Identification Signs" of minimum size 48"x96", design to be provided after contract award. Erect on site at location established by Construction Manager
- C. Temporary Signs: Provide and erect other signs as indicated and as required to inform public and individuals seeking entrance to Project. Minimum temporary signage as indicated below to be placed at direction of Construction Manager.
 - 1. Provide temporary, directional signs for construction personnel and visitors at East Ridge Road project entrance.
 - 2. Provide safety signage on site fencing and at every entrance gate both vehicular and pedestrian.
 - a. Provide "Hard Hats & Safety Glasses Required", "No Smoking", Authorized Personnel Only" signage every 100' along temporary fencing.
 - b. Provide 36"x48" Site Entrance Sign at main vehicle gate along North South Access Road. Design to be provided after contract award. Erect sign at main gate by direction of Construction Manager.
 - c. Provide 24"x36" Site Compliance/Security Signs at main vehicle gate, along temporary fencing, and inside building enclosure. Design to be provided after contract award. Erect sign by direction of Construction Manager. Include a minimum of twenty (25) signs to be provided by contract.
 - 3. Provide temporary signage along North South Access Road to direct both trucks, and personnel to field office or parking areas.

4. Provide (30) thirty 28" traffic cones to Construction Manager for use during project and traffic flow.
- D. Maintain and touch up signs so they are legible at all times.
- E. No other signs are allowed without Owner/ Construction Manager permission except those required by law.

1.13 FIELD OFFICES

- A. Field Offices: With approval by Construction Manager, each contractor may provide for its own use the following; Storage and Fabrication sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- B. Construction Manager's Field Office: Construction Manager has provided a field office of sufficient size to accommodate needs of Construction Manager and Architect and to accommodate project meetings specified in other Division 01 sections. Contract 1 shall equip the office as follows.
 1. Office supplies and office equipment as required for duration of the project to meet needs of project team to be billed against Allowance No. 1. See Section 01 21 00 – Allowances for further details.
 2. Telecommunications Equipment as specified in Section 1.04 of this document
- C. Portable Storage Containers: Owner / Construction Manager will have materials arriving that need to be stored on site throughout the duration of the project. Provide and maintain until project completion (2) two 40' storage containers on site. Provide locks on both and furnish keys to construction manager.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

- B. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- C. Pest Control: Engage pest-control services to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 2. Indicate sequencing work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure by prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written installation instructions for temperature, relative humidity, and exposure to water limits.

END OF SECTION 015000

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.

1.3 USE CHARGES

- A. General: Installation and removal of temporary facilities shall be included in the Contract Sum. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Usage Charges: All temporary utility usage charges will be incurred by owner.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installers of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 TEMPORARY ELECTRICITY

- A. Provide Temporary Electrical Service for the building and site during construction operations. Electrical service will be fed from the existing Temp Service Meter Panel. Service will be required to run underground following the direction of Construction Manager. Service may be picked up near CM trailer and be direct bury underground from existing panel board to board

mounted panel and disconnect near existing CM Office Trailer. Provide necessary distribution and safety equipment and panel board. Service should be sized adequately for the loads specified in this Section 015100 - Temporary Utilities and Section 015000 - Temporary Facilities and Controls and based on square footage and size of the project. Coordination may need to be had with RG&E if existing service is not adequately sized for new construction loads.

- B. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each major work area. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- G. Temporary Trailers: Electrical contractor to include hookup of up to (4) four office / storage trailers of other Prime Contractors. Any one (1) disconnect of existing CM office trailer following the completion of the project. Hookup location will be from existing or new panel board located next to CM Office Trailer.

1.7 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. When required by CM provide exterior building lights for safety and security purposes.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

1.8 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- C. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic controls.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide

and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.9 TEMPORARY WATER SERVICE

- A. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- B. Provide running water service to CM office trailer restroom to allow use of restroom inside the office trailer.

1.10 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

- E. Electric Power Service: Provide electric power service and distribution of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service underground unless otherwise indicated.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

END OF SECTION 015100

WATER CONTROLS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compliance with Air and Water Laws and Regulations.
- B. Each contractor and any and all tier level subcontractors agree as follows:
 - 1. The contractor, and his subcontractors warrant that any facility to be utilized in the performance of any non-exempt Contract or Subcontract is not listed on the List of Violating Facilities issued by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20. A condition for the award of the Contract is that prompt notice will be given to the City of any notification received from the Director, Office of Federal Activities, and EPA, indicating that a facility utilized or to be utilized for the Project is under consideration to be listed on the EPA List of Violating Facilities.
 - 2. The contractor warrants that he has not been convicted under Section 113(c) (1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.
 - 3. The contractor promises to comply with all the requirements of Sections 144 of the Clean Air Act, as amended (47 USC 1857C-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC 1318) relating to the inspection, monitoring, entry, reports and information as well as all other requirements specified in Section 144 and Section 308, and all regulations and guidelines issued thereunder.
 - 4. Air Pollution Abatement. All contractors are put on notice that there will be no burning of trees, rubbish or other material by any contractor during this Agreement. Normal burning of fuels in operation of construction equipment is exempt here except as the construction work is affected by the requirements of the Public Health Law (Air Pollution Control) and Chapter IV, Air Pollution Control of the Official Compilation of Codes, Rules and Regulations of the State of New York, Title 10, and local regulations, which are to be met.
 - 5. Soil Erosion and Water Pollution Abatement. Each contractor shall schedule and conduct his operations to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems, existing sanitary systems, impoundments (lakes, reservoirs, etc.) and lands adjacent to or affected by the work. Construction of drainage facilities and performance of other work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon there-after as practicable. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum. All contractors will comply with the Storm Water Pollution Prevent Plan (SWPP) Published in Division 1.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 METHODS

- A. Whenever a contractor's operations, carried out in accordance with the approved schedule, result in a situation where temporary erosion control measures must be taken, these measures are to follow the requirements set forth herein and be approved by the Architect or Owner.
- B. In carrying out erosion control measures, the contractor will be guided by, but not limited to, the following controls:
 - 1. Dewater for all conditions encountered. The site shall be controlled both during and after completion of the work so that erosion will be minimized. Waste or disposal areas shall be located and constructed in a manner that will keep the site free of standing water.
 - 2. All areas shall be cleared as soon as it is practicable during construction operations. Ditches which are filled or partly inoperative shall be cleaned and made operative before the Contractor stops work for any day, and shall be maintained in a condition satisfactory to the Owner or Architect for the duration of the Construction.
 - 3. Water from aggregate washing or other operations containing sediment shall be treated by filtration, settling basin or other means sufficient to reduce the sediment content.
 - 4. Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged into sanitary or storm systems or into natural or man made channels. Wash water or waste from concrete mixing operations shall not be allowed to enter sanitary or storm systems.

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3.2 COSTS

- A. The costs for performing this work shall be the responsibility of the contractor(s) performing work in conjunction with this specification.

END OF SECTION 015630

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Construction Contractor shall provide dumpsters as required for entire work of the project. Dumpsters shall be located on site. Each contractor may legally load acceptable construction debris into the Dumpsters (from this project only). Cost of all dumpsters and disposal fees shall be by the General Construction Contractor. Dumpsters shall remain on the project until project completion, or as directed by Construction Manager, Owner or Architect. See section 015000 - Temporary Facilities for specific requirements.
- B. Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.2 CLEANING NOTICE

- A. Each contractor is responsible for clean-up and disposal of waste materials, debris, and rubbish on a daily basis.
- B. The Owner/Architect/Construction Manager may issue written notification of insufficient cleaning relative to the requirements of this section. Upon issuance of the cleaning notice:
 - 1. All waste and accumulation of trash containing the contractor's debris shall be removed from the Owner's premises within 24 hours of notification.
 - 2. All designated project areas containing the contractor's debris or requiring general housekeeping shall be left fine broom clean (interior) or raked clean (exterior or rough surface). Sweeping compound shall be used for all interior broom cleaning to control dust.
- C. Failure by the contractor to comply with the 24-hour requirement of the notice to the satisfaction of the Owner/Architect/Construction Manager will result in a cleaning program directed by the Construction Manager at the expense of the contractor. Cost of clean-up performed for the Owner will be deducted from the contractor's request for payment.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 CLEANING

- A. Maintain areas under contractor's control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
- C. Daily clean interior areas to provide suitable conditions for work.

- D. Broom clean interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.
- E. Control cleaning operations so that dust and other particles will not adhere to wet or newly-coated surfaces.

3.2 DISPOSAL

- A. On a daily basis, remove waste materials, debris, and rubbish from site or to a dumpster supplied by the General Construction Contractor.

END OF SECTION 015690

FINAL CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Final cleaning of interior and exterior of project will be the responsibility of the General Construction Contractor.

1.2 DESCRIPTION

- A. Execute cleaning prior to inspection for substantial completion of each designated portion of the work and again at final completion before owner occupancy.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 - EXECUTION

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces. Remove all cleaning materials upon completion of cleaning.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a clear shine condition; remove foreign substances.
- E. Vacuum clean, shampoo carpeted and similar soft surfaces.
- F. Clean, damp mop, wax (3 coats), and polish resilient and hard-surface floor as recommended by the manufacturer.
- G. Clean surfaces of equipment; remove excess lubrication.
- H. Clean plumbing fixtures and toilet rooms to a sanitary condition.
- I. Clean light fixtures and lamps.
- J. Clean all interior and exterior windows, both sides.

END OF SECTION 015700

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Requirements in this Section apply to all Prime Contractors. See Division 21- 28 Sections for additional requirements and limitations applicable to cutting and patching mechanical and electrical installations.
- C. Each Prime Contractor is responsible for determining the scope of and performing all cutting, patching, trenching, backfill, bedding and compaction required by its own Work necessary to complete the project. Each Prime Contractor is responsible for infilling, finishing and fire stopping the annular spaces for its own Work.

1.2 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete, Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of Owner's personnel.
 6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 7. Complete startup testing of systems.
 8. Submit test/adjust/balance records.
 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 10. Advise Owner of changeover in heat and other utilities.
 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 12. Complete final cleaning requirements, including touchup painting.
 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or

will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 1. Submit a final Application for Payment.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit **three (3) copies** of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Organize list of spaces in sequential order.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit **one (1) copy** of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties within ten (10) days of Substantial Completion or on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner with at least **seven (7)** days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Sweep concrete floors broom clean in unoccupied spaces.
 - g. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - n. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

MAINTENANCE

PART 1 – GENERAL

1.1 SUMMARY

- A. Contractor shall compile product data and related information appropriate for Owner's operating and maintenance of products furnished under his contract.
 - 1. Prepare operating and maintenance data specified in this section and as referenced in other pertinent sections of specifications.
- B. Instruct Owner's personnel in operating and maintenance of products.
- C. Related Requirements Specified in Other Sections:
 - 1. SUBMITTAL PROCEDURES - Section 013300
 - 2. CLOSEOUT PROCEDURES - Section 017700
 - 3. CONSTRUCTION PROGRESS DOCUMENTATION - Section 013200
 - 4. Respective sections of specifications.

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel
 - 1. Trained and experienced in operating and maintenance of described products
 - 2. Completely familiar with requirements of this section
 - 3. Skilled as a technical writer to extent required to communicate essential data
 - 4. Skilled as a draftsman competent to prepare required drawings

1.3 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8-1/2" X 11"
 - 2. Paper: 20 lb. minimum, white, for typed pages
 - 3. Text: Manufacturer's printed data, or neatly typewritten
 - 4. Drawings:
 - a. Provide reinforced punched binder tab; bind in with text
 - b. Fold larger drawings to size of text pages
 - 5. Provide fly-leaf for each separate product or each piece of operating equipment
 - a. Provide typed description of product and major component parts
 - b. Provide indexed tabs

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

- a. Title of project
- b. Identity of separate structure as applicable
- c. Identity of general subject matter covered in manual

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers
2. Maximum ring size: 1 inch
3. When multiple binders are used, correlate data into related consistent groupings

1.4 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of volume.
3. List, with each product, name, address and telephone number of -
 - a. Subcontractor or installer
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement
4. Identify each product by product name and other identifying symbols as set forth in contract documents.

B. Product Data:

1. Include only those sheets which are pertinent to specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed
 - b. Clearly identify data applicable to installation
 - c. Delete references to inapplicable information

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of system
2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
3. Do not use project record documents as maintenance drawings

D. Written text, as required to supplement product data for particular Installation:

1. Organize in a consistent format under separate headings for different procedures
 2. Provide a logical sequence of instructions for each procedure
- E. Copy of each warranty, bond and service contract issued
1. Provide information sheet for Owner's personnel giving:
 - a. Proper procedures in event of failure
 - b. Instances which might affect validity of warranties or bonds

1.5 MANUAL FOR MATERIALS AND FINISHES

- A. Submit three (3) copies of complete manual in final form.
- B. Content for moisture protection and weather-exposed products
 1. Manufacturer's data giving full information on products
 - a. Applicable standards
 - b. Chemical composition
 - c. Details of installation
 2. Instructions for care, inspection, maintenance and repair.
- C. Additional requirements for maintenance data: Respective sections of specifications.

1.6 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents prior to start of work.
 1. Architect will review draft and return one copy with comments.
- B. Submit one copy of completed data in final form fifteen (15) days prior to final inspection or acceptance.
 1. Copy will be returned after final inspection or acceptance with comments.
- C. Submit specified number of copies of approved data in final form ten (10) days after final inspection or acceptance.

1.7 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in care and maintenance of all products and systems.
- B. Operation and maintenance manual shall constitute basis of instruction:

1. Review content of manual with personnel in full detail to explain all aspects of operation and maintenance.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 018000

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 OVERVIEW

A. Abbreviations

The following are common abbreviations used in this document.

| | | | |
|-----------------|-----------------------------|-------------|-----------------------|
| A/E- | Architect/Engineers | FT- | Functional Test |
| CA- | Commissioning Authority | GC- | General Contractor |
| CM- | Construction Manager | PM- | Project Manager |
| Cx- | Commissioning | TAB- | Testing and Balancing |
| Cx Plan- | Commissioning Plan document | | |

B. Definitions

Acceptance Phase - Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

Architect / Engineer (A/E) - the prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

Commissioning Coordinator - the member of the contractor's firm that is responsible for carrying out the contractor's commissioning tasks for the project. The Commissioning Coordinator is responsible for scheduling commissioning tests, coordination, ensuring start-up documents are completed, checklists are completed, correction of deficiencies and all other tasks defined in the responsibilities section of this document. The Commissioning Coordinator does not use a sampling strategy for checking equipment but rather checks 100% of the equipment included in the commissioning scope.

Commissioning Authority (CA) - an independent authority, not otherwise associated with the A/E design team members or the Contractor. The CA directs and coordinates the commissioning activities. The CA does not take an oversight role. The CA is part of the Owner's team and shall report directly to the Owner.

Commissioning Plan - an overall plan, developed before bidding that provides the structure, schedule and coordination planning for the commissioning process.

Construction Manager – shall refer to the person or company that is hired directly by the owner to coordinate trades, schedule work and other similar construction planning activities. For projects that do not have a construction manager hired directly by the owner, Construction Manager (CM) shall refer to the member of the general contractor that is responsible for coordinating trades and scheduling construction activities, usually the site superintendent.

Contract Documents - the documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, *Cx Plan*, etc.).

Contractor - General Contractor or authorized representative.

Control System - the central building energy management control system.

Data logging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data loggers separate from the control system.

Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed prior to substantial completion.

Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

Design Narrative or Design Documentation - sections of either the Owner's Project Requirements or Basis of Design or additional narrative as needed to comply with reporting requirements.

Direct Indicators - visually observing a system's response to a given condition or event.

Factory Testing - testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.

Functional Performance Tests (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed *after prefunctional checklists and startups are complete*.

General Contractor (GC) - See Contractor.

Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.

Manual Test - using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").

Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

Non-Compliance - see Deficiency.

Non-Conformance - see Deficiency.

Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50F to 75F to verify economizer operation). See also "Simulated Signal."

Owner (PM) – State University Construction Fund.

Phased Commissioning - commissioning that is completed in phases (by building or by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.

Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

Seasonal Performance Tests - FT's that are deferred until the system(s) will experience conditions closer to their design conditions.

Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.

Specifications - the construction specifications of the Contract Documents.

Startup - the initial starting or activating of dynamic equipment, including executing prefunctional checklists.

Test Procedures - the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CA.

Test Requirements - requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

Vendor - supplier of equipment.

Warranty Period - warranty period for entire project, including equipment components.

Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

C. Commissioning Definition

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction of this project is intended to achieve the following specific objectives:

1. Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.

D. Commissioned Systems

The following systems will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

HVAC Systems (and all integral equipment controls)

Variable Speed Drives

Air Handling Units

Makeup Air Units

Exhaust Fans

Unit Heaters

Infrared Heaters

Building Automation System - control sequences

HVAC Fire Mode - verify interface

Emergency Power Mode - verify restart transition

Plumbing Systems

Domestic Water Heaters
Domestic Hot Water Recirculation Pumps

Lighting Controls

Occupancy Sensors
Vacancy Sensors
Networked Low Voltage Lighting Control System

1.2 ROLES AND RESPONSIBILITIES

A. Responsibilities

1. All Parties
 - a. Follow the Commissioning Plan.
 - b. Attend commissioning scoping meeting and additional meetings, as necessary.
2. Contractor

Construction and Acceptance Phase
 - a. Assign a Commissioning Coordinator to oversee, plan and schedule commissioning tasks for all trades.
 - b. Coordinate the commissioning work to ensure that commissioning activities are being included in the schedule.
 - c. Include all costs of commissioning related work in the total contract price.
 - d. Review, become familiar and approve the final Commissioning Plan.
 - e. Ensure that all commissioning responsibilities are executed according to the Contract Documents and schedule.
 - f. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
 - g. Perform functional performance testing and operation of commissioned equipment in the presence of the CA.
 - h. Provide review of the commissioning progress and timely responses to the deficiency reports. Remedy the deficiencies.
 - i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.

- j. Provide all special tools, hardware, software and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CA.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- c. Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
- d. If deficiencies are not corrected in a timely manner such that seasonal or deferred retesting can not occur within the warranty period, the warranty period for the deficient item shall be extended until such time that the deficiency can be retested and approved.

3. Contractor (Mechanical Trade)

- a. Provide startup for all HVAC equipment, except for the building automation control system.
- b. Provide technical representatives to assist in equipment testing.
- c. Review test procedures for equipment installed by factory representatives.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

4. Contractor (Controls Trade)

- a. Assist and cooperate with the CA in the following manner:
 - 1. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system as specified. Assist in the functional testing of all equipment.

1.3 COMMISSIONING PROCESS

A. Brief Overview of Tasks

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. The CA develops specific equipment and system functional performance test procedures. The contractor reviews the procedures.
4. The procedures are executed by the contractor, under the direction of, and documented by the CA.
5. Items of non-compliance in material, installation or setup are corrected at the contractor's expense and the system retested.
6. Deferred testing is conducted, as specified or required.

1.4 COMMISSIONING SCOPING MEETING

A. Overview

A commissioning scoping meeting is planned and conducted by the CA within 90 days of the beginning of construction. In attendance are the CA, PM, assigned members of the CM, GC, A/E (particularly the mechanical and electrical engineers), the mechanical trade, electrical trade, TAB trade, plumbing trade, controls trade, any other installing trades or suppliers of equipment. At the meeting commissioning parties are introduced and the commissioning process reviewed, management and reporting lines determined. The Cx Plan is reviewed, process questions are addressed, lines of reporting and communications determined and the work products list discussed. Also covered are the general list of each party's responsibilities, who is responsible to develop the startup plan for each piece of equipment and the proposed commissioning schedule. The outcome of the meeting is increased understanding by all parties of the commissioning process and their respective responsibilities. The meeting provides the CA additional information needed to finalize the Cx Plan, including the commissioning schedule.

B. Construction Schedule Delivery

Prior to this meeting the CA is given, by the GC, the construction schedule by trade.

C. Meeting Minutes

The CA keeps notes from the meeting and distributes them to each team member.

1.5 MEETINGS

A. Commissioning Meetings

Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the contractor as required. These meetings will be used to review:

1. A log of all commissioning-related issues that require current or future attention using a Commissioning Issues Log.
2. Overall commissioning progress.

1.6 PROGRESS REPORTING AND LOGS

A. Issues Log

An updated commissioning issues log will be distributed to all parties each time changes are made to it. This log will be distributed showing open items only. Any party can receive a complete issues log showing both open and closed items at any time by requesting the complete log from the CA in writing.

1.7 DEVELOPMENT OF FUNCTIONAL TEST AND VERIFICATION PROCEDURES

A. Overview

Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is performed by the contractor.

B. Scope of Testing

The specifications provide a specific functional testing scope for each piece of commissioned equipment. If specific testing requirements were not included in the bid documents and original specifications, they will be developed for this project for each piece of commissioned equipment by the CA after the submittal phase of the project.

1.8 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

A. Overview and Process

The CA schedules functional tests through the contractor. The CA oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The contractor executes the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is

completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

B. Acceptance Criteria

In order for systems to be considered acceptable the following conditions must be met:

1. All sequences of operation must work per contract documents
2. Water flows are +/- 10% of the reported value
3. Water temperatures are +/- 10% of the reported value
4. Air flows are +/- 10% of the reported value
5. Air temperatures are +/- 10% of the reported value

C. Deficiencies and Retesting

1. The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported on the issues log. The contractor corrects deficiencies and notifies the CA when they are corrected. The CA schedules retesting through the contractor. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA and the installing technician. The CA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the contractor and A/E. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the owner. The owner gives final approval on each test.
2. The cost for the Contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the CA and PM will direct the retesting of the equipment once at no "charge" to the GC for their time. However, the CA's and PM's time for a second (and subsequent) retest will be charged to the GC. The time for the CA and PM to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back-charged to the GC.
3. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the PM. In such case, the Contractor shall provide the Owner with the following:
 - a. Within one week of notification from the PM, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the PM within two weeks of the original notice.

- b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
- c. The PM will determine whether a replacement of all identical units or a repair is acceptable.
- d. Two examples of the proposed solution will be installed by the Contractor and will test the installations for up to one week, upon which the PM will decide whether to accept the solution.
- e. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Facility Staff Participation

The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The owner will coordinate their attendance directly with the CA if desired.

E. Sampling

Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. If any type of equipment is functionally tested using a sampling strategy, all pieces of equipment that are not physically tested shall have their operation documented using trend logging and the logs reviewed for anomalies. The trend logs shall be submitted to the commissioning authority after review. The commissioning authority shall verify tests using the same sampling quantities as specified in section 1.19 of this specification.

F. Deferred Testing

- 1. Unforeseen Deferred Tests: Testing shall occur when environmental and building conditions allow for operation of any commissioned systems and allow observation of all specified functions. If any part of the sequence of operation cannot be observed for any reason (weather, partially occupied building, etc...) then the testing shall be deferred to a season in which the equipment can be operated through all sequences of operation. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. The contractor is responsible for determining the need for deferred testing based on the construction schedule, ability to put false loading on the system, and phasing shown in the contract documents. Any required deferred testing shall be provided to the owner at no additional cost.

2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as specified in this contract. The CA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the contractor, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builts due to the testing will be made.

1.9 WARRANTY PERIOD

A. Requirements

During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. The CA coordinates this activity. Tests are executed and deficiencies corrected by the contractor, witnessed by facilities staff and the CA. Any final adjustments to the O&M manuals and as-builts due to the testing are made. Refer to specification for seasonal testing details for this project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 019113

PART 1 - GENERAL

1.1 PROJECT INFORMATION

- A. Project Identification: City of Chester – New Public Works Garage and Salt Shed.
 - 1. Project Location: 2nd Street & Pennell Street, Chester, PA 19013.
- B. Owner: City of Chester, 1 4th Street, Chester, PA 19013.
- C. Architect and Engineer: Colliers Engineering and Design, Inc.
 - 1. Architect's Representative: Eric S. Baugher, AIA, NCARB
eric.baugher@colliersengcom.
- D. Architects Project Number: COCD004A.
- E. Construction Manager: The General Contractor engaged under contract 1 will be responsible to handle the duties and responsibilities of the construction manager.
- F. Web-Based Project Software: Project software administered by the General Contractor will be used for purposes of managing communication and documents during the construction stage.
- G. The Work of the Project is defined by the Contract Documents and consists of the following:
 - 1. **Contract 1: - General Trades, Earthwork & Sitework:** This Contract consists principally of all general construction work including the Pre-Engineered Metal Building, all Earthwork consisting of excavating, and mass grading of the entire work site and all site work that consists principally of all site utilities, subbase improvements and additional infrastructure.
 - 2. **Contract 2: Electrical:** This contract consists principally of all building electrical systems including standby power and life safety systems.
 - 3. **Contract 3: Plumbing & Fire Protection:** This Contract consists principally of all building plumbing systems for office area and garage as well as Fire Protection systems.
 - 4. **Contract 4: HVAC:** This Contract consists principally of all building heating and cooling systems as well as ventilation for the main garage bays.

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Multi-prime contract, based on a Stipulated Price.
- B. Multiple contracts are separate contracts, representing significant construction activities, between Owner and separate contractors. Description of work included under each separate contract is included herein. Each contract is performed concurrently and coordinated closely with construction activities performed on the Project under other contracts. Contracts for this Project include the following:
 - 1. Contract 1 - General Trades, Earthwork and Sitework
 - 2. Contract 2 – Electrical
 - 3. Contract 3 – Plumbing & Fire Protection
 - 4. Contract 4 – HVAC

*Future work is provided for reference purposes only.

C. The work of each separate prime contract is identified in this section.

1.3 **WORK BY OWNER**

A. All working in *italic* font below shall be provided by the owner. All work in **bold** font below shall be provided by the contractor and included in their bid.

B. Generator & Transfer Switch

- *Due to schedule implications, the owner will purchase the backup Generator and Transfer switch to be received by the electrical contractor for installation. The basis of design is provided on the electrical drawings for reference. The exact make & model that is purchased will be supplied upon procurement of the equipment.*
- **The electrical contractor shall include in Contract 2, all work associated with receiving the owner supplied equipment upon delivery and installation of a fully functional and code compliant electrical system. Electrical contractor shall be responsible for the care and protection of the equipment from the time of receipt until the entire project is turned over to the owner with an approved Certificate of Occupancy.**

C. Third Party Special Inspections

- *The Owner shall engage a third party inspection agency to perform inspections for steel construction, concrete construction, masonry construction and soil conditions, as required by IBC 2018 code and all additional requirements of the local Authority Having Jurisdiction (AHJ).*
- **The General Contractor shall include in Contract 1 all coordination and scheduling services to allow for inspections to occur in a timely manner and within the project construction sequence to keep the project schedule on track.**

D. Furniture, Furniture Systems & Equipment (FF&E)

- *The owner will engage a vendor for the design of Furniture systems.*
- *Tables, chairs, desks, cubicles, file cabinets, storage shelving in garage.*
- *Flag for flagpole*
- *All items above and final placement shall be provided and installed by the Owner's FF&E vendor.*
- **Procurement and installation of the Flagpole is to be included in Contract 1.**
- **Procurement and installation of the Lockers are to be included in Contract 1.**
- **Procurement and installation of the Vehicle Lift is to be included in Contract 1.**

E. Internet/Technology (IT)

- *The Owner will engage a vendor for the design of IT equipment and cabling requirements.*

- *Office/Open Office: Computers / Printers / Copiers / Phone system (VO/IP systems)*
- *Communications Room: Server Rack and Server equipment*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's IT vendor*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

F. Security

- *The Owner will engage a vendor for the design of Security equipment and cabling requirements.*
- *Office/Open Office: Computers, Data cables*
- *Communications Room: Security panel*
- *Cameras & Access Door Control Devices*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's Security Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**

G. Audio/Visual (AV):

- *The Owner will engage a vendor for the design of AV equipment and cabling requirements.*
- *Conference Rooms: Display Monitors, Conf. speakers & microphones, tabletop furniture outlets for AV connections*
- *Cabling and head end Equipment are Excluded*
- *All items above and final placement/connections shall be provided and installed by the Owner's AV Vendor.*
- **Procurement and installation of the Back Boxes, raceways & Conduit for cabling are to be included in Contract 2.**
- **Procurement and installation of concealed blocking shall be included in Contract 1, coordinate final locations with Owner's AV vendor.**

H. Appliances:

- *The Owner will make final selections of make and model for the below appliances*
- *Breakroom: (2) Refrigerator(s), (2) Microwave(s), Trash bins; Purchased and installed by Owner*

- *Mudroom: Washer/Drier Purchased by owner and installed by the Contractor*
 - **General Contractor shall include in Contract 1 the receivership of the above referenced Owner provided appliances and coordination with other trades for installation. Plumbing connections to be included in Contract 3. Exhaust connections to be included in Contract 4.**

I. Signage:

- *The owner will engage a vendor for the design of Signage, not required by the code, including but not limited to the following:*
- *Exterior Building Mounted Signs or Monument Signs*
- *Interior and/or Exterior Wayfinding signs of any kind.*
- *Interior Office name plate sign placards.*
- *All items above and final connections shall be provided and installed by the Owner's signage Vendor*
- **Procurement and installation of the Interior egress signage and room identification signage as required by code are to be included in Contract 1.**

J. Artwork/Wall Art

- *Artwork of any kind, unless noted otherwise on drawings shall be provided and installed by the Owner.*

K. Trash Containers

- a. *Exterior Trash containers are to be provided by the Owner's trash vendor.*
- b. *Interior trash containers are to be provided by the Owner's furniture vendor*

1.4 FUTURE WORK:

A. Solar Panels Over Parking Canopy: Contractor shall ensure that the installed parking canopy is capable of supporting the weight of future solar panels (7psf dead load).

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this section.
- B. Limits:
 - 1. Limit site disturbance, including earthwork and clearing of vegetation, to 40 feet beyond building perimeter; 10 feet beyond surface walkways, patios, surface parking, and utilities less than 12 inches in diameter; 15 feet beyond primary roadway curbs and main utility branch trenches; and 25 feet beyond constructed areas with permeable surfaces (such as

pervious paving areas, storm water detention facilities, and playing fields) that require additional staging areas in order to limit compaction in the constructed area.

- C. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- D. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- E. Time Restrictions:
 - 1. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
 - 2. Off hours work as approved by Owner.
- F. Utility Outages and Shutdown:
 - 1. Limit disruption of utility services to hours the site is unoccupied.
 - a. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
 - b. Obtain Construction Manager's written permission before proceeding with utility interruptions.
 - 2. Prevent accidental disruption of utility services to other facilities.
- G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Construction Manager.
 - 1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Construction Manager's written permission before proceeding with disruptive operations.
- H. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Construction Manager.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

- B. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 GENERAL REQUIREMENTS OF CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Prime Contractor should note that the project is applicable to all prevailing wage rates as determined by the wage rate schedule within these contract documents. Contractors will be required to submit certified payroll reports with their payment applications prior to processing and release of payments.
 3. Trenches and other excavation for the work of each contract shall be the work of each Contract for its own work.
 4. Blocking, backing panels, sleeves, and metal fabrication supports for the work of each contract shall be the work of each Contract for its own work.
 5. Furnishing of access panels for the work of each contract shall be the work of each Contract for its own work. Installation of all access panels shall be the work of Contract 3 - General Trades.
 5. Painting for the work of each contract shall be the work of each Contract for its own work.
 6. Cutting and Patching: Provided under each Contract for its own work, all patching work is to match existing materials in kind.
 7. Contractors' Startup Construction Schedule: Within five (5) working days after startup horizontal bar-chart-type construction schedule submittal has been received from Prime Contractors, submit a matching startup horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.
 8. All prime contractors are to review the drawings and specifications in their entirety. Where information conflicts occur or where multiple options are presented, the contractor is to have included the cost for the more expensive option.
 9. All prime contractors are responsible for any and all enclosures, partitions, temporary shoring, bracing, supports, or protection systems necessary to complete their own work.
 10. All prime contractors are required to implement and maintain a project specific safety program. Prime contractors shall submit their safety program within (5) business days of contract award notification to the Construction Manager. The program shall include company safety philosophy, history, action plans, emergency contact list, hazardous

communications sheets, OSHA filings, maintained weekly safety meeting minutes and reporting system for any accidents or injuries.

11. All prime contractors are required to submit a project specific Silica compliance program plan within (5) business days of contract award notification to the Construction Manager. The program must include safety equipment and procedures specific to completion of work of each contract.
 11. Each Prime Contractor and their applicable Subcontractors (If Any) are responsible to provide adequate, skilled manpower; and appropriate supervision throughout the course of the project as necessary to maintain the overall construction schedule and milestone dates.
 12. Local custom and trade-union jurisdictional settlements do not control the Scope of Work included in each Prime Contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, the affected Prime Contractors shall promptly negotiate a reasonable settlement to avoid or minimize the pending interruption and delays.
 13. All Federal, State, County and Local laws, codes, standards, rules and regulations including but not limited to zoning, planning, fire, health, tax, insurance, safety, OSHA, criminal, building code, plumbing code, HVAC code, Electrical code, traffic, labor, transportation, environmental, and education shall be adhered to.
 14. Prime Contractors are responsible for full time on site supervision of both prime contractors work as well as sub-contractors work being performed. It is the responsibility of Prime Contractor to undertake this superintendent type role for each respective Prime Contract.
 15. Prime Contractor will be responsible to maintain a master set of red line drawings. This master set will be kept in the GC's field office. As a condition of payment, each contractor will have a representative update the drawings with any and all changes made during the month including posting change order work, field directives, sketches issued, requests for information (RFI) answers, and so on.
 16. Prime Contractors shall follow all standards, requirements and time lines of the ARPA Grant as provided by the Owner and the Owner's representative UHY.
 17. Prime Contractors shall follow all standards, requirements and time lines of the EPA Grant related to the procurement and installation of the electrical vehicle charging stations as provided by the Owner and the Owner's representative UHY.
- C. Substitutions: Contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the work.
- D. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 01 Section 01 50 00 - Temporary Facilities and Controls and in Section 01 51 00 - Temporary Utilities each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office complete with necessary furniture, utilities, and telephone service at discretionary approval by Construction Manager.
 4. Its own storage and fabrication sheds, in a location designated by the Owner/Construction Manager.

5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting requirements for its own construction activities, up to and in excess of 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis, as necessary, at the CM's discretion. Back charges will be assessed to those Prime Contractors who fail to comply with progress cleaning requirements. It is the responsibility of Prime Contractors to enforce these requirements with their subcontractors.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 12. Dewatering necessary to lower and control groundwater levels and hydrostatic pressure to permit excavation and construction to be performed properly under dry conditions for the work of each contract shall be the work of each Contract for its own work.
- E. Temporary Heating, Cooling, and Ventilation: Contract 4 – HVAC is responsible for temporary heating, cooling, and ventilation before weather tight enclosure of building is complete. Contract 4 – HVAC is responsible for temporary heating, cooling, ventilation after permanent enclosure of building is complete. See Section 012100 – Allowances for specific details and requirements.
- G. Use Charges: Comply with the following:
1. Sewer Service: The cost for sewer service use by all parties engaged in construction activities at Project site is to be provided by the Owner.
 2. Water Service: The cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site is to be provided by the Owner.
 3. Electric Power Service: The cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site is to be provided by the Owner.

1.9 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Division 00 - Procurement and Contracting Requirements: All.
- C. Division 01 - General Requirements: All.

1.10 CONTRACT NO. 1 – EARTHWORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Earthwork Contract includes, but is not limited to, the following:

1. Contract 1 - Foundations shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 31 - Earthwork
 - a. All contract specification as listed under division 31 in Specification Section 000110 Table of Contents.
4. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 000115 List of Drawing Sheets.
5. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
6. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
7. Contractor must comply with all applicable OSHA standards.
8. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
9. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
10. Survey and Layout Data, the Owner will provide the Contractor with the minimum necessary Horizontal & Vertical Control in order to perform their required Construction Layout.
11. Construction Layout, Contract 1- Earthwork, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
12. Generally, Contractor is responsible for cut of existing site as indicated on civil drawings and specifications.
13. Contractor is responsible for coordination with utility companies for any work needed during coordination of mass cut / mass fill of sites and, or and relocation of existing utility structures as noted on Contract Drawings.
14. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
15. During mass cut contractor is responsible to maintain passage from Site Entrance to Field Office / MC DES Tunnel. Use on temporary roads may be required based on contractor's approach to the work.

16. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.

1.11 CONTRACT NO. 1 – SITE WORK

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Site Work Contract includes, but is not limited to, the following:
 1. Contract 1 - Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Place Concrete
 4. Division 13 - Special Construction
 - a. Specification Section 13 20 00 - Above Ground Storage Tanks and Fuel Systems
 5. Division 21 - Fire Suppression
 - a. Specification Section 21 11 00 - Facility Fire-Suppression Water-Service Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 6. Division 22 - Plumbing
 - a. Specification Section 22 11 13 - Facility Water Distribution Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint.
 - b. Specification Section 22 13 13 - Facility Sanitary Sewers
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 - c. Specification Section 22 16 23 - Natural Gas Piping
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section from 5'-0" outside the Building Footprint
 7. Division 32 - Exterior Improvements
 - a. All contract specification as listed under division 32 in Specification Section 000110 Table of Contents.
 8. Division 33 - Utilities
 - a. All contract specification as listed under division 33 in Specification Section 000110 Table of Contents.
 9. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 10. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report

- c. Preliminary Project Milestone Schedule.
- 11. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
- 12. Contractor must comply with all applicable OSHA standards.
- 13. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
- 14. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
- 15. Survey and Layout Data, the Civil Engineer will provide the Contractors Surveyor with the minimum horizontal & Vertical Control in order to perform their required Construction Layout.
- 16. Construction Layout, Contract 1 - General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
- 17. Temporary heating of work for Contract 1 – General Trades, Earthwork & Site Work is the responsibility of the contractor to maintain proper product requirements and schedule.
- 18. Contractor is responsible for coordination with utility companies for any work on or around existing utility structures as noted on Contract Drawings.
- 19. Contractor will need to coordinate with Owner, Construction Manager, and PENNDOT before removal of any fencing / guide rail to ensure all agencies required are notified.
- 20. Contractor is responsible to maintain passage from Site Entrance to Field Office.
- 21. Coordination and associated drawings for Site Work interfaced with all other Prime Contractors work.
- 22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 23. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
- 24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 25. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 26. Concrete Pavement, Sidewalks, and Curbing, including all Concrete Reinforcing & Cast-In-Place Concrete at Sidewalks & Pads indicated on the documents unless otherwise called for under a separate Prime Contract.
- 27. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.
- 28. Site Clearing and Earth Moving, all associated Excavated Spoils & C&D Waste generated directly from the performance of Contract 1 - General Trades, Earthwork & Site Work are to be Loaded, Hauled & Stockpiled onsite in the location indicated by Construction Manager and Owner.
- 29. Earth Moving, any Undercutting of existing subgrades directed by the 3rd Party Geotechnical Engineer and/or Testing Agency, but not indicated on the Contract Documents, shall

be performed on a unit cost basis for the appropriate material as outlined in the Contract Drawings, verified & signed written approval and acceptance by the CM's Site Representative at the end of each day will be required.

30. Earth moving at building footprint; preparation for the concrete slab on grade construction within the building footprint; strip topsoil, excavate, proof roll, 3rd party geotechnical agency approval, undercutting existing subgrades if directed, install Geotextile Stabilization Fabric if applicable, and import #2 crusher run stone structural fill materials to raise the existing grades & install required subbase to an Elevation of (- 1') of Finish Floor Elevation for Slab on Grade Construction, as per the Contract Documents.
 31. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 32. Site Utilities, this work is to include the hiring of a Plumbing Contractor Licensed in the City of Chester and incorporated directly under Contract 1 - General Trades, Earthwork & Site Work. All Utilities specified to be included within Contract 1 - Site Work scope of work are to be properly terminated including any necessary fittings required for final connection, within 5'-0" of the building footprint to be continued by the applicable Prime Contractor.
 33. Emergency Generator concrete pad and PECO transformer pad with associated work, including bollards, are the responsibility of Contract 1 – General Trades, Earthwork & Site Work.
 34. Dust control and cleaning of roadways at the completion of work day and as needed at CM discretion is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Traffic Control, as required for the performance Contract 1 - General Trades, Earthwork & Site Work.
 3. Support of Excavation and Protection, as required for the performance of Contract 1 - General Trades, Earthwork & Site Work.

1.12 CONTRACT NO. 1 – GENERAL TRADES

- A. Specification sections listed below as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the General Trades Contract includes, but is not limited to, the following:
 1. Contract 1 - General Trades, Earthwork & Site Work shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 1 is generally described as General Trades, Earthwork & Site Work, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.

3. Division 3 - Concrete
 - a. Specification Section 03 30 00 - Cast-in-Concrete
4. Division 4 - Masonry
 - a. All contract specification as listed under division 4 in Specification Section 000110 Table of Contents.
5. Division 5 - Metals
 - a. All contract specification as listed under division 5 in Specification Section 000110 Table of Contents.
6. Division 6 - Woods, Metals and Composites
 - a. All contract specification as listed under division 6 in Specification Section 000110 Table of Contents.
7. Division 7 - Thermal and Moisture Protection
 - a. All contract specification as listed under division 7 in Specification Section 000110 Table of Contents.
8. Division 8 - Openings
 - a. All contract specification as listed under division 8 in Specification Section 000110 Table of Contents.
9. Division 9 - Finishes
 - a. All contract specification as listed under division 9 in Specification Section 000110 Table of Contents.
10. Division 10 - Specialties
 - a. All contract specification as listed under division 10 in Specification Section 000110 Table of Contents.
11. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
12. Division 12 - Furnishings
 - a. All contract specification as listed under division 12 in Specification Section 000110 Table of Contents.
13. Division 13 - Special Equipment
 - a. Specification Section 13 34 19 - Metal Building Systems
14. Division 14 - Conveying Equipment
 - b. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
15. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
16. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
17. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
18. Contractor must comply with all applicable OSHA standards.
19. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
20. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and

cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.

21. Construction Layout, Contract 1- General Trades, Earthwork & Site Work, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
22. Cutting and Patching, to match existing in kind, as required for the performance of Contract 1 - General Trad General Trades, Earthwork & Site Work es.
23. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 1 - General Trades, Earthwork & Site Work.
24. Final Cleaning Work by a professional cleaning company, preapproved by the CM, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
25. Contract 1 - General Trades, Earthwork & Site Work is responsible to hire a professional cleaning company, preapproved by the CM, to perform weekly cleaning services in the CM's field office at the CM's discretion.
26. Submit Design Calculations, Shop Drawings and other Structural Data for all required building components Stamped/Sealed by a PA Licensed Professional Engineer for Review & Approval prior to the start of the Framing Activities.
27. Welding Certificates, all on site welding activities are to be performed by a Certified Welder. Copies of Certificates for welding procedures and personnel are to be provided to the CM by Contract 1 - General Trades, Earthwork & Site Work prior to any necessary welding activities on site.
28. Construction Waste Management and Disposal, includes Dumpsters, Hauling, and Legal Disposal of all C&D Waste generated by all Prime Contractors for the duration of the project, is the responsibility of Contract 1 - General Trades, Earthwork & Site Work
29. Coordination and associated drawings for Contract 3 - General Trades interfaced with all other MEP Prime Contractors Work.
30. Contract 1 – General Trades, Earthwork & Site Work is responsible for painting of all exposed MEP pipe, conduit, hangers, racks, ductwork, and so on in exposed ceiling areas and open mechanical bays.
31. Install all sleeves & embedment's provided by MEP Contractors along with the locations for any Work penetrating Concrete and Masonry Walls.
32. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
33. Excavation and Backfill Work for Contract 1 - General Trades is required for the performance of Contact 1 - General Trades, Earthwork & Site Work.
34. Temporary Fire Protection, OSHA compliant Temporary Fire Extinguishers as required, with the associated necessary Signage is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
35. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - General Trades for the Work of Contract 1 - General Trades, Earthwork & Site Work.
36. Miscellaneous Metals are the responsibility of Contract 1 - General Trades, Earthwork & Site Work.
37. Installation of steel bollards located throughout the site both interior and exterior of building areas is the responsibility of Contract 1 - General Trades, Earthwork & Site Work.

38. Roof Curbs, Flashing, and all other associated metal work with these specialties shall be provided by and installed by the PEMB vendor under Contract 1 - General Trades, Earthwork & Site Work.
 39. Contract 1 - General Trades, Earthwork & Site Work will be responsible for installation of louvers provided by Contract 4 – HVAC.
 40. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
 41. Contract 1 - General Trades, Earthwork & Site Work is responsible for all interior striping of the building footprint.
- D. Temporary facilities and controls in the General Trades Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Hoists, as required for the performance of Contract 3 – General Trades, includes all material, labor, and equipment necessary for all Cranes and Rigging.
 2. OSHA Temporary Perimeter fall protection, temporary cable safety railing, cable, eyebolts, turnbuckles, thimbles-1 strand 1-1/4" cable and accessories including top, middle & bottom rails per OSHA Standards typical at elevated floor and roof levels as required.
 3. Temporary Enclosures is the responsibility of Contract 1 - General Trades, Earthwork & Site Work for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures. Temporary enclosures and building lockup for security are at the discretion of the Construction Manager.

1.13 CONTRACT NO. 2 – ELECTRICAL

- A. Specification sections listed below as applicable to all contracts.
 1. Section 01 51 00: Temporary Utilities
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the Electrical Contract includes, but is not limited to, the following:
 1. Contract 2 - Electrical shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 2 is generally described as Electrical, but more specifically described in this Scope of Work.
 2. Wiring and temporary power provisions for temporary heat unit as outlined in Contract 4 – HVAC are the responsibility of this Contract 2 - Electrical.
 3. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 4. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection

- 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
5. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
6. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
7. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as indicated on the contract drawings or specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
8. Division 21 - Fire Suppression
 - a. Specification Section 21 05 33 - HEAT TRACING FOR FIRE SUPPRESSION PIPING
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
9. Division 26 - Electrical
 - a. All contract specification as listed under division 26 in Specification Section 000110 Table of Contents.
10. Division 27 - Communications
 - a. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Communication Systems provided by the Owner
11. Division 28 - Electronic Safety and Security
 - a. Specification Section 28 46 21.11 - Addressable Fire Alarm System
 - b. This Contractor shall provide all Work for pathways and back boxes, as indicated on drawings or specified in the Specification Section, as required for the installation of Conductors and Cables for Electronic Safety and Security provided by the Owner
12. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 2 - Electrical.
13. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
14. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.

15. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
16. Contractor must comply with all applicable OSHA standards.
17. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
18. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
19. Construction Layout, Contract 2 - Electrical, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
20. Cutting and Patching, to match existing in kind, as required for the performance of Contract 2 - Electrical.
21. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 2 - Electrical.
22. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
23. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 2 - Electrical.
24. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 2 - Electrical.
25. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 6 - Electrical for the Work of Contract 2 - Electrical.
26. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 6 - Electrical. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
27. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 2 - Electrical.
28. All ceiling mounted devices as part of Contract 2 - Electrical are to be mounted in the center of all recessed ceiling tiles.
29. Cast-In-Place Concrete Foundations & Pads are to be provided, as required for the performance of Contract 2 - Electrical.
30. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Site Work Contractor all Sleeves & Embedment's for Contract 2 - Electrical that penetrates Concrete & Masonry Walls. Contract 2 - Electrical shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
31. Site Electrical Work indicated in the Contract Documents is the Responsibility of this Contract 2 - Electrical. All Electrical Service Work is to be as per PECO's standard prac

- tices & procedures at Secondary Connections. Provide pull strings in all empty and spare Conduits.
32. Excavation and Backfill Work for Contract 2 - Electrical is required for the performance of Contract 2 - Electrical.
 33. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 2 - Electrical shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 2 - Electrical.
 36. All systems and equipment procured and installed for the New Public Works Facility must integrate with current City of Chester IT infrastructure systems. Coordinate with Owner's IT vendor to ensure a complete and compatible system.
 37. Fire Alarm Systems installed in the New Public Works Facility are required to integrate with the existing City of Chester service and maintenance contracts already in place for Fire Alarm Systems.
 38. Door Contacts, Card Readers, Door Controllers, Door Controllers Panels and all other associated security components will be furnished and installed by the Owner's Security vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 39. Drop downs and devices with cover plates, server equipment & racks and all other associated IT components will be furnished and installed by the Owner's IT vendor. All necessary back boxes, and conduit / raceways are part of base bid contract of this Contract 2 - Electrical.
 45. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 46. All underground electrical work associated with Contract 2 - Electrical inclusive of interior to the building footprint will be the responsibility of Contract 2 - Electrical.
- D. Temporary facilities and controls in other Contracts include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Electricity, Power & Lighting, including Labor, Materials & Equipment for the Project Site and also each Field Office is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 2 - Electrical. All Temporary Electrical Service Work is to be as per local utilities standard practices & procedures at Secondary Connections
 2. Temporary Hoists, as required for the performance of Contract 2 - Electrical.
 3. Traffic Control, as required for the performance Contract 2 - Electrical.

1.14 CONTRACT NO. 3 – PLUMBING AND FIRE PROTECTION

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.

- C. Work in the Plumbing & Fire Protection Contract includes, but is not limited to, the following:
1. Contract 3 - Plumbing & Fire Protection shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 3 is generally described as Plumbing & Fire Protection, but more specifically described in this Scope of Work.
 2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
 3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 6. Division 14 - Conveying Equipment
 - a. Specification Section 14 45 00 - Heavy Duty Vehicle Lifts
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 7. Division 21 - Fire Suppression
 - a. All contract specification as listed under division 21 in Specification Section 000110 Table of Contents.
 8. Division 22 - Plumbing
 - a. All contract specification as listed under division 22 in Specification Section 000110 Table of Contents.
 9. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 10. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
 11. Other Documents List:

- a. Geotechnical Report.
- b. Stormwater Infiltration Exploration Report
- c. Preliminary Project Milestone Schedule.
12. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
13. Contractor must comply with all applicable OSHA standards.
14. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
15. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
16. Construction Layout, Contract 3 - Plumbing & Fire Protection, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
17. Cutting and Patching, to match existing in kind, as required for the performance of Contract 3 - Plumbing & Fire Protection.
18. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 3 - Plumbing & Fire Protection.
19. Contract 3 - Plumbing & Fire Protection is responsible for Water, Sewer & Storm Services to 5'-0" outside the Building Footprint also including all necessary Fittings & Tie-In's, and Gas Service outside to the Service Providers Gas Meter Bars includes all necessary Fittings & Tie-in's as well.
20. Contract 3 - Plumbing & Fire Protection is responsible for Water and Sewer Services; also including all necessary fittings & tie-in's, and gas service to the Service Providers Gas Meter Bars, include all necessary fittings and tie-in's as well.
21. Coordination, Contract 4 – HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 – HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
22. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 3 - Plumbing & Fire Protection.
23. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 3 - Plumbing & Fire Protection.
24. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 3 - Plumbing & Fire Protection for the Work of Contract 3 - Plumbing & Fire Protection.
25. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 3 – Plumbing & Fire Protection. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)

26. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 3 – Plumbing & Fire Protection.
 27. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 3 - Plumbing & Fire Protection that penetrates Concrete & Masonry Walls. Contract 3 - Plumbing & Fire Protection shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
 28. All Sprinkler Heads must be placed in the center of an acoustic ceiling tile and symmetrically located in any hard-surfaced ceilings.
 29. Temporary heating of work for Contract 3 - Plumbing & Fire Protection is the responsibility of Contract 4 – HVAC to maintain proper product requirements and schedule.
 30. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
 31. Excavation and Backfill Work for Contract 3 - Plumbing & Fire Protection is required for the performance of Contract 3 - Plumbing & Fire Protection.
 33. After Contract 1 – General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.
 34. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 35. Contract 3 - Plumbing & Fire Protection shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 3 - Plumbing & Fire Protection.
- D. Temporary facilities and controls in the Foundations Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Temporary Water, including Labor, Materials & Equipment is to be provided, and maintained, as necessary for all Prime Contractors use, by Contract 3 - Plumbing & Fire Protection.
 2. Temporary Hoists, as required for the performance of Contract 3 - Plumbing & Fire Protection.
 3. Traffic Control, as required for the performance Contract 3 - Plumbing & Fire Protection.

1.15 CONTRACT NO. 4 – HVAC

- A. Specification sections listed above as applicable to all contracts.
- B. Provide all Work except Work specifically assigned to other contractors in this Section.
- C. Work in the HVAC Contract includes, but is not limited to, the following:
 1. Contract 4 – HVAC shall provide labor, material, plant, tools, equipment, administration, management, supervision and trades related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for Contract 4 is generally described as Mechanical/HVAC, but more specifically described in this Scope of Work.

2. Should the achievement of the watertight envelope not be completed by an appropriate date, at the discretion of the CM, the Mechanical/HVAC contract will be responsible for providing temporary heat. Temporary Heat will include the following:
 - a. All installation and hook-up of a Temporary Exterior packaged unit (i.e. Babfar Unit or approved alternate)
 - b. All material, equipment and labor to provide temporary heat including set-up and demobilization at the end of the heating season.
 - c. All ductwork for a 1.5m BTUH gas fired unit with associated manual dampers for both floors and ductwork to be extended throughout all work in spaces.
 - d. A maintained temperature range of 45-60 degrees.
 - e. Temporary heating equipment, material and labor is to be billed out of the Temporary Heating Allowance for Contract 4. Refer to Section 01 21 00 – Allowances for details. Contractor markup for this allowance is limited to 10% total.
2. Drawings and General Provisions of the Contract, including General and Supplementary General Conditions and other Division 0 & 1 Specification Sections, apply to this Section.
3. Division 7 - Thermal and Moisture Protection
 - a. Specification Section 07 92 00 - Thermal and Moisture Protection
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
4. Division 8 - Openings
 - a. Specification Section 08 31 13 - Access Doors and Frames
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
5. Division 11 - Equipment
 - a. Specification Section 11 31 00 - Residential Appliances
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
6. Division 23 - Heating Ventilating and Air Conditioning
 - a. All contract specification as listed under division 23 in Specification Section 000110 Table of Contents.
7. Division 31 - Earthwork
 - a. Specification Section 31 10 00 - Site Clearing
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
 - b. Specification Section 31 20 00 - Earthwork
 - 1) This Contractor shall provide all Work complete, as specified in the Specification Section, as required for the performance of Contract 4 - HVAC.
8. Contract Drawings:
 - a. All contract drawings as listed in Specification Section 00 01 15 List of Drawing Sheets.
9. Other Documents List:
 - a. Geotechnical Report.
 - b. Stormwater Infiltration Exploration Report
 - c. Preliminary Project Milestone Schedule.
10. Other Work of this Contract:
 - a. As per all Federal, State, County & Local Code Requirements. Provide all required Permits, Licenses & associated Fees.
11. Contractor must comply with all applicable OSHA standards.

12. Perform a Field Survey to verify all Existing Conditions prior to Submitting a Bid.
13. Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of (2) weeks advance notice prior to the time of the proposed shut down and cutover. Any shutdowns and cutovers, depending on their type, generally must be scheduled on weekends, at night, or during holiday periods. The Contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the contractor to complete the shutdowns or cutovers.
15. Construction Layout, Contract 4 - HVAC, shall be responsible for all Construction Layout & Stakeout to be performed by a PA Licensed Professional Surveyor as required for the performance of their own Work.
16. Cutting and Patching, to match existing in kind, as required for the performance of Contract 4 - HVAC.
17. Progress Cleaning, on a daily basis, as necessary, associated with the performance of Contract 4 - HVAC.
18. Coordination, Contract 4 - HVAC shall provide initial backgrounds for coordination drawings to be utilized by all MEP trades. Final Drawings shall be provided by Contract 4 - HVAC for all trades to build by upon acceptance & sign-off by the Mechanical Engineer on Record.
19. Cut, Cap & Make Safe, any Utilities as required for the performance of Contract 4 - HVAC.
20. Perform hand, or machine Test Pits as required to locate existing Utilities prior to Tie-Ins as required for the performance of Contract 4 - HVAC.
21. Fire Resistive Systems and Through Penetration Firestopping is the responsibility of Contract 4 - HVAC for the Work of Contract 5 - HVAC.
22. Earth Moving at Building Footprint & Paving Area's; Excavation and Backfill with Select Stone Structural Fill Materials to the Underside of the Concrete Slab-on-Grade Construction or Paving area's to +/- 1", as per the Contract Documents, and as required for the performance of Contract 4 - HVAC. (Direct Load all Excavation Spoils so not to Contaminate the Building Pad Subbase and Load, Haul & Legally Dispose of all Spoils at an Off-Site Location)
23. Any Dewatering is to be included by this Contractor, as required for the performance of Contract 4 - HVAC.
24. Furnish along with locations to the Contract 1 - General Trades, Earthwork & Sitework Contractor all Sleeves & Embedment's for Contract 5 - HVAC that penetrates Concrete & Masonry Walls. Contract 4 - HVAC shall provide necessary Sawing & Coring for penetrations through Walls, Floors and Ceilings where Sleeves were not provided.
25. Temporary heating for all work is the responsibility of the contractor for Contract 4 - HVAC to maintain proper product requirements and schedule.
26. Excavation and Backfill Work for Contract 4 - HVAC is required for the performance of Contract 4 - HVAC.
27. Contractor is responsible for coordination with utility companies for any work needed as noted on Contract Drawings.
28. After Contract 1 - General Trades, Earthwork & Site Work establishes the identified building pad elevations (-1'), the responsibility for maintenance of material will be the responsibility of each Contractor for their own work. Any disturbance of approved subgrade will be the responsibility each Contract for its own work.

29. Contractor is responsible for final survey by a licensed contractor of field layout required to complete their work in accordance with the Contract Documents and Specifications.
 30. Contract 4 - HVAC shall provide all necessary coordination of work with the PEMB Vendor under Contract 1 - General Trades, Earthwork & Sitework as required for the performance of Contract 4 - HVAC.
 31. Contract 4 - HVAC shall provide all louvers to be installed by Contract 1 - General Trades, Earthwork & Sitework.
- D. Temporary facilities and controls in the Plumbing & Fire Protection Contract include the following, and Division 01 50 00 Section "Temporary Facilities and Controls" and Division 01 51 00 Section "Temporary Utilities":
1. Contract 4 - HVAC is responsible for temporary heating, cooling, and ventilation after permanent enclosure of building is complete and Owner will pay utility-use charges. This Contract 4 - HVAC shall provide an even distribution of 1 CFM per SF and maintain ambient Room Temperature of 72 degrees Fahrenheit as required by any Prime Contractors in order to maintain specific manufacturer's product warranties.
 2. Temporary Hoists, as required for the performance of Contract 4 - HVAC.
 3. Traffic Control, as required for the performance Contract 4 - HVAC.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 011000

LIST OF STANDARD ABBREVIATIONS

PART 1 – GENERAL

1.1 GENERAL

- A. Where, in the Contract Documents, abbreviations are used, they shall be defined as indicated in the following list.
- B. Should contractor find abbreviations that are not indicated in list, or shall a question arise relative to an abbreviation, he shall notify Architect in writing and a clarifying addendum shall be issued.

1.2 INDEX OF STANDARD ABBREVIATIONS:

- A. The following is a list of abbreviations used in these contract documents and their meaning:

| | | |
|-----|-------------------------|-----------------|
| 1. | Above finished floor | A.F.F. |
| 2. | Acoustic tile | ACT. T. or A.T. |
| 3. | Addition | ADD. |
| 4. | Adjustable | ADJ. |
| 5. | Air condition | A.C. |
| 6. | Alteration or alternate | ALT. |
| 7. | Aluminum | ALUM. |
| 8. | Ampere | A. |
| 9. | Angle | > |
| 10. | Annunciator | ANNC. |
| 11. | Architect | ARCH. |
| 12. | At | @ |
| 13. | Auditorium | AUD. |
| 13. | Avenue | AVE. |
| 14. | Basement | BSMT. |

| | | |
|-----|---------------------|------------------|
| 15. | Bearing | BRG. |
| 16. | Bench mark | B.M. |
| 17. | Bent | BT. |
| 18. | Bituminous | BIT. |
| 19. | Block or blocking | BLK. or BLKG. |
| 20. | Board | BD. |
| 21. | Bottom | BOTT. OR BTM. |
| 22. | Bracket | BRKT. |
| 23. | Building | BLDG. |
| 24. | Built-up roof | B.U.R. |
| 25. | Cabinet | CAB. |
| 26. | Carpet | CARP. or CPT |
| 27. | Cast iron | C.I. |
| 28. | Catch basin | C.B. |
| 29. | Ceiling | CLG. |
| 30. | Cement plaster | C. PLAS. |
| 31. | Center line | CL |
| 32. | Ceramic mosaic tile | C.M.T. |
| 33. | Ceramic tile | C.T. |
| 34. | Chalkboard | CHK. BD. or C.B. |
| 53. | Classroom | CR. |
| 35. | Cleanout | C.O. |
| 36. | Clear | CLR. |
| 37. | Column | COL. |

| | | |
|-----|-------------------------|-----------------------|
| 38. | Concrete | CONC. |
| 39. | Concrete block lintel | C.B.L. |
| 40. | Concrete masonry unit | C.M.U. |
| 41. | Conduit | C. |
| 42. | Conference | CONF. |
| 42. | Connection | CONN. |
| 43. | Construction | CONST. |
| 44. | Construction joint | CONST. JT. |
| 45. | Continuous | CONT. |
| 46. | Contractor | CONTR. |
| 47. | Control joint | C.J. |
| 48. | Convactor | CONV. |
| 49. | Corrugated steel pipe | C.S.P. |
| 50. | Counter | CTR. |
| 51. | Course (brick or block) | CRS. |
| 52. | Cubic foot | CU. FT. |
| 53. | Cubic foot per minute | CFM |
| 54. | Cubic inch | CU. IN. |
| 55. | Cubic yard | CU. YD. |
| 56. | Department | DEPT. |
| 57. | Detail | DET. |
| 58. | Diameter | DIAM., D., DIA., or Ø |
| 59. | Dimension | DIM. |
| 60. | Dispenser or disposal | DISP. |
| 61. | Double | DBL. |

| | | |
|-----|---------------------------|---------------|
| 62. | Dowels | DWLS. |
| 63. | Down | DN. |
| 64. | Downspout | D.S. |
| 65. | Drawing | DWG. or DRWG. |
| 66. | Drinking fountain | D.F. |
| 67. | Each | EA. |
| 68. | Each face | E.F. |
| 69. | Each way | E.W. |
| 69. | Electric | ELEC. |
| 70. | Electrical Contractor | E.C. |
| 71. | Elevation | ELEV. OR EL. |
| 72. | Epoxy | EP. |
| 73. | Equipment | EQUIP. |
| 74. | Equipment supplier | E.S. |
| 75. | Existing | EXIST. or EX. |
| 76. | Expansion joint | EXP. JT. |
| 77. | Exposed | EXP. |
| 78. | Exterior | EXT. |
| 79. | Feet | FT. or (') |
| 80. | Fiber | FIB. |
| 81. | Finish | FIN. |
| 82. | Fire extinguisher | F.E. |
| 82. | Fire extinguisher cabinet | F.E.C. |
| 83. | Fire hose | F.H. |

| | | |
|------|-----------------------------|-------------------|
| 84. | Fire rated | F.R. |
| 85. | Fixture | FIX. |
| 86. | Floor | FL. or FLR. |
| 87. | Floor drain | F.D. |
| 88. | Fluorescent | FLUOR. |
| 89. | Foot | FT. (') |
| 90. | Footing | FTG. |
| 91. | Foundation | FDN. |
| 92. | Fresh air intake (or inlet) | FAI |
| 93. | Gallon | GAL. |
| 94. | Galvanized | GALV. |
| 95. | Gauge | GA. |
| 96. | General Contractor | G.C. |
| 97. | Glass | GL. |
| 98. | Grab bar | G.B. |
| 99. | Grade | GR. or GRD. |
| 100. | Gymnasium | GYM. |
| 100. | Gypsum | GYP. |
| 101. | Gypsum board | GYP. BD. |
| 102. | Hard | HD. |
| 103. | Hardner | HARD. |
| 104. | Heating Contractor | H.C. |
| 105. | Height | HGT. or HT. or H. |
| 106. | Hollow metal | H.M. |
| 107. | Horizontal | HORIZ. |

| | |
|------------------------|-----------------------|
| 108. Horsepower | HP |
| 109. Hour | HR. |
| 110. Inch | IN. or (") |
| 111. Inside diameter | I.D. |
| 112. Inside pipe size | I.P.S. |
| 113. Insulation | INSUL. |
| 114. Interior | INT. |
| 115. Invert | INV. |
| 116. Joint | JT. |
| 117. Kilo volt ampere | K.V.A. |
| 118. Kilowatt | K.W. |
| 119. KIP (1,000 lb.) | K. |
| 120. Laboratory | LAB. |
| 121. Laminated plastic | LAM. PLAS. or L.P. |
| 122. Lavatory | LAV. |
| 123. Left hand | L.H. |
| 124. Lighting panel | L.P. |
| 125. Linear feet | LIN. FT. |
| 126. Lockers | LKRS. |
| 127. Machine | MACH. |
| 128. Magnetic | MAG. |
| 129. Manhole | M.H. |
| 130. Manufacturer | MFG. or MFGR. or MFR. |
| 131. Marker Board | M.B. |

| | |
|-------------------------|---------------|
| 131. Masonry | MAS. |
| 132. Masonry opening | M.O. |
| 133. Material | MAT'L. |
| 134. Maximum | MAX. |
| 135. Mechanical. | MECH. |
| 136. Medicine cabinet | MED. CAB. |
| 137. Metal | MET. or MTL. |
| 138. Minimum | MIN. |
| 139. Mirror | MIR. |
| 139. Miscellaneous | MISC. |
| 140. Moisture resistant | M.R. |
| 141. Not in contract | N.I.C. |
| 142. Not to scale | N.T.S. |
| 143. Number | NO. or # |
| 144. Office | OFF. |
| 144. On center | O.C. |
| 145. Opening | OPG. or OPNG. |
| 146. Operator | OPER. |
| 147. Opposite | OPP. |
| 148. Outside diameter | O.D. |
| 149. Overall | O.A. |
| 150. Overhead | O.H. |
| 151. Paint | PT. |
| 151. Painted | PTD. |
| 152. Pair | PR. |

| | |
|------------------------------|-----------------|
| 153. Panel | PNL. |
| 154. Pavement | PVMT. |
| 155. Percent | % |
| 156. Perimeter | PERIM. |
| 157. Piece | PC. |
| 158. Plaster | PLAS. |
| 159. Plastic drain pipe | P.D.P. |
| 160. Plastic laminate | P.L. or P. LAM. |
| 161. Plastic underdrain pipe | P.U.P. |
| 162. Plate | P _L |
| 163. Plumbing | PLBG. or PLMB. |
| 164. Plumbing Contractor | P.C. |
| 165. Plywood | PLYW. or PLYWD. |
| 166. Poly vinyl chloride | P.V.C. |
| 167. Pound | LB. or # |
| 168. Pounds per cubic foot | #/CU. FT. |
| 169. Pounds per square foot | #/SQ. FT., PSF |
| 170. Pounds per square inch | #/SQ. IN., PSI |
| 171. Power panel | P.P. |
| 172. Pressure treated | P.T. |
| 173. Principal | PRINC. |
| 174. Projection | PROJ. |
| 173. Quarry tile | Q.T. |
| 174. Radius | R. or RAD. |

| | |
|-------------------------------|------------------|
| 175. Rain leader | R.L. or R.W.L. |
| 176. Receptacle | REC. |
| 177. Refrigerator | REFRIG. |
| 178. Reinforce or reinforcing | REINF. |
| 179. Required | REQ'D. |
| 180. Revolution per minute | R.P.M. |
| 181. Right hand | R.H. |
| 182. Roof drain | R.D. |
| 183. Room | RM. |
| 184. Rough opening | R.O. |
| 185. Rubber | RUB. |
| 186. Sanitary | SAN. |
| 187. Schedule | SCHED. |
| 188. Science | SCI. |
| 188. Section | SECT. |
| 189. Sheet | SHT. |
| 190. Sheet vinyl | SHT. V. |
| 191. Shelving | SHLVG. |
| 192. Similar | SIM. |
| 193. Sound transmission glass | S.T.G. |
| 194. Specifications | SPEC. |
| 195. Square | SQ. |
| 196. Square foot | SQ. FT. |
| 197. Square inch | SQ. IN. |
| 198. Stainless steel | S.S. or ST. STL. |

| | |
|------------------------------------|-----------------|
| 199. Standard | STD. |
| 200. Steel | STL. |
| 201. Stone | STN. |
| 202. Street | ST. |
| 203. Structural | STRUC. |
| 204. Structural glazed facing tile | S.G.F.T. |
| 205. Surfaced four sides | S4S |
| 206. Suspend | SUSP. |
| 207. Switch | SW. |
| 208. Tack board | TK. BD. or T.B. |
| 209. Temperature | TEMP. |
| 210. Terrazzo | TERR. |
| 211. Thermostat | THERMO. |
| 212. Thick | THK. |
| 213. Thousand pounds | KIP or K |
| 214. Threshold | THRES. |
| 215. Tile | T. |
| 216. Tile-like coating | T.L.C. |
| 217. Toilet | TLT. |
| 217. Toilet tissue | T.T. |
| 218. Tongue and groove | T & G |
| 219. Towel bar | T.B. |
| 220. Typical | TYP. |
| 221. Unit heater | U.H. |

| | |
|-----------------------------|--------|
| 222. Unit ventilator | U.V. |
| 223. Vent Stack | V.S. |
| 224. Vent through roof | V.T.R. |
| 223. Verify in field | V.I.F. |
| 224. Vertical | VERT. |
| 225. Vinyl asbestos tile | V.A.T. |
| 226. Vinyl composition tile | V.C.T. |
| 227. Vinyl wallcovering | V.W.C. |
| 228. Vitrified clay pipe | V.C.P. |
| 229. Volume | VOL. |
| 230. Wainscot | WAINS. |
| 231. Water closet | W.C. |
| 232. Weatherproof | WP. |
| 233. Welded wire mesh | W.W.M. |
| 234. Wide flange (steel) | W.F. |
| 235. With | W/ |
| 236. Without | W/O |
| 237. Wood | WD. |
| 238. Yard | YD. |
| 239. Yard panel | Y.P. |

END OF SECTION 011700

ALLOWANCES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Contingency allowance.

1.2 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.3 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.4 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 CONTINGENCY ALLOWANCE

- A. Use the contingency allowance only as directed by Construction Manager or Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

- B. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Contingency Allowance.
- C. Funds will be drawn from the Contingency Allowance only by Change Order.
- D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance for Contract 1, General Trades, Earthwork & Site Work: Include the sum of \$(155,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- B. Allowance No. 2: Contingency Allowance for the Contract 2, Electrical work: Include the sum of \$(39,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- C. Allowance No. 3: Contingency Allowance for the Contract 3, Plumbing & Fire Protection: Include the sum of \$(15,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.
- D. Allowance No. 4: Contingency Allowance for Contract 4, HVAC: Include the sum of \$(17,000.00).
 - 1. This allowance includes material cost receiving, handling, installation, and Contractor overhead and profit.

- E. Allowance No. 5: Temporary Heating Allowance for Contract 4, HVAC: Include the sum of \$(9,000.00).
 - 1. This allowance includes all temporary heating requirements as specified in Section 01 50 00 - Temporary Facilities and Controls.

END OF SECTION 012100

ALTERNATE AND UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for alternates and unit prices

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- B. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the unit price.
- C. Notification: Immediately following award of the Contract, the Construction Manager shall notify each prime contractor, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.
- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- F. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

1.4 PROCEDURES FOR UNIT PRICES

- A. Unit prices include all necessary material, labor, equipment, services and incidentals, plus cost for the delivery, installation, insurance, overhead and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurements and payment for unit prices are specified in those Sections. Quantities indicated in the documents in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount. Payment will not be made on the following: Products wasted or disposed of in a manner that is not acceptable; Products determined as unacceptable before or after placement; Products not completely unloaded from the transporting vehicle; Products placed beyond the lines and levels of the required work; Products remaining on hand after the completion of the Work, Loading, hauling, and disposing of rejected products.
- C. Owner/Construction Manager reserve the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit prices: A schedule of unit prices is included in part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Salt Shed Structure and Prefab Roof system.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations, protective bollards, and all other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed as shown on the drawings in its entirety, including but not limited to foundations with associated earthwork and site work, Concrete walls, protective bollards, prefab membrane roof structure, finishes, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed.

B. Alternate No. 1A: Salt Shed Structure, Excluding Prefb Roof System.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Salt Shed in its entirety, including footings, foundations and all

other associates, plumbing & electrical components. Paving, as indicated on the civil drawings, shall cover the area of the salt shed and shall be consistent with adjacent grades. Extend the concrete curb along the area that would make up the south and west walls of the salt shed.

Alternate: Provide the cost to construct the salt shed walls, foundations and footings, with associated earthwork and site work, concrete finishes and striping, lighting and plumbing hose bib as indicated on contract drawings. Omit the extended concrete curb along the area that would make up the south and west walls of the salt shed. Omit the procurement and installation of the prefabricated fabric membrane roof system.

C. Alternate No. 2: Parking Canopy.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy as shown on the contract drawings in its entirety, including but not limited to foundations and footings, concrete piers, prefabricated roof structure, finishes and associated electrical components for lighting systems.

D. Alternate No. 2A: Parking Canopy Footings & Foundations.

Basis of Design: The base contract shall NOT include the cost for procurement and installation of the Parking Canopy in its entirety, including footings, foundations and all other associated electrical components. Paving, as indicated on the civil drawings, shall cover the area of the parking canopy and shall be consistent with adjacent grades. Provide parking space striping as shown on drawings.

Alternate: Provide the cost to construct the Parking Canopy footings and foundations as shown on the contract drawings, including concrete piers, finishes and associated electrical components for lighting systems. Omit the prefabricated steel parking canopy structure.

E. Alternate No. 3: Commercial EV Charging Stations.

Basis of Design: Omit all work associated with the EV Charging stations, as indicated in the drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching, back filling, cutting and patching and adjacent protective bollards (2 at each unit).

Alternate: Provide the cost to construct the commercial grade electrical vehicle (EV) charging stations in their entirety, as shown on the contract drawings including but not limited to purchase and installation of the equipment, electrical power supply, breakers and disconnects, conduits and feeders, trenching, back filling, cutting and patching and adjacent protective bollards (2 at each unit). All work must be completed in compliance with the EPA grant, provided by the owner, within the timeframe indicated in the grant requirements.

F. Alternate No. 4: Sealed Concrete In Breakroom & Locker Rooms.

Basis of Design: Provide and install tile and laminate flooring as indicated on the contract drawings in the Men's Locker room, Women's Locker rooms and Break room respectively.

Alternate: Provide the deduct cost to omit the tile and/or laminate flooring, prep and underlayment in the locker rooms and breakroom and seal the concrete slab in these rooms with Conc-1 as the final finish (3 coats). Omit extension kits required to set floor drains level with applied flooring systems.

G. Alternate No. 5: Eliminate HVLS Fans (Big Ass Fans).

Basis of Design: Provide and install HVLS fans and all associated utilities and support structure as indicated on the contract drawings.

Alternate: Provide the deduct cost to omit the HVLS fans only. The associated electrical utilities and structural support components are to remain as part of the base bid and shall be constructed with or without the procurement and installation of the fans.

H. Alternate No. 6: Radiant Heaters and Heat Trace.

Basis of Design: Provide and install Unit Heaters as indicated on the contract drawings. Provide all electrical, structural and mechanical components necessary for a complete installation of the unit heaters. (Do not include cost for procurement and installation of radiant heaters, heat trace, electrical, support from bent frames, plumbing, and mechanical components necessary for radiant and heat trace systems).

Alternate: Provide the cost to omit the unit heaters and all associated electrical, plumbing and mechanical components and structural support from main frame and in lieu of unit heaters, procure and install radiant heaters and heat trace as shown on the contract drawings with all electrical, structural and mechanical components necessary for a complete installation.

I. Alternate No 7: Heavy Duty Vehicle Lift.

Basis of design: Contractors to provide and install Vehicle Lift and make all final connections per trade as indicated in contract drawings and specifications. Contractors to provide all accessory elements required for fully functional equipment system including but not limited to concrete footings, power and final connections, compressed air and final connections.

Alternate: Contractors to provide deduct cost to omit procurement and installation of the Heavy Duty Vehicle Lift Equipment. Contractors shall still provide all accessory elements required for a fully functional equipment system including but not limited to concrete footings, power, compressed air. Owner to provide and install the heavy duty vehicle lift equipment and make final connections through co-operative vender.

3.2 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Removal of potential unforeseen building foundation. The General Contractor shall provide the Contract Unit Price per cubic yard for removal and disposal of any existing concrete footings, stone or masonry foundations unforeseen on the surface.
- B. Unit Price No. 2: Trench Rock. The General Contractor shall provide the Contract Unit Price per cubic yard for rock excavation by ram hammer
- C. Unit Price No. 3: Unsuitable Soils Removal and Replacement with Stone. The General Contractor shall provide the Contract Unit Price per cubic yard for removing and disposing of unsuitable soils as determined by the geotechnical engineer, and replaced with #2 crusher run stone structural fill materials
- D. Unit Price No. 4: Installation of Underground Conduit for EV stations. Electrical Contractor to provide the Contract Unit Price per linear foot for trenching, installation of (2) 2-1/2" conduits with pull strings for the EV Charging Stations and back filling as required by the contract documents. Reference electrical specifications for allowable conduit type.

END OF SECTION 012300

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTIONS

- A. Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed after award of the Contract are considered requests for substitutions. The following are not requests for substitutions:
1. Substitutions requested during the bidding period and accepted by Addendum prior to award of the Contract.
 2. Revisions to the Contract Documents requested by the Owner.
 3. Specified options included in the Contract Documents.
 4. Contractor's compliance with regulations issued by governing authorities.

1.2 SUBSTITUTION REQUEST SUBMITTAL

- A. The Architect will consider requests for substitution received within 30 days after Notice of Award.
1. Submit three (3) copies of each request for substitution. Submit requests according to procedures required for change-order proposals.
 2. Identify the product or method to be replaced in each request. Include related Specification Section and Drawing numbers.
 3. Provide documentation showing compliance with the requirements for substitutions and the following information:
 - a. Coordination information, including a list of changes needed to other Work that will be necessary to accommodate the substitution.
 - b. A comparison of the substitution with the Work specified, including performance, weight, size, durability, and visual effect.
 - c. Product Data, including Drawings and descriptions of products and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the effect on the Construction Manager's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the substitution on Contract Time.
 - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
 - g. Certification that the substitution conforms to the Contract Documents and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may become necessary because of the failure of the substitution to perform adequately.
 4. Architect's Action: If necessary, the Architect will request additional information within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection within 2 weeks of receipt of the request. Acceptance will be in the form of a change order.

- a. Use the product specified if the Architect cannot make a decision within the time allocated.

PART 2 - PRODUCTS

2.1 CONDITIONS

- A. The Architect will receive and consider a request for substitution when one or more of the following conditions are satisfied. Otherwise, the Architect will return the requests without action except to record noncompliance with these requirements.
 1. Extensive revisions to the Contract Documents are not required.
 2. Changes are in keeping with the intent of the Contract Documents.
 3. The specified product cannot be provided within the Contract Time. The Architect will not consider the request if the specified product cannot be provided as a result of failure to pursue the Work promptly.
 4. The request is related to an "or-equal" clause.
 5. The substitution offers the Owner a substantial advantage, in cost, time, or other considerations, after deducting compensation to the Architect for redesign and increased cost of other construction.
 6. The specified product cannot receive approval by a governing authority, and the substitution can be approved.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction not complying with the Contract Documents do not constitute an acceptable request for substitution, nor do they constitute approval.

PART 3 - EXECUTION - Not Applicable

END OF SECTION 012500

PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Alternates & Unit Prices" for administrative requirements governing the use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G732 and AIA Document G703 as form for Applications for Payment. Substitutions to this form are allowed only by approval of Architect and Construction Manager.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt within 24 hours. Two copies shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Schedule of unit prices.
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707-1994, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 012900

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- J. Requests for Interpretation (RFI) procedures.

1.2 RELATED REQUIREMENTS

- A. Section 01 60 00 - Product Requirements: General product requirements.

1.3 REFERENCE STANDARDS

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.
- C. CSI/CSC Form 12.1A - Submittal Transmittal; Current Edition.
- D. CSI/CSC Form 13.2A - Request for Interpretation; Current Edition.

1.4 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for site access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 10 00 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punch list, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 - 1. Newforma Project Cloud: www.newformaprojectcloud.com.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.2 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and Architect.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.3 SITE MOBILIZATION MEETING

- A. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements and occupancy prior to completion.
 - 3. Construction facilities and controls provided by Owner.
 - 4. Temporary utilities provided by Owner.
 - 5. Survey and building layout.
 - 6. Security and housekeeping procedures.
 - 7. Schedules.
 - 8. Application for payment procedures.
 - 9. Procedures for testing.
 - 10. Procedures for maintaining record documents.
 - 11. Requirements for start-up of equipment.
 - 12. Inspection and acceptance of equipment put into service during construction period.

- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

- A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings. Meetings will occur on a weekly basis at a specified time and day to be determined after contract award.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Special consultants.
 - 5. Contractor's superintendent.
 - 6. Major subcontractors.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of RFIs log and status of responses.
 - 7. Review of off-site fabrication and delivery schedules.
 - 8. Maintenance of progress schedule.
 - 9. Corrective measures to regain projected schedules.
 - 10. Planned progress during succeeding work period.
 - 11. Coordination of projected progress.
 - 12. Maintenance of quality and work standards.
 - 13. Effect of proposed changes on progress schedule and coordination.
 - 14. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.

- E. Project Coordinator will prepare complete Construction Schedule incorporating all contractor's notations and values. Schedule will be published and updated when appropriate.

3.6 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect and Construction Manager.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Completion of site clearing.
 - 2. Excavations in progress.
 - 3. Foundations in progress and upon completion.
 - 4. Structural framing in progress and upon completion.
 - 5. Enclosure of building, upon completion.
 - 6. Final completion, minimum of ten (10) photos.
- E. Views:
 - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 - 2. Consult with Architect for instructions on views required.
 - 3. Provide factual presentation.
 - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
 - 5. Point of View Sketch: Provide sketch identifying point of view of each photograph.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: Via email or TBD file sharing medium.
 - 2. File Naming: Include project identification, date and time of view, and view identification.
 - 3. Point of View Sketch: Include digital copy of point of view sketch with each electronic submittal; include point of view identification in each photo file name.
 - 4. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.7 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.
- C. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - 1) Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - 2) Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - 3) Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

D. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
3. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
4. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
5. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
6. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
7. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

E. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Submittal Format: Submit or post coordination drawing files using PDF format.

2. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.

3.8 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information .
 - b. Use CSI/CSC Form 13.2A - Request for Interpretation.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 2. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 3. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

- a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Discrete and consecutive RFI number, and descriptive subject/title.
 - 3. Issue date, and requested reply date.
 - 4. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 5. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 6. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION 013000

COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittal Procedures" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 1 Section "Closeout Procedures" for coordinating contract closeout.
 - 3. Division 1 Section "Administrative Requirements" for project specific requirements.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
 - 3. Make provisions to accommodate items scheduled for later installation.
 - 4. Each Contractor is required to coordinate with the Other Trades and be on site as walls are being built to lay out all penetrations to walls under construction.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 - 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals Procedures."

B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.
2. Each Contractor shall prepare and publish this list.

PART 2 – PRODUCTS - (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessively high or low temperatures.
 - 4. Thermal shock.
 - 5. Excessively high or low humidity.
 - 6. Air contamination or pollution.
 - 7. Water or ice.
 - 8. Solvents.
 - 9. Chemicals.
 - 10. Light.
 - 11. Radiation.
 - 12. Puncture.
 - 13. Abrasion.
 - 14. Heavy traffic.
 - 15. Soiling, staining, and corrosion.
 - 16. Bacteria.
 - 17. Rodent and insect infestation.
 - 18. Combustion.
 - 19. Electrical current.
 - 20. High-speed operation.
 - 21. Improper lubrication.
 - 22. Unusual wear or other misuse.
 - 23. Contact between incompatible materials.

- 24. Destructive testing.
- 25. Misalignment.
- 26. Excessive weathering.
- 27. Unprotected storage.
- 28. Improper shipping or handling.
- 29. Theft.
- 30. Vandalism.

END OF SECTION 013100

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule. (All Prime Contractors)
 - 2. Daily construction reports. (All Prime Contractors)
 - 3. Field condition reports. (All Prime Contractors)

1.2 SUBMITTALS

- A. Contractor's Construction Schedule: The Contractor will provide printed copies to Construction Manager of initial and updated schedule, large enough to show entire schedule for entire construction period.
- B. Daily Construction Reports: Submit two (2) copies at weekly intervals.

1.3 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate prime contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Gantt-Chart Schedule: Contractors shall submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within ten (10) days of date established for the Notice to Proceed.

2.2 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. High and low temperatures and general weather conditions.
 4. Accidents.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, and losses.
 7. Meter readings and similar recordings.
 8. Emergency procedures.
 9. Orders and requests of authorities having jurisdiction.
 10. Change Orders received and implemented.
 11. Construction Change Directives received.
 12. Services connected and disconnected.
 13. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At bi-weekly intervals, Construction Manager shall generate and update master schedule to reflect actual construction progress and activities. Prime Contractors shall submit weekly updates of their construction schedules to Construction Manager. Distribution: General Construction Contractor will coordinate and update master construction schedule and distribute copies of approved schedule to Architect, Owner, and other Prime Contractors, and other parties identified with a need-to-know schedule responsibility.
1. Schedules will be posted in project meeting rooms and temporary field offices.

END OF SECTION 013200

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CADD Drawings of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals. Cost shall be \$200 per CADD file. Check payable to Bergmann Associates shall be submitted prior to file transfer. Contractors requesting electronic files will be required to execute a "CADD/Electronic File Transfer Agreement" which will indemnify the Architect – Refer to Section 013500 "Electronic Document Transfer" for information.
- B. Electronic Submittals: With the exception of samples and color charts, or as otherwise approved by the Design Builder, all submittals shall be electronic PDF images which shall be submitted for review and approval via the electronic project management web site or email. For submittals and/or shop drawings larger than 11" x 17", subcontractors are to submit hard copies in accordance with this section.
- C. Process: All submittals will be processed in/out by the Architect.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.
1. Review: Allow ten (10) working days for review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- F. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Contractor.
 - d. Name and address of subcontractor.
 - e. Name of manufacturer.
 - f. Number and title of appropriate Specification Section.
- G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.
- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.
 2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Remarks.
 - i. Signature of transmitter.

- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit five (5) copies of any non-electronic submittal to the Architect and Construction Manager. Architect will return two (2) copies, except shop drawings as required below.
 - 2. Shop Drawings: Submit two (2) non-reproducible copies of any non-electronic shop drawing to the Architect and Construction Manager. Architect will return two (2) copies to the contractor.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
 - k. Compliance with recognized trade association standards.
 - l. Compliance with recognized testing agency standards.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:

- a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shop work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Samples: Prepare physical units of materials or products, including the following:
1. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of the variations.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 4. Number of Samples for Verification: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.

- a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
- F. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 1. Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Construction Manager/Architect will not return copies.
 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
- B. Material Safety Data Sheets: Submit information directly to Owner. If submitted to Architect, Architect will not review this information but will return it with no action taken.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. No Exception Taken
 - 2. Revise and Resubmit
 - 3. Furnish as Corrected
 - 4. Rejected
- C. Informational Submittals: Architect will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 013300

ELECTRONIC DOCUMENT TRANSFER

PART 1- GENERAL

1.1 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A This Section includes administrative and procedural requirements for the request and transfer of electronic documents from the Architect/Engineer to the Contractor, Subcontractors and the associated Equipment Vendors.
- B. Electronic Documents include, but are not limited to, the following:
 - 1. Floor Plan drawings.
 - 2. Detail drawings.
 - 3. Tables and charts.
- C. Transfer of documents includes, but is limited to, the following:
 - 1. Computer disks and CDs.
 - 2. E-mail attachments.
- D. All drawings, specifications or other documents of any kind prepared by the Architect/Engineer or its sub-consultants, whether in hard copy or any electronic or machine-readable format, including Electronic Documents are, and shall remain, instruments of their services. These Instruments of Services were prepared solely for use in connection with this Project. The Architect/Engineer and its sub consultants retain all common law, statutory and other reserved rights, including the copyright.
- E. The Electronic Documents are provided as a convenience to the Contractor for informational purposes only in connection with the Contractor's performance of its responsibilities and obligations relating to the Project. The Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications, which are, and remain, the Contract Documents for the Project or the paper copies of any other document prepared by the Architect/Engineer or its sub consultants.
- F. If any differences exist between printed Instruments of Services and the Electronic Documents, the information contained in the printed documents shall be presumed to be correct and shall take precedence over the Electronic Documents.
- G. Contractor agrees and understands that field conditions may alter or modify the configuration, products, materials, and installation of the information shown on the electronic documents. Contractor shall be fully responsible to verify all field conditions and if applicable to modify the electronic documents to the actual conditions prior to use of the documents. These documents are provided as a convenience only, and do not change the responsibility of the Contractor as outlined in the Drawings and Specifications.

- H. Architect/Engineer will not be responsible for, or required to assist the Contractor in the plotting or printing of any documents.

1.3 ELECTRONIC DOCUMENT TRANSFER PROCEDURES

- A Coordination: Coordinate transfer requests with performance of construction activities. Transmit each request to the CM and A/E sufficiently in advance of scheduled needs to avoid delay.
1. Processing: To avoid the need to delay installation as a result of the time required to process document transfers:
 - a. Allow 10 working days for the A/E's processing of each request, after receipt of a written request and the required processing fee.
 - b. The A/E will not authorize an extension of time because of the Contractor's failure to transmit requests and fees to the A/E sufficiently in advance of the Work to permit processing.
- B. Electronic Document Transfer Requests: Contractor shall submit a written request for any transfer consisting of the following:
1. Signed, completed copy of the attached "Electronic Document Transfer Agreement".
 2. List of drawing numbers and titles requested.
 3. A check in the proper amount for each drawing to cover the cost of processing the request. Refer to Section 013300 "Submittal Procedures."
 4. Statement of the requested software format. Drawings are only available in AutoCAD 2013 format.
 5. Statement clarifying the document format, i.e. either a CD copy or issue as an e-mail attachment.

PART 2 - PRODUCTS (Not applicable)

PART 3-EXECUTION (Not applicable)

END OF SECTION 013500

(CADD/ELECTRONIC FILE TRANSFER AGREEMENT – ATTACHED)

CADD/ELECTRONIC FILE TRANSFER TO CONTRACTOR

Dear **Contractor Name**:

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to **City of Chester – Public Works Facilities** and subject to the following terms and conditions:

We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced specifications.

Data contained on these electronic files are part of our instrument of service and shall not be used by you or anyone else receiving these data through or from you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or subconsultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we reserve the right to remove all indicia of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawing sheets: _____

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us and we make no warranties, either express or implied of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss or profit or any consequential damages as a result of your use or reuse of these electronic files.

XXX
Colliers Engineering & Design

Contractor Name:

signature

SPECIAL INSPECTIONS AND TESTING

PART 1 – GENERAL

- 1.1 The Owner shall employ the services of an independent testing agency/laboratory to perform specified field inspections and laboratory testing, (special inspection) and to make and cure compression test specimens as specified in Section 033000. Laboratory testing and preparation of concrete test specimens shall be paid for by Owner. Refer to respective sections for contractor's and Owner's requirements.
 - A. Contractor shall cooperate with laboratory to facilitate execution of its required services.
 - B. Employment of laboratory shall in no way relieve contractor's obligation to perform work of contract.
- 1.2 SPECIAL INSPECTION
 - A. Owner will employ services of an independent approved testing agency to perform special inspections during construction as required by the Pennsylvania Uniform Construction Code and authorities having jurisdiction. Inspections shall include but not limited to the following:
 - 1. Verification and inspection of steel construction per section 1705.2 and Table 1705.2.1 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 2. Verification and inspection of concrete construction per section 1705.3 and Table 1705.3 of 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 3. Inspection for masonry design per paragraph 1705.4 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
 - 4. Inspection for seismic resistance per section 1705 of the 2018 International Building Code as adopted by the Pennsylvania Uniform Construction Code.
- 1.3 RELATED REQUIREMENTS IN OTHER PARTS OF PROJECT MANUAL
 - A. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: Conditions of the contract.
- 1.4 RELATED REQUIREMENTS SPECIFIED IN OTHER SECTIONS
 - A. Certification of products: Respective sections of specifications.
 - B. Test, adjust and balance of equipment: Respective sections of specifications.
 - C. Laboratory tests required and standards for testing: Each specification section listed.

PART 2 - PRODUCTS

2.1 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or expand the requirements of the Contract Documents
 - 2. Approve or accept any portion of work
 - 3. Perform any duties of contractor

2.2 NOTIFICATION OF TEST FAILURE

- A. Testing Laboratory shall notify the Architect/Construction Manager/Owner via telephone and in written form of any tests performed failing to meet specifications. Notification shall take place the same day the test results are obtained.

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to work, to manufacturer's operations.
- B. Secure and deliver to laboratory, adequate quantities of representational samples of materials proposed to be used which require testing.
- C. Provide to laboratory, preliminary design mix proposed to be used for concrete and other material mixes which require control by testing laboratory.
- D. Furnish copies of products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to work to be tested
 - 2. To obtain and handle samples at project site or at source of product to be tested
 - 3. To facilitate inspections and tests
 - 4. For storage and curing of test samples
- F. Notify Construction Manager sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 - 1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to contractor's negligence.
- G. Make arrangements with laboratory and pay for additional samples and tests required for contractor's convenience.
- H. When directed by Architect, employ and pay for services of a separate, equally qualified independent testing laboratory acceptable to Architect to perform additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.

- I. Refer to respective sections of specifications for additional contractor responsibilities.
- J. Refer to STATEMENT OF SPECIAL INSPECTIONS following this section.

END OF SECTION 014100

REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": The term "approved," when used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.
- D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Connect" is to mean the labor and materials necessary to join or attach equipment, materials or systems to perform the function intended.
- G. "Product" includes materials, systems and equipment.
- H. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- I. "Supplier" is any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design.
- J. "Install": The term "install" describes operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- L. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.
- M. "Experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

- N. "Project site" is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.
- O. "Utility" is considered to mean any gas, steam, water, sanitary sewer, storm sewer, electrical or other such service.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section 012100 - Allowances
- C. Section 015100 - Temporary Utilities

1.2 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.3 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. All temporary utility usage charged will be incurred by the owner.

1.4 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Verizon or Comcast Internet Service: Internet Service will be established for use of the General Contractors Field Office for Project Meetings and On-Site Activities, a fee of \$100 per month shall be carried by contractors from project start to finish. Service will need to be maintained from September 1, 2025 until project completion.

2. Printer/Copier: "All-in-on" unit, Toshiba e-Studio 2508a or equal printer server, combining color printing, photocopying, and scanning. Capability of letter, legal, and 11x17 paper. Provide paper, toner, and service for the duration of the project. Maintain service until project completion.
3. Conference Call Speaker: Provide one (1) Harmon/Kardon – Onyk Mini Portable Wireless Speakers for use by the CM / AE for project conference calls and meetings in CM trailer.

1.5 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain portable facilities and enclosures. Provide at time of project mobilization. Provide a minimum of 4 portable toilets and provide additional as required by project.
- B. Provide bladder and cleaning service for CM office trailer restroom for project duration.
- C. Maintain daily in clean and sanitary condition.
- D. When necessary provide equipment to hold facilities upright and prevent them from tipping over.

1.6 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.7 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around entrance to construction site and field office areas; equip with vehicular and pedestrian gates with locks.
- C. Fencing and gate locations to be coordinated with Owner. Gate entrances along 2nd street (route 13) are strongly discouraged.
- D. Vehicle access gate on Lloyd Street to be post driven, heavy duty swing gate, and operable. Minimum Gate Opening to be 25' Wide by 6' High. Provide chain and combination lock on each gate. Approval by Owner is required before installation of entrance gate.
- E. Quantity of fencing will be approximately 1200 Lineal Feet. Provide provisions for at least 3 swing gates in main site fencing.
- F. Fencing to be maintained through project completion and removed from the project by Contract 1 – General Trades, Earthwork & Site Work.

1.8 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.9 SECURITY

- A. Provide security and facilities to protect own Work, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Site Security Systems: Maintain existing Site Security systems.
 - 1. Web Based security camera system.
 - 2. Site Security Lighting.
- C. When such a time is deemed appropriate by Construction Manager and Architect, provide secure building enclosure of permanent structure. Either provide temporary door cylinders with keys and cores to Construction Manager or provide adequate other means of lockable doors for egress.

1.10 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner / Construction Manager.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets at all gates. A minimum of one Truck Drive Off Areas will be required along Llyod Street. Placement is at discretion of Construction Manager/Owner. Contractor will be responsible for maintenance of Drive Off Areas throughout the duration of the Project.
- E. ALL CONTRACTS - Temporary Contractor parking can occur along Lloyd street to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Provide snow and ice removal as required to minimize accumulations. Accumulation of 3 or more inches will require plowing and or salting to create passable entrance for vehicles and workers entering the site and building. Removal limits are site work area, building pad areas, entrances and walkways. Should snow begin to incumber work provide for off-site removal of snow. All entrances are to remain accessible and free of ice and snow throughout the work day.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition for the duration of the project.
 - 1. Provide minimum of (1) one container service to be used by all contractors. Size determined by contractor.
 - 2. Provide (1) one 6yd or 8yd container service with lid to be placed next to field office and contractor parking area.
 - 3. Provide additional container services as project necessitates.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.
- E. Containers provided are to be utilized by all contracts included Construction Manager, Architect, and Owner.

1.12 PROJECT IDENTIFICATION / SIGNAGE

- A. Provide (1) one "Project Identification Sign" of minimum size 48"x96", design and construction indicated after contract award. Erect on site at location established by Architect or Construction Manager.
- B. Provide (4) four "Field Office Identification Signs" of minimum size 48"x96", design to be provided after contract award. Erect on site at location established by Construction Manager
- C. Temporary Signs: Provide and erect other signs as indicated and as required to inform public and individuals seeking entrance to Project. Minimum temporary signage as indicated below to be placed at direction of Construction Manager.
 - 1. Provide temporary, directional signs for construction personnel and visitors at East Ridge Road project entrance.
 - 2. Provide safety signage on site fencing and at every entrance gate both vehicular and pedestrian.
 - a. Provide "Hard Hats & Safety Glasses Required", "No Smoking", Authorized Personnel Only" signage every 100' along temporary fencing.
 - b. Provide 36"x48" Site Entrance Sign at main vehicle gate along North South Access Road. Design to be provided after contract award. Erect sign at main gate by direction of Construction Manager.
 - c. Provide 24"x36" Site Compliance/Security Signs at main vehicle gate, along temporary fencing, and inside building enclosure. Design to be provided after contract award. Erect sign by direction of Construction Manager. Include a minimum of twenty (25) signs to be provided by contract.
 - 3. Provide temporary signage along North South Access Road to direct both trucks, and personnel to field office or parking areas.

4. Provide (30) thirty 28" traffic cones to Construction Manager for use during project and traffic flow.
- D. Maintain and touch up signs so they are legible at all times.
- E. No other signs are allowed without Owner/ Construction Manager permission except those required by law.

1.13 FIELD OFFICES

- A. Field Offices: With approval by Construction Manager, each contractor may provide for its own use the following; Storage and Fabrication sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- B. Construction Manager's Field Office: Construction Manager has provided a field office of sufficient size to accommodate needs of Construction Manager and Architect and to accommodate project meetings specified in other Division 01 sections. Contract 1 shall equip the office as follows.
 1. Office supplies and office equipment as required for duration of the project to meet needs of project team to be billed against Allowance No. 1. See Section 01 21 00 – Allowances for further details.
 2. Telecommunications Equipment as specified in Section 1.04 of this document
- C. Portable Storage Containers: Owner / Construction Manager will have materials arriving that need to be stored on site throughout the duration of the project. Provide and maintain until project completion (2) two 40' storage containers on site. Provide locks on both and furnish keys to construction manager.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.14 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

1.15 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore new permanent facilities used during construction to specified condition.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- E. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

- B. Storm water Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.
- C. Pest Control: Engage pest-control services to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 2. Indicate sequencing work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard and replace stored or installed material that begins to grow mold.

7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure by prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written installation instructions for temperature, relative humidity, and exposure to water limits.

END OF SECTION 015000

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.2 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.

1.3 USE CHARGES

- A. General: Installation and removal of temporary facilities shall be included in the Contract Sum. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Usage Charges: All temporary utility usage charges will be incurred by owner.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installers of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 TEMPORARY ELECTRICITY

- A. Provide Temporary Electrical Service for the building and site during construction operations. Electrical service will be fed from the existing Temp Service Meter Panel. Service will be required to run underground following the direction of Construction Manager. Service may be picked up near CM trailer and be direct bury underground from existing panel board to board

mounted panel and disconnect near existing CM Office Trailer. Provide necessary distribution and safety equipment and panel board. Service should be sized adequately for the loads specified in this Section 015100 - Temporary Utilities and Section 015000 - Temporary Facilities and Controls and based on square footage and size of the project. Coordination may need to be had with RG&E if existing service is not adequately sized for new construction loads.

- B. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each major work area. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
- G. Temporary Trailers: Electrical contractor to include hookup of up to (4) four office / storage trailers of other Prime Contractors. Any one (1) disconnect of existing CM office trailer following the completion of the project. Hookup location will be from existing or new panel board located next to CM Office Trailer.

1.7 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft.
- B. Provide and maintain 0.25 watt/sq ft H.I.D. lighting to interior work areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. When required by CM provide exterior building lights for safety and security purposes.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

1.8 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- C. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic controls.
- D. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide

and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.9 TEMPORARY WATER SERVICE

- A. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- B. Provide running water service to CM office trailer restroom to allow use of restroom inside the office trailer.

1.10 TEMPORARY FIRE PROTECTION

- A. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

- E. Electric Power Service: Provide electric power service and distribution of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service underground unless otherwise indicated.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

END OF SECTION 015100

WATER CONTROLS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Compliance with Air and Water Laws and Regulations.
- B. Each contractor and any and all tier level subcontractors agree as follows:
 - 1. The contractor, and his subcontractors warrant that any facility to be utilized in the performance of any non-exempt Contract or Subcontract is not listed on the List of Violating Facilities issued by the U.S. Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20. A condition for the award of the Contract is that prompt notice will be given to the City of any notification received from the Director, Office of Federal Activities, and EPA, indicating that a facility utilized or to be utilized for the Project is under consideration to be listed on the EPA List of Violating Facilities.
 - 2. The contractor warrants that he has not been convicted under Section 113(c) (1) of the Clean Air Act or Section 309(c) of the Federal Water Pollution Control Act.
 - 3. The contractor promises to comply with all the requirements of Sections 144 of the Clean Air Act, as amended (47 USC 1857C-8) and Section 308 of the Federal Water Pollution Control Act, as amended (33 USC 1318) relating to the inspection, monitoring, entry, reports and information as well as all other requirements specified in Section 144 and Section 308, and all regulations and guidelines issued thereunder.
 - 4. Air Pollution Abatement. All contractors are put on notice that there will be no burning of trees, rubbish or other material by any contractor during this Agreement. Normal burning of fuels in operation of construction equipment is exempt here except as the construction work is affected by the requirements of the Public Health Law (Air Pollution Control) and Chapter IV, Air Pollution Control of the Official Compilation of Codes, Rules and Regulations of the State of New York, Title 10, and local regulations, which are to be met.
 - 5. Soil Erosion and Water Pollution Abatement. Each contractor shall schedule and conduct his operations to minimize erosion of soils and to prevent silting and muddying of streams, rivers, irrigation systems, existing sanitary systems, impoundments (lakes, reservoirs, etc.) and lands adjacent to or affected by the work. Construction of drainage facilities and performance of other work which will contribute to the control of erosion and sedimentation shall be carried out in conjunction with earthwork operations or as soon there-after as practicable. The area of bare soil exposed at any one time by construction operations shall be kept to a minimum. All contractors will comply with the Storm Water Pollution Prevent Plan (SWPP) Published in Division 1.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 METHODS

- A. Whenever a contractor's operations, carried out in accordance with the approved schedule, result in a situation where temporary erosion control measures must be taken, these measures are to follow the requirements set forth herein and be approved by the Architect or Owner.
- B. In carrying out erosion control measures, the contractor will be guided by, but not limited to, the following controls:
 - 1. Dewater for all conditions encountered. The site shall be controlled both during and after completion of the work so that erosion will be minimized. Waste or disposal areas shall be located and constructed in a manner that will keep the site free of standing water.
 - 2. All areas shall be cleared as soon as it is practicable during construction operations. Ditches which are filled or partly inoperative shall be cleaned and made operative before the Contractor stops work for any day, and shall be maintained in a condition satisfactory to the Owner or Architect for the duration of the Construction.
 - 3. Water from aggregate washing or other operations containing sediment shall be treated by filtration, settling basin or other means sufficient to reduce the sediment content.
 - 4. Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged into sanitary or storm systems or into natural or man made channels. Wash water or waste from concrete mixing operations shall not be allowed to enter sanitary or storm systems.

Pollutants such as fuels, lubricants, bitumens, raw sewage, and other harmful materials shall not be discharged into sanitary or storm systems or into natural or man made channels. Wash water or waste from concrete mixing operations shall not be allowed to enter sanitary or storm systems.

3.2 COSTS

- A. The costs for performing this work shall be the responsibility of the contractor(s) performing work in conjunction with this specification.

END OF SECTION 015630

CONSTRUCTION CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Construction Contractor shall provide dumpsters as required for entire work of the project. Dumpsters shall be located on site. Each contractor may legally load acceptable construction debris into the Dumpsters (from this project only). Cost of all dumpsters and disposal fees shall be by the General Construction Contractor. Dumpsters shall remain on the project until project completion, or as directed by Construction Manager, Owner or Architect. See section 015000 - Temporary Facilities for specific requirements.
- B. Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.2 CLEANING NOTICE

- A. Each contractor is responsible for clean-up and disposal of waste materials, debris, and rubbish on a daily basis.
- B. The Owner/Architect/Construction Manager may issue written notification of insufficient cleaning relative to the requirements of this section. Upon issuance of the cleaning notice:
 - 1. All waste and accumulation of trash containing the contractor's debris shall be removed from the Owner's premises within 24 hours of notification.
 - 2. All designated project areas containing the contractor's debris or requiring general housekeeping shall be left fine broom clean (interior) or raked clean (exterior or rough surface). Sweeping compound shall be used for all interior broom cleaning to control dust.
- C. Failure by the contractor to comply with the 24-hour requirement of the notice to the satisfaction of the Owner/Architect/Construction Manager will result in a cleaning program directed by the Construction Manager at the expense of the contractor. Cost of clean-up performed for the Owner will be deducted from the contractor's request for payment.

PART 2 - PRODUCTS - N/A

PART 3 - EXECUTION

3.1 CLEANING

- A. Maintain areas under contractor's control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from closed or remote spaces, prior to closing the space.
- C. Daily clean interior areas to provide suitable conditions for work.

- D. Broom clean interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.
- E. Control cleaning operations so that dust and other particles will not adhere to wet or newly-coated surfaces.

3.2 DISPOSAL

- A. On a daily basis, remove waste materials, debris, and rubbish from site or to a dumpster supplied by the General Construction Contractor.

END OF SECTION 015690

FINAL CLEANING

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Final cleaning of interior and exterior of project will be the responsibility of the General Construction Contractor.

1.2 DESCRIPTION

- A. Execute cleaning prior to inspection for substantial completion of each designated portion of the work and again at final completion before owner occupancy.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

- A. Use materials which will not create hazards to health or property, and which will not damage surfaces.
- B. Use only materials and methods recommended by manufacturer of material being cleaned.

PART 3 - EXECUTION

- A. In addition to removal of debris and cleaning specified in other sections, clean interior and exterior exposed-to-view surfaces. Remove all cleaning materials upon completion of cleaning.
- B. Remove temporary protection and labels not required to remain.
- C. Clean finishes free of dust, stains, films, and other foreign substances.
- D. Clean transparent and glossy materials to a clear shine condition; remove foreign substances.
- E. Vacuum clean, shampoo carpeted and similar soft surfaces.
- F. Clean, damp mop, wax (3 coats), and polish resilient and hard-surface floor as recommended by the manufacturer.
- G. Clean surfaces of equipment; remove excess lubrication.
- H. Clean plumbing fixtures and toilet rooms to a sanitary condition.
- I. Clean light fixtures and lamps.
- J. Clean all interior and exterior windows, both sides.

END OF SECTION 015700

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Requirements in this Section apply to all Prime Contractors. See Division 21- 28 Sections for additional requirements and limitations applicable to cutting and patching mechanical and electrical installations.
- C. Each Prime Contractor is responsible for determining the scope of and performing all cutting, patching, trenching, backfill, bedding and compaction required by its own Work necessary to complete the project. Each Prime Contractor is responsible for infilling, finishing and fire stopping the annular spaces for its own Work.

1.2 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to minimize interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete, Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

END OF SECTION 017310

CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of Owner's personnel.
 6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 6. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 7. Complete startup testing of systems.
 8. Submit test/adjust/balance records.
 9. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 10. Advise Owner of changeover in heat and other utilities.
 11. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 12. Complete final cleaning requirements, including touchup painting.
 13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or

will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment.
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit **three (3) copies** of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.

1.5 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Record Specifications: Submit **one (1) copy** of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble three (3) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
1. Operation Data:
 - a. Emergency instructions and procedures.
 - b. System, subsystem, and equipment descriptions, including operating standards.
 - c. Operating procedures, including startup, shutdown, seasonal, and weekend operations.
 - d. Description of controls and sequence of operations.
 - e. Piping diagrams.
 2. Maintenance Data:
 - a. Manufacturer's information, including list of spare parts.
 - b. Name, address, and telephone number of Installer or supplier.
 - c. Maintenance procedures.
 - d. Maintenance and service schedules for preventive and routine maintenance.
 - e. Maintenance record forms.
 - f. Sources of spare parts and maintenance materials.
 - g. Copies of maintenance service agreements.
 - h. Copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties within ten (10) days of Substantial Completion or on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner with at least **seven (7)** days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instruction for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Sweep concrete floors broom clean in unoccupied spaces.
 - g. Clean transparent materials, including glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - j. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - n. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

MAINTENANCE

PART 1 – GENERAL

1.1 SUMMARY

- A. Contractor shall compile product data and related information appropriate for Owner's operating and maintenance of products furnished under his contract.
 - 1. Prepare operating and maintenance data specified in this section and as referenced in other pertinent sections of specifications.
- B. Instruct Owner's personnel in operating and maintenance of products.
- C. Related Requirements Specified in Other Sections:
 - 1. SUBMITTAL PROCEDURES - Section 013300
 - 2. CLOSEOUT PROCEDURES - Section 017700
 - 3. CONSTRUCTION PROGRESS DOCUMENTATION - Section 013200
 - 4. Respective sections of specifications.

1.2 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel
 - 1. Trained and experienced in operating and maintenance of described products
 - 2. Completely familiar with requirements of this section
 - 3. Skilled as a technical writer to extent required to communicate essential data
 - 4. Skilled as a draftsman competent to prepare required drawings

1.3 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by Owner's personnel.
- B. Format
 - 1. Size: 8-1/2" X 11"
 - 2. Paper: 20 lb. minimum, white, for typed pages
 - 3. Text: Manufacturer's printed data, or neatly typewritten
 - 4. Drawings:
 - a. Provide reinforced punched binder tab; bind in with text
 - b. Fold larger drawings to size of text pages
 - 5. Provide fly-leaf for each separate product or each piece of operating equipment
 - a. Provide typed description of product and major component parts
 - b. Provide indexed tabs

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

- a. Title of project
- b. Identity of separate structure as applicable
- c. Identity of general subject matter covered in manual

C. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers
2. Maximum ring size: 1 inch
3. When multiple binders are used, correlate data into related consistent groupings

1.4 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of volume.
3. List, with each product, name, address and telephone number of -
 - a. Subcontractor or installer
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement
4. Identify each product by product name and other identifying symbols as set forth in contract documents.

B. Product Data:

1. Include only those sheets which are pertinent to specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed
 - b. Clearly identify data applicable to installation
 - c. Delete references to inapplicable information

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of system
2. Coordinate drawings with information in project record documents to assure correct illustration of completed installation.
3. Do not use project record documents as maintenance drawings

D. Written text, as required to supplement product data for particular Installation:

1. Organize in a consistent format under separate headings for different procedures
 2. Provide a logical sequence of instructions for each procedure
- E. Copy of each warranty, bond and service contract issued
1. Provide information sheet for Owner's personnel giving:
 - a. Proper procedures in event of failure
 - b. Instances which might affect validity of warranties or bonds

1.5 MANUAL FOR MATERIALS AND FINISHES

- A. Submit three (3) copies of complete manual in final form.
- B. Content for moisture protection and weather-exposed products
 1. Manufacturer's data giving full information on products
 - a. Applicable standards
 - b. Chemical composition
 - c. Details of installation
 2. Instructions for care, inspection, maintenance and repair.
- C. Additional requirements for maintenance data: Respective sections of specifications.

1.6 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of preliminary draft of proposed formats and outlines of contents prior to start of work.
 1. Architect will review draft and return one copy with comments.
- B. Submit one copy of completed data in final form fifteen (15) days prior to final inspection or acceptance.
 1. Copy will be returned after final inspection or acceptance with comments.
- C. Submit specified number of copies of approved data in final form ten (10) days after final inspection or acceptance.

1.7 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in care and maintenance of all products and systems.
- B. Operation and maintenance manual shall constitute basis of instruction:

1. Review content of manual with personnel in full detail to explain all aspects of operation and maintenance.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 018000

GENERAL COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 OVERVIEW

A. Abbreviations

The following are common abbreviations used in this document.

| | | | |
|-----------------|-----------------------------|-------------|-----------------------|
| A/E- | Architect/Engineers | FT- | Functional Test |
| CA- | Commissioning Authority | GC- | General Contractor |
| CM- | Construction Manager | PM- | Project Manager |
| Cx- | Commissioning | TAB- | Testing and Balancing |
| Cx Plan- | Commissioning Plan document | | |

B. Definitions

Acceptance Phase - Phase of construction after startup and initial checkout when functional performance tests, O&M documentation review and training occurs.

Approval - Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.

Architect / Engineer (A/E) - the prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer/engineer and the electrical designer/engineer.

Commissioning Coordinator - the member of the contractor's firm that is responsible for carrying out the contractor's commissioning tasks for the project. The Commissioning Coordinator is responsible for scheduling commissioning tests, coordination, ensuring start-up documents are completed, checklists are completed, correction of deficiencies and all other tasks defined in the responsibilities section of this document. The Commissioning Coordinator does not use a sampling strategy for checking equipment but rather checks 100% of the equipment included in the commissioning scope.

Commissioning Authority (CA) - an independent authority, not otherwise associated with the A/E design team members or the Contractor. The CA directs and coordinates the commissioning activities. The CA does not take an oversight role. The CA is part of the Owner's team and shall report directly to the Owner.

Commissioning Plan - an overall plan, developed before bidding that provides the structure, schedule and coordination planning for the commissioning process.

Construction Manager – shall refer to the person or company that is hired directly by the owner to coordinate trades, schedule work and other similar construction planning activities. For projects that do not have a construction manager hired directly by the owner, Construction Manager (CM) shall refer to the member of the general contractor that is responsible for coordinating trades and scheduling construction activities, usually the site superintendent.

Contract Documents - the documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, *Cx Plan*, etc.).

Contractor - General Contractor or authorized representative.

Control System - the central building energy management control system.

Data logging - monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data loggers separate from the control system.

Deferred Functional Tests - FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed prior to substantial completion.

Deficiency - a condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

Design Narrative or Design Documentation - sections of either the Owner's Project Requirements or Basis of Design or additional narrative as needed to comply with reporting requirements.

Direct Indicators - visually observing a system's response to a given condition or event.

Factory Testing - testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.

Functional Performance Tests (FT) - Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not functional testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is usually performed by the installing contractor or vendor. FTs are performed *after prefunctional checklists and startups are complete*.

General Contractor (GC) - See Contractor.

Indirect Indicators - indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.

Manual Test - using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").

Monitoring - the recording of parameters (flow, current, status, pressure, etc.) of equipment operation using data loggers or the trending capabilities of control systems.

Non-Compliance - see Deficiency.

Non-Conformance - see Deficiency.

Over-written Value - writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50F to 75F to verify economizer operation). See also "Simulated Signal."

Owner (PM) – State University Construction Fund.

Phased Commissioning - commissioning that is completed in phases (by building or by floors, for example) due to the size of the structure or other scheduling issues, in order minimize the total construction time.

Sampling - Functionally testing only a fraction of the total number of identical or near identical pieces of equipment.

Seasonal Performance Tests - FT's that are deferred until the system(s) will experience conditions closer to their design conditions.

Simulated Condition - condition that is created for the purpose of testing the response of a system (e.g., applying a hair blower to a space sensor to see the response in a VAV box).

Simulated Signal - disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.

Specifications - the construction specifications of the Contract Documents.

Startup - the initial starting or activating of dynamic equipment, including executing prefunctional checklists.

Test Procedures - the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CA.

Test Requirements - requirements specifying what modes and functions, etc. shall be tested. The test requirements are not the detailed test procedures. The test requirements are specified in the Contract Documents.

Vendor - supplier of equipment.

Warranty Period - warranty period for entire project, including equipment components.

Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

C. Commissioning Definition

Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. Commissioning during the construction of this project is intended to achieve the following specific objectives:

1. Ensure that applicable equipment and systems are installed properly and receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.

D. Commissioned Systems

The following systems will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

HVAC Systems (and all integral equipment controls)

Variable Speed Drives

Air Handling Units

Makeup Air Units

Exhaust Fans

Unit Heaters

Infrared Heaters

Building Automation System - control sequences

HVAC Fire Mode - verify interface

Emergency Power Mode - verify restart transition

Plumbing Systems

Domestic Water Heaters
Domestic Hot Water Recirculation Pumps

Lighting Controls

Occupancy Sensors
Vacancy Sensors
Networked Low Voltage Lighting Control System

1.2 ROLES AND RESPONSIBILITIES

A. Responsibilities

1. All Parties
 - a. Follow the Commissioning Plan.
 - b. Attend commissioning scoping meeting and additional meetings, as necessary.
2. Contractor

Construction and Acceptance Phase
 - a. Assign a Commissioning Coordinator to oversee, plan and schedule commissioning tasks for all trades.
 - b. Coordinate the commissioning work to ensure that commissioning activities are being included in the schedule.
 - c. Include all costs of commissioning related work in the total contract price.
 - d. Review, become familiar and approve the final Commissioning Plan.
 - e. Ensure that all commissioning responsibilities are executed according to the Contract Documents and schedule.
 - f. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.
 - g. Perform functional performance testing and operation of commissioned equipment in the presence of the CA.
 - h. Provide review of the commissioning progress and timely responses to the deficiency reports. Remedy the deficiencies.
 - i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.

- j. Provide all special tools, hardware, software and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CA.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
- c. Assist the CA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.
- d. If deficiencies are not corrected in a timely manner such that seasonal or deferred retesting can not occur within the warranty period, the warranty period for the deficient item shall be extended until such time that the deficiency can be retested and approved.

3. Contractor (Mechanical Trade)

- a. Provide startup for all HVAC equipment, except for the building automation control system.
- b. Provide technical representatives to assist in equipment testing.
- c. Review test procedures for equipment installed by factory representatives.

Warranty Period

- a. Provide seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.
- b. Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

4. Contractor (Controls Trade)

- a. Assist and cooperate with the CA in the following manner:
 - 1. Using a skilled technician who is familiar with this building, execute the functional testing of the controls system as specified. Assist in the functional testing of all equipment.

1.3 COMMISSIONING PROCESS

A. Brief Overview of Tasks

1. Commissioning during construction begins with a scoping meeting conducted by the CA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. The CA develops specific equipment and system functional performance test procedures. The contractor reviews the procedures.
4. The procedures are executed by the contractor, under the direction of, and documented by the CA.
5. Items of non-compliance in material, installation or setup are corrected at the contractor's expense and the system retested.
6. Deferred testing is conducted, as specified or required.

1.4 COMMISSIONING SCOPING MEETING

A. Overview

A commissioning scoping meeting is planned and conducted by the CA within 90 days of the beginning of construction. In attendance are the CA, PM, assigned members of the CM, GC, A/E (particularly the mechanical and electrical engineers), the mechanical trade, electrical trade, TAB trade, plumbing trade, controls trade, any other installing trades or suppliers of equipment. At the meeting commissioning parties are introduced and the commissioning process reviewed, management and reporting lines determined. The Cx Plan is reviewed, process questions are addressed, lines of reporting and communications determined and the work products list discussed. Also covered are the general list of each party's responsibilities, who is responsible to develop the startup plan for each piece of equipment and the proposed commissioning schedule. The outcome of the meeting is increased understanding by all parties of the commissioning process and their respective responsibilities. The meeting provides the CA additional information needed to finalize the Cx Plan, including the commissioning schedule.

B. Construction Schedule Delivery

Prior to this meeting the CA is given, by the GC, the construction schedule by trade.

C. Meeting Minutes

The CA keeps notes from the meeting and distributes them to each team member.

1.5 MEETINGS

A. Commissioning Meetings

Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the contractor as required. These meetings will be used to review:

1. A log of all commissioning-related issues that require current or future attention using a Commissioning Issues Log.
2. Overall commissioning progress.

1.6 PROGRESS REPORTING AND LOGS

A. Issues Log

An updated commissioning issues log will be distributed to all parties each time changes are made to it. This log will be distributed showing open items only. Any party can receive a complete issues log showing both open and closed items at any time by requesting the complete log from the CA in writing.

1.7 DEVELOPMENT OF FUNCTIONAL TEST AND VERIFICATION PROCEDURES

A. Overview

Functional testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees and documents the actual testing, which is performed by the contractor.

B. Scope of Testing

The specifications provide a specific functional testing scope for each piece of commissioned equipment. If specific testing requirements were not included in the bid documents and original specifications, they will be developed for this project for each piece of commissioned equipment by the CA after the submittal phase of the project.

1.8 EXECUTION OF FUNCTIONAL TESTING PROCEDURES

A. Overview and Process

The CA schedules functional tests through the contractor. The CA oversees, witnesses and documents the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The contractor executes the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is

completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between systems.

B. Acceptance Criteria

In order for systems to be considered acceptable the following conditions must be met:

1. All sequences of operation must work per contract documents
2. Water flows are +/- 10% of the reported value
3. Water temperatures are +/- 10% of the reported value
4. Air flows are +/- 10% of the reported value
5. Air temperatures are +/- 10% of the reported value

C. Deficiencies and Retesting

1. The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported on the issues log. The contractor corrects deficiencies and notifies the CA when they are corrected. The CA schedules retesting through the contractor. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA and the installing technician. The CA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the contractor and A/E. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the owner. The owner gives final approval on each test.
2. The cost for the Contractor to retest a prefunctional or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the Owner. For a deficiency identified, not related to any prefunctional checklist or start-up fault, the CA and PM will direct the retesting of the equipment once at no "charge" to the GC for their time. However, the CA's and PM's time for a second (and subsequent) retest will be charged to the GC. The time for the CA and PM to direct any retesting required because a specific prefunctional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back-charged to the GC.
3. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the PM. In such case, the Contractor shall provide the Owner with the following:
 - a. Within one week of notification from the PM, the Contractor or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided to the PM within two weeks of the original notice.

- b. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
- c. The PM will determine whether a replacement of all identical units or a repair is acceptable.
- d. Two examples of the proposed solution will be installed by the Contractor and will test the installations for up to one week, upon which the PM will decide whether to accept the solution.
- e. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Facility Staff Participation

The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The owner will coordinate their attendance directly with the CA if desired.

E. Sampling

Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. If any type of equipment is functionally tested using a sampling strategy, all pieces of equipment that are not physically tested shall have their operation documented using trend logging and the logs reviewed for anomalies. The trend logs shall be submitted to the commissioning authority after review. The commissioning authority shall verify tests using the same sampling quantities as specified in section 1.19 of this specification.

F. Deferred Testing

- 1. Unforeseen Deferred Tests: Testing shall occur when environmental and building conditions allow for operation of any commissioned systems and allow observation of all specified functions. If any part of the sequence of operation cannot be observed for any reason (weather, partially occupied building, etc...) then the testing shall be deferred to a season in which the equipment can be operated through all sequences of operation. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. The contractor is responsible for determining the need for deferred testing based on the construction schedule, ability to put false loading on the system, and phasing shown in the contract documents. Any required deferred testing shall be provided to the owner at no additional cost.

2. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as specified in this contract. The CA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the contractor, with facilities staff and the CA witnessing. Any final adjustments to the O&M manuals and as-builds due to the testing will be made.

1.9 WARRANTY PERIOD

A. Requirements

During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications. The CA coordinates this activity. Tests are executed and deficiencies corrected by the contractor, witnessed by facilities staff and the CA. Any final adjustments to the O&M manuals and as-builds due to the testing are made. Refer to specification for seasonal testing details for this project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 019113

GEOTECHNICAL INVESTIGATIONS

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, technical specifications and general provisions of the Contract, including information for bidders, Bidding and General Requirements and other specification sections, apply to this section.

1.2 SUMMARY

- A. This section provides information to the Contractors on geotechnical conditions at the site as contained in the November 14, 2024 Report of Geotechnical Exploration for the proposed Proposed Public Works Garage and Shed, West 2nd Street and Lloyd Street, City of Chester, Delaware County, Pennsylvania, attached at the end of this section.
- B. This section provides information to the Contractors on stormwater conditions at the site as contained in the November 14, 2024 Report of Stormwater Infiltration Exploration for the proposed Proposed Public Works Garage and Shed, West 2nd Street and Lloyd Street, City of Chester, Delaware County, Pennsylvania, attached at the end of this section.
- C. The Contractors are responsible to provide additional site investigation as required to perform the Work. No allowance or adjustments to the Contract will be considered, based on the Contractor's lack of site investigation above the exploration work listed herein.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTIONS (Not Applicable)

END OF SECTION 023200



Engineering
& Design

Report of Geotechnical Exploration

November 14, 2024

Proposed Public Works Garage and Shed

West 2nd Street and Lloyd Street

City of Chester, Delaware County, Pennsylvania



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Project No. COCD0004

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Appendices

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Appendix A

Test Boring Logs

Appendix B

Laboratory Test Results

1. Introduction

We are pleased to present this report regarding the geotechnical exploration performed for the proposed public works garage and shed to be constructed at W. 2nd Street and Lloyd Street in the City of Chester, Pennsylvania. This exploration was conducted in accordance with our proposal COCD0004 (work Order Issued June 26, 2024) and the subsequent Work Requisition (approved July 15, 2024).

Our scope of services for this exploration included the completion of eight test borings for the proposed structure and parking improvements (TB-101 through TB-108); three test borings and complimentary infiltration testing for the proposed underground stormwater management features (TB-109 through TB-111; IT-1 through IT-4); laboratory testing of representative soil samples; engineering analyses of the subsurface data obtained from this field exploration program; and the preparation of this report. The intent of this report is to provide geotechnical-related design recommendations for the proposed garage and shed structures. The conclusions and recommendations related to the stormwater infiltration testing are summarized in a report under separate cover (Report of Stormwater Infiltration Exploration).

2. Site Description

The subject site is located on the south side of West 2nd Street between Pennel Street and Lloyd Street in the City of Chester, Pennsylvania, as shown on the Site Location Map (Figure 1). The site is otherwise bordered by commercial developments to the north, south, east, and west. The Delaware River is located less than 0.25 miles to the south of the site.

The existing lot serves as a vehicle storage/parking for various commercial tractor trailer rigs and accompanying vehicle transport trailers. There is a small wood shack located in the western-central portion of the site. There is a relatively small loading dock platform (suspected remnant of a former structure) located in the southern-central portion of the subject property. The site is otherwise predominantly covered with asphalt pavement (existing parking lot), which is in poor condition with abundant cracking and potholes. The pavements in the northern portion of the site are completely dilapidated. There are partially vegetated landscape areas along the northern and eastern property boundaries. There are several small piles of scrap automotive parts (e.g. tires, truck body parts, etc.) in the existing parking lot area, just north of the former loading dock area.

The overall site is relatively flat to gently sloping with elevations ranging from ± 16 to ± 12 , grading downward slightly from the northwest side of the site to the southeast. Utility mark-outs, including water, storm sewer, electric, and communications, were observed within and around the perimeter of the site. Other un-marked below-grade utilities may also exist at the site.

Historical Review

Based on review of historical aerial images and topographic maps, the subject site appears to have been partially developed since the early 1900's. The type and extent of the development was not apparent from the historical images/maps. However, based on the variations in the aerial images, it appears that the site was manipulated / disturbed in the late 1930's and early 1940's. Aerial images from 1940 suggest that a through street traversing the site from Front Street to W 2nd Street was removed and modifications to Lloyd Street were made. At some point in the early to mid-1950's, a loading dock structure was added to the southwest portion of the site and the subject property appeared to be utilized as material storage and shipping yard. Between the early to mid-1960's and early 1980's, the site appeared to be relatively vacant and unused. In the early to late-1990's the property appeared to be utilized for tractor trailer storage. Between the late 1990's and mid-2000's the property appeared to be unutilized. Between the late 2000's and present day there was a small shed structure added to the western-central portion of the property and the property appears to be utilized for vehicle and transport tractor trailer parking / storage.

3. Proposed Development

The site for the proposed development is located on the parcel situated southwest of the intersection formed by W. 2nd Street and Lloyd Street in the City of Chester, Delaware County, PA, as shown on the Exploration Location Plan, Figure 2. The current design concept includes a 13,152 square-foot (SF), single-story office and garage building on the north side of the site, and a 9,000 SF, single-story, high bay maintenance facility/salt shed on the southwest side of the site. We assume that the proposed building additions will consist of steel framing with CMU block walls. The proposed structures are planned to have a finished floor elevation (FFE) of 14.95. No basement levels are proposed.

Based on discussions with the design team, proposed maximum column and wall loads for the proposed office/garage building are estimated at 45 kips and 4 kips per linear foot (klf), respectively. The maximum column and wall loads for the proposed maintenance facility/salt shed building are estimated at 80 kips and 7 klf, respectively. We assume that maximum total and differential post-construction settlements on the order of 1 inch and 0.5 inches, respectively, are within tolerable limits.

The current concept plan includes one underground stormwater management (SWM) feature located in the southeastern portion of the site. We understand that the type of SWM feature will be determined based on the results of the infiltration testing and related subsurface exploration. Discussions and recommendations regarding the stormwater management aspects of the project are submitted under separate cover.

4. Field Exploration and Laboratory Testing

Subsurface conditions for this geotechnical exploration related to the proposed development were explored through the completion of eleven test borings, identified as TB-101 through TB-111. The test borings were performed by Soil Borings Inc. of Haddonfield, New Jersey, at the locations shown on the Exploration Location Plan, Figure 2. The test locations were field located by Colliers Engineering & Design, Inc. (CED) and cleared for below-grade utilities by Level A Underground Solutions. The drilling was performed under the full-time technical supervision of CED. Elevations of the test locations were estimated using the Overall Grading, Drainage, and Utility Plan (Sheet No. 3), dated October 11, 2024, by Colliers Engineering & Design, Inc. Please refer to the Logs of Test Borings included in Appendix A of this report.

The test borings were advanced using hollow-stem drilling techniques. Soil samples for strata identification and analyses were obtained from each of the test borings by means of a 2-inch OD split barrel sampler. This spoon is typically driven 18 inches or 24 inches by blows from a 140-pound hammer which free falls 30 inches (the Standard Penetration Test, ASTM D 1586). The boring logs are presented in the Appendix with descriptions of the soil horizons encountered and depth to encountered groundwater. The penetration resistance of the drive sampler has been recorded on the test boring log adjacent to the sample locations as the number of hammer blows required for each 6 inches of sampler penetration or fraction thereof. The Standard Penetration Test values (N) are determined by totaling the blow counts required for the middle 12 inches of sampler penetration, and are expressed as blows per foot. Upon completion, the test borings were backfilled with the cuttings and repaired with asphalt cold patch where applicable.

The test borings were performed under the full-time technical observation of CED. Representative soil samples were collected and visually identified in accordance with the Burmister Soil Classification System. Details pertaining to the subsurface conditions encountered are presented on the test boring logs in Appendix B.

Laboratory testing was performed on representative samples to evaluate the physical properties of the subsoils, as well as augment the field exploration. Laboratory testing was performed at our accredited facility located in Mays Landing, New Jersey. The stratigraphic continuity and physical characteristics of the subsoils were tested for determination of water content, Atterberg Limits, and grain size distribution by weight (GS). The test results are presented on the laboratory test reports included in Appendix C.

Soil samples obtained during this exploration will be retained by CED for 60 days from issuance of this report. At the end of this time, they will be discarded unless we receive other instructions from the City of Chester Public Works.

5. Subsurface Conditions

The site for the proposed development is located within the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain physiographic province. Locally, the site is underlain by existing

fill material, followed by fine- and coarse-grained alluvial deposits of the Trenton Gravel formation, followed by the decomposed and weathered remains of the Wissahickon Formation. These materials were encountered in the test borings, as described in the following paragraphs.

5.1 Subsurface Description

Based on the results of the test borings, the generalized subsurface conditions at the site are described below, in order of depth.

- **Surface Cover Material:** Asphalt pavement was encountered in eight of the eleven test borings (TB-104 through TB-111) at thicknesses ranging from about 1.5 to 5.0 inches, averaging about 2.9 inches thick. A concrete pavement/slab ranging from about 6 to 8.5 inches, and averaging 7 inches, was encountered below the asphalt layer in test borings TB-104, TB-105, and TB-111. The asphalt and concrete layers are underlain by aggregate base materials, ranging from 3 to 5 inches, and averaging about 3.8 inches in thickness. Dilapidated pavements and/or existing fill materials were encountered at the surface of test borings TB-101 through TB-103.
- **Existing Fill Materials:** Existing fill material was encountered at the ground surface (i.e. dilapidated pavements) or beneath the surficial cover materials at each test boring location within the proposed building and pavement areas (except TB-106), extending to depths ranging from approximately 2 to 6 feet, averaging about 3.5 feet below the existing grades. The existing fill layer generally consists of a sand with moderate to high percentages of gravel and low to moderate amounts of silt/clay. Some of the near surface fill materials were comprised of silt/clay with moderate percentages of sand and lesser amounts of gravel. Occasional demolition debris was intermixed within the existing fill materials (i.e. brick, asphalt, and concrete fragments).

The Standard Penetration Test (SPT) 'N'-values for the existing fill layer range from 3 blows per foot (bpf) to greater than 100 bpf, averaging about 23 bpf. The upper 2 to 3 feet of the existing fill layer is generally relatively dense immediately below the asphalt and concrete layer, but typically becomes loose to medium dense thereafter nearing the transition with the underlying Stratum A soil layer. The existing fill generally appears to have been placed in a controlled/compacted manner.

- **Stratum A – Coarse-Grained and Fine-Grained Alluvial Soils:** Coarse-grained and fine-grained alluvial soils (intermixed layers) were encountered beneath the surface cover materials and/or existing fill layer in each of the test borings performed within the proposed building and pavement areas, extending to depths ranging from 8 feet to 13 feet, averaging about 10.5 feet.

The predominantly coarse-grained Stratum A soils are generally comprised of a sand with moderate to high amounts of silt and low to moderately high percentages of medium to fine gravel. Overall, the SPT 'N'-values of the coarse-grained Stratum A soils range widely from 4 bpf to 44 bpf, averaging 20 bpf. However, they are typically loose to medium dense, with infrequent, isolated very loose and very dense layers.

The predominantly fine-grained Stratum A soils consist of clay and silt mixtures with moderate amounts of coarse to fine sand and lesser percentages of fine gravel. Overall, the SPT 'N'-values of

the fine-grained Stratum A soils range widely from 3 bpf to 27 bpf, averaging 13 bpf. However, they are typically medium to stiff, with less frequent soft or very stiff layers. Based on the results of field pocket penetrometer testing, the fine-grained Stratum A soils have unconfined compression values ranging from less than 0.25 tons per square foot (tsf) to 4.5 tsf, averaging about 2.3 tsf.

- **Stratum B – Decomposed Rock:** Decomposed rock was encountered beneath the Stratum A soils in each of the test borings. For purposes of this report, decomposed rock is defined as the completely weathered remains of the underlying bedrock (i.e. a soil-like material), which retains some of the relic rock structure. The decomposed rock at this site generally consists of loose to very dense micaceous sand with moderate amounts of silt and trace amounts of friable rock fragments. See below for additional details regarding trends in relative density with depth.

The test borings were either terminated (i.e. auger refusal or end of test boring depth) in the Stratum B layer in test borings TB-104, TB-107, TB-109, and TB-111 at depths ranging from 15 feet to 30 feet, or the layer extended to the transition with the underlying Stratum C – Altered Rock materials (TB-101 through TB-103, TB-105, TB-106, TB-108, and TB-110) at depths ranging from 10.5 feet to 38 feet below the existing ground surface. In general, the decomposed rock layer appears to trend deeper from northeast to southwest towards the Delaware River.

Stratum B soils are generally loose to very dense, with SPT 'N'-values ranging from 7 bpf to 92 bpf, averaging 21 bpf. We note that the loose conditions were only observed in TB-105 near the transition from Stratum A to B. The density of Stratum B generally increases with depth approaching the underlying Stratum C - Altered Rock layer and that the very dense conditions were identified in TB-108 at a depth of 12 feet (near the Stratum C interface).

- **Stratum C – Altered Rock:** Altered rock (a.k.a. saprolite) was encountered beneath the Stratum B – Decomposed Rock layer in test borings TB-101, TB-102, TB-103, TB-105, TB-106, TB-108, and TB-110, extending to the maximum depths explored. For purposes of this report, altered rock is defined as the partially weathered remains of the parent bedrock. It is differentiated from the Stratum B – Decomposed Rock layer based on the increased resistance to split spoon sampling (typically resulting in split spoon refusal) and augering (penetrable with some difficulty). The altered rock at this site generally consists of dense to very dense micaceous sand with moderate amounts of silt and lesser amounts of both friable and non-friable rock fragments.

The SPT "N" values for Stratum C are typically in excess of 100 blows for less than 1 foot of penetration.

5.2 Groundwater Conditions

Groundwater or very moist soil conditions (indicating the presence of groundwater) was encountered in each of the test borings. Groundwater readings obtained at completion of the test borings ranged from depths of 7.7 feet to 9.2 feet, averaging about 8.7 feet below existing grades (elevations ranging from 4.3 to 7.7, averaging 5.2). In general, groundwater levels at the site are expected to fluctuate slightly based on seasonal and man-made influences, as well as variations of the Delaware River water levels.

6. Development Issues

Based on our geotechnical exploration, we are highlighting the following the following geotechnical design considerations that merit further discussion:

6.1 Foundation / Slab Subgrade Preparation

Based on the finished floor elevations, spread footing foundations for the proposed buildings are expected to bear within either the existing fill or Stratum A soils. The slab will be supported on-grade by the existing fill and/or newly placed load-bearing fill. Some of the existing fill soils and Stratum A materials may be soft / loose and unstable. To limit risks of excessive post-construction settlement, we are recommending the following foundation / slab subgrade preparation procedure:

- Following excavation and prior to foundation construction, compact the exposed bearing subgrades using trench compaction equipment. The foundation subgrades shall be evaluated by a qualified geotechnical representative during compaction and probed using a conical tipped hand probe. Loose or otherwise unstable materials at the bearing elevations shall be stabilized in place by compaction, or over-excavated to more stable bearing materials and backfilled with load-bearing fill. Where over-excavations are required, they shall extend a minimum of 1 foot laterally beyond the perimeter edges of the foundation for every 2 feet in depth of over-excavation.
- Immediately prior to slab construction (e.g. aggregate base placement), we recommend that the exposed subgrade surface be thoroughly compacted and proofrolled using as large as practical construction equipment. Loose or otherwise unstable existing fill materials identified during the subgrade compaction and proofroll shall be improved in place or selectively removed and replaced with load-bearing fill to mitigate excessive total and/or differential settlement.
- Deleterious materials (e.g. wood, asphalt fragments, plastic, cinders, etc.) and nested pockets of over-sized inert debris (e.g. bricks, concrete, etc.), where encountered, shall be removed and chased out laterally a minimum of 5 feet beyond the footprint of the building / foundation.

6.2 Potential for Historic / Buried Features

There is some limited risk for encountering unanticipated historic remnant buried features associated with prior site development. The site has a limited history of prior site development based on our review of historic aerial images. Furthermore, we encountered some difficulty augering through the existing fill zone within test borings TB-101 and TB-103, indicating the possible presence of occasional zones of buried debris and/or unknown historic site features.

If existing foundations or slabs associated with historic site features are encountered during construction, we recommend that they be demolished and removed to a minimum of 3 feet below the proposed subgrade / bearing elevations to minimize interference with the proposed

development and to reduce the effect of hard points. Similarly, nested zones of inert debris (e.g. brick, concrete, etc.) should be over-excavated and replaced with load-bearing fill. Deleterious materials (e.g. wood, metal, plastic, cinders, etc.), if encountered, should be similarly removed, as discussed in Section 6.1.

7. Summary of Conclusions and Recommendations

Conclusions and recommendations pertaining to the design and construction of the proposed development are summarized in the following paragraphs.

7.1 Site Preparation

The purpose of these site preparation procedures is to provide stable and uniform bearing conditions for the proposed building foundations and slab-on-grade. The following procedures should be performed under the technical supervision of the Geotechnical Engineer.

- Install soil erosion and sedimentation control devices as specified by others. Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Utilize temporary sump pits and pumping (e.g. dewatering system) in excavated areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove any standing water afterwards.
- Remove the asphalt pavement from the area of proposed construction and dispose offsite.
- Existing underground or above-ground utility locations should be verified in the field and relocated or abandoned as necessary, prior to construction. If the option to abandon utilities in-place is chosen, we recommend a lean cement grout (1,000 psi) be used to fill the utility lines.
- Excavate the existing subsurface soil materials, as necessary, to achieve the proposed subgrade elevations. In general, the existing fill soils may be excavated using conventional construction equipment. Larger excavators and/or hydraulic pecking equipment may be more productive excavating and removing larger debris or potential buried concrete pavements/slabs and historic buried features (if present) within the existing fill.
- Perform the foundation and slab-on-grade subgrade preparation procedures outlined in Section 6.1, including over-excavation and replacement of the soft, loose, or otherwise unstable existing fill soils at the foundation bearing elevations, as well as the proofrolling procedure for the slab-on-grade subgrade. Refer to Sections 6.1 and 6.2 for additional details.
- Place and compact load-bearing fill as needed to achieve the final subgrade elevations.

7.2 Load Bearing Fill and Backfill Materials

The excavated site soils can be reused as compacted structural fill with some limitations. Some debris (e.g. brick, concrete, and asphalt fragments) was encountered within the existing fill at boring locations TB-101, T-102, TB-103, and TB-108 during the explorations; however, there is potential to encounter larger debris and/or deleterious materials (e.g. wood, plastic, metal, etc.) in unexplored

portions of the property. As such, the on-site geotechnical representative should assess the existing fill soils prior to reuse. The Contractor shall be prepared to screen over-sized debris and/or deleterious material from the existing fill prior to reuse as structural fill.

The near surface soils (Stratum A and portions of the existing fill) contain high percentages of silt/clay and will be subject to moisture-related compaction problems. Additionally, excavated soils left unprotected during precipitation events will become unsuitable for compaction. As such and depending on the prevailing weather conditions at the time earthwork is performed, moisture conditioning of the excavated soils will likely be required prior to their reuse as fill or backfill. If air-drying of the soil is not possible due to precipitation and/or colder temperatures, or if the project schedule cannot accommodate the time required for air-drying of the soil, the Contractor should anticipate that unsuitable soils will have to be exported from the site and suitable structural fill materials will have to be imported. The Contractor shall consider the use of tarps or similar protective cover over stockpiles prior to precipitation events to help reduce the amount of moisture conditioning and/or soil amendment that may be required prior to reuse.

If imported material is required for use as structural fill, the material should consist of well-graded, predominantly granular material and be tested and approved by the Geotechnical Engineer prior to use. If open-graded stone must be used as structural fill or backfill, the stone should be separated from surrounding soils with geotextile filter fabric to limit particle migration.

Fill materials supporting loads from the proposed buildings and pavements are considered structural fill and should be installed under the observation of the Geotechnical Engineer. Mass structural fill consisting of predominantly fine-grained soil (silt and clay) should be placed in maximum 8-inch-thick loose lifts. Predominantly granular fill materials can be placed in lifts ranging up to 12 inches in loose thickness and compacted using a smooth drum roller in vibratory mode. Backfill placed in confined areas, such as utility and foundation excavations, should be spread in thinner layers and compacted using the largest equipment possible without damaging the utilities. Backfill placed within 3 feet of below-grade walls or retaining walls should be compacted with manually operated compaction equipment. Fill and backfill should be compacted to the following minimum requirements:

TABLE 1
COMPACTION RECOMMENDATIONS BY SUPPORT TYPE
Proposed Public Works Garage and Shed
Chester, PA

| Type of Support | Percent of Maximum Dry Density (ASTM D-1557) |
|---|--|
| Structural fill below foundations, slabs-on-grade, and pavements | 95% |
| Backfill for retaining walls, below-grade walls, and utility trenches | 92% |
| General fill for landscaped and other non-structural areas | 90% |

Subgrades should be evaluated for stability by the Geotechnical Engineer prior to fill placement, and the compactive effort for each lift of fill should be verified by in-place density testing prior to placement of subsequent lifts. Adjustments to the lift thickness and/or compaction equipment may be required, as directed by the Geotechnical Engineer, based on prevailing weather conditions at the time of fill placement and performance of the compacted soils.

7.3 Foundation Recommendations

We recommend that the proposed garage/office and shed structures be supported using a conventional shallow foundation system. Assuming a finished floor elevation of 14.95, the proposed building foundations will typically bear at or about elevation 11.95. Assuming the subgrade preparation techniques outlined below (and in Section 6.2) are performed, the foundations may be proportioned assuming an allowable bearing capacity of 3,000 pounds per square foot (psf).

Prior to foundation construction, we recommend that the foundation bearing surface be compacted using trench compaction equipment. The bearing surface shall be evaluated by the on-site geotechnical representative during compaction and probed using a conical tipped hand probe. Loose or otherwise unstable materials identified shall be compacted in place or over-excavated to more stable materials and backfilled with load-bearing fill. Over-excavations, where required, shall extend a minimum 1 foot laterally beyond the perimeter edge of the proposed foundation for every 2 feet vertically of over-excavation. This procedure is intended to remove marginal quality, potentially unstable existing fill materials or soft Stratum A soils and to provide a uniform bearing surface for support of the foundations. Please refer to Section 6.1 for additional foundation subgrade preparation procedures.

We expect foundation settlement will generally be limited to 1 inch total and 0.5 inches differential between adjacent columns. We expect the primary settlement will occur relatively quickly following construction of the proposed structures.

The minimum width of all wall footings should be 24 inches, and the minimum horizontal dimension of all spread footings should be 36 inches, regardless of the bearing pressure developed. All exterior footings subject to frost action should be based at least 36 inches below the adjacent exterior grade. Interior foundations in permanently heated portions of the building may be established at convenient depths below the floor slab that will not interfere with subsequent floor slab construction.

The contractor should be prepared to encounter trapped groundwater in the foundation excavations, particularly if construction occurs during wet periods. Based on our experience at similar sites, infiltrating surface runoff tends to become trapped within the more granular materials above the finer-grained Stratum A layer. If trapped groundwater is encountered, we expect that the groundwater can be managed through conventional sump and pump techniques.

7.4 Seismic Considerations

In accordance with the provisions of the 2018 International Building Code, the site has a Site Class Definition of "D" for the existing subsurface soil and groundwater conditions. This classification was determined by utilizing the Standard Penetration Test (SPT) blow count data through the upper 50 feet of the subsurface profile with assumptions thereafter to a depth of 100 feet.

7.5 Floor Slabs-on-Grade

Assuming the proposed building subgrades are prepared under the observation of a Geotechnical Engineer as described below (and Section 6.1), the floor slabs may be supported on-grade. The floor slab subgrade should be compacted with a smooth-drum roller just prior to installation of the aggregate base to re-compact any materials disturbed by previous construction activities or adverse weather conditions. Any unstable zones detected that cannot be stabilized by additional compaction should be removed, and the excavated area backfilled with load-bearing fill. Deleterious materials (e.g. wood, metal, plastic, etc.) and/or nested zones of brick and concrete debris should be removed and "chased out" laterally a minimum of 5 feet beyond the footprint of the building.

Immediately prior to slab construction, we recommend that a minimum 4-inch layer of dense-graded aggregate conforming to PADOT 2A be placed and compacted over the prepared subgrade. For interior portions of the buildings to receive floor coatings such as carpeting, floor tile, or epoxy-based finishes, we recommend that a 10-mil vapor retarder be placed over the subgrade, followed by the minimum 4-inch layer of dense-graded aggregate. The aggregate should be dampened just prior to concrete placement. These procedures are intended to provide uniform concrete curing conditions.

Reinforced concrete floor slabs should be simply supported at wall and column junctures to allow unrestricted rotation of the slab edges. Alternatively, the slabs should be free to undergo vertical deflections at the edges. We anticipate that, following proper site preparation, the existing fill materials and Stratum A materials can achieve a Modulus of Subgrade Reaction on the order of 120 pounds per cubic inch (pci). A coefficient of sliding friction of 0.20 may be used for design of a floor slab with a polyethylene vapor retarder over soil. A coefficient of sliding friction of 0.40 may be used for design of a floor slab without a vapor retarder.

7.6 Lateral Earth Pressure Parameters

We are not aware of any proposed site retaining walls or permanent below-grade features (e.g. basement levels) that will act as earth retention structures. However, we understand that portions of the CMU walls (particularly on the north side of the garage / office building may have unbalanced loads based on the site grades. The lateral earth pressure parameters presented in this section are intended for use in the design of those features, as well as temporary support of excavation features, if required.

The excavated predominantly fine-grained (silt / clayey silt) on-site soils are not well-suited for backfill of below-grade walls and should be avoided. These soils will be sensitive to moisture-related compaction problems and their inherently poor drainage characteristics typically result in hydrostatic pressures exerted on the back-face of walls. Predominantly granular portions of the excavated site soils or imported well-graded granular soils will be better suited for use as wall backfill material, though their availability on site will be very limited. The maximum particle size in wall backfill materials should be limited to 3 inches, and the backfill should be free of deleterious matter and debris. Recommended soil parameters for design of below-grade walls are presented in the following table.

TABLE 2
LATERAL EARTH PRESSURE COEFFICIENTS
Proposed Public Works Garage and Shed
Chester, PA

| Subsurface Material | Total Unit Weight (pcf) | Internal Friction Angle | Wall Condition | Earth Pressure Coefficient | Equivalent Fluid Pressure |
|--------------------------|-------------------------|-------------------------|----------------|----------------------------|---------------------------|
| Existing Fill | 120 | 30° | At Rest, K_o | 0.50 | 60 |
| | | | Active, K_a | 0.33 | 40 |
| | | | Passive, K_p | 3.00 | 360 |
| Granular Stratum A Soils | 125 | 32° | At Rest, K_o | 0.47 | 59 |
| | | | Active, K_a | 0.31 | 39 |
| | | | Passive, K_p | 3.25 | 405 |
| Structural Fill | 130 | 34° | At Rest, K_o | 0.44 | 58 |
| | | | Active, K_a | 0.28 | 37 |
| | | | Passive, K_p | 3.54 | 455 |

*Values based on industry standard empirical correlations. Specific values should be confirmed via lab testing prior to final design.

Walls restrained from lateral movement at the top of the wall and/or intermediate points should be designed using the at-rest earth pressure coefficient. Walls that are not restrained from lateral displacement (free to rotate) should be designed using active earth pressure coefficients. We recommend that passive earth pressures be omitted from the wall designs. Surcharge loads

imposed by sloping backfill, pavements, terraced walls, material stockpiles, construction equipment, etc. must be considered in the wall designs. Retaining wall design should consider internal stability and external global stability at all critical stages during and following construction. Retaining wall foundations should be designed assuming a maximum allowable net bearing pressure of 3,000 psf (provided the recommendations for the building foundations subgrade preparation are applied for the retaining wall foundations).

Light pole bases can be designed assuming a coefficient of friction against sliding of 0.25 and a maximum allowable lateral soil pressure of 120 psf per foot of base depth below the ground surface. Light pole bases should extend below the Existing Fill into suitable Stratum A soils.

7.7 Pavements

New pavements can be constructed on suitable site soils or newly placed and compacted load-bearing fill. Immediately prior to pavement construction, the exposed pavement subgrade should be compacted with a minimum 10-ton smooth-drum roller and be proof-rolled with a loaded tandem-axle dump truck under the observation of the geotechnical engineer to evaluate stability. Subgrade areas that are observed to be unstable or contain debris/deleterious matter should be selectively excavated and replaced with compacted load-bearing fill or granular subbase material.

As previously indicated, some of the site soils have high percentages of sensitive fine-grained soils and will be susceptible to disturbance from exposure to moisture and construction equipment. Depending on the timing between pavement subgrade preparation and pavement section construction, the contractor should anticipate that remedial work could be required to achieve a stable subgrade prior to paving, even if the subgrade soils had previously been compacted to the required densities. Prudent scheduling of pavement construction and control of construction equipment traffic will reduce the need for potential remedial work.

Provided the pavement subgrade is prepared in accordance with the recommendations contained herein, we have assumed a California Bearing Ratio (CBR) of 3 to account for variability of fine-grained soils throughout the site (CBR value to be confirmed via laboratory testing prior to pavement construction). We expect that the standard duty pavements will be exposed to passenger vehicle traffic only. As such, we have conservatively assumed a typical minimum pavement section for the standard duty section, which is expected to be suitable for the traffic expected in the office parking lot area (ESAL value of about 40,000).

We anticipate that the heavy-duty asphalt pavement sections will be used in the areas of the proposed maintenance building, garage, and salt shed, and that they will be exposed to heavier truck traffic associated with trash trucks as well as periodic dump trucks and rubber-tire front end loader equipment (for during winter salting operations). As a result, we have assumed up to 10 single-axle trucks and 5 double-axle trucks per day for heavy duty pavements (ESAL value of 310,000). CED can review and modify the pavement sections based on actual anticipated vehicle traffic, if this information later becomes available.

The following tables present recommended minimum flexible and rigid pavement sections. We note that the rigid (concrete) pavement section may be better suited in the heavy-duty truck traffic areas

compared to the heavy duty flexible (asphalt) pavement, particularly where the pavements will be exposed to tight turning, long-term staging of vehicles, etc., which can cause premature deterioration of flexible (asphalt) pavements. If rigid pavements are considered for the area near the salt sheds, the concrete design shall consider the anticipated high concentration of salt exposure and associated implications on the concrete to prevent premature deterioration.

TABLE 3
RECOMMENDED MINIMUM FLEXIBLE (ASPHALT) PAVEMENT SECTIONS
Proposed Public Works Garage and Shed
Chester, PA

| STANDARD-DUTY ASPHALT PAVEMENT (Automobile Traffic Only) | |
|---|----------------------------------|
| Asphalt Pavement Element | Thickness (inches) |
| 9.5MM PG64-22 HMA Wearing Course | 1.5 |
| 19MM PG64-22 HMA Base Course | 2.5 |
| PennDOT 2A Stone (1) | 6.0 |
| Improved Subgrade (2) | 12.0 |
| HEAVY-DUTY ASPHALT PAVEMENT (Automobile and Truck Traffic) | |
| Asphalt Pavement Element | Thickness (inches) |
| 9.5MM PG64-22 HMA Wearing Course | 1.5 |
| 25MM PG64-22 HMA Base Course | 5.0 |
| PennDOT 2A Stone (1) | 6.0 |
| Improved Subgrade (2) | 12.0 |
| Flexible Pavement Design Parameters | |
| Light Duty Traffic: 40,000 ESAL's | Reliability: 90 percent |
| Heavy Duty Traffic: 310,000 ESAL's | Overall Standard Deviation: 0.45 |
| Service Life: 20 years | Initial Serviceability: 4.25 |
| Design CBR = 3 | Terminal Serviceability: 2.0 |
| (1) Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557. | |
| (2) Subgrade soil to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 3. The moisture content of the material should also be maintained within +/- 2 percent of the optimum moisture content. | |

TABLE 4
RECOMMENDED MINIMUM FLEXIBLE (CONCRETE) PAVEMENT SECTIONS
Proposed Public Works Garage and Shed
Chester, PA

| HEAVY-DUTY CONCRETE PAVEMENT (Truck Traffic) | |
|---|----------------------------------|
| Concrete Pavement Element | Thickness (inches) |
| 4,500 psi Air Entrained Concrete (1) | 7.0 |
| PennDOT 2A Stone (2) | 6.0 |
| Improved Subgrade (3) | 12.0 |
| Rigid Pavement Design Parameters | |
| Heavy Duty Traffic: 310,000 ESAL's | Reliability: 90 percent |
| Service Life: 20 years | Overall Standard Deviation: 0.45 |
| Design CBR = 3 | Initial Serviceability: 4.25 |
| | Terminal Serviceability: 2.0 |

- (1) Concrete reinforcement (rebar, welded wire fabric, or macro-fibers) shall be designed by others.
- (2) Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
- (3) Subgrade soil to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 3. The moisture content of the material should also be maintained within +/- 2 percent of the optimum moisture content.

7.8 Excavation Safety

In accordance with the Occupational Safety and Health Administration (OSHA) "Excavating and Trenching Operations" manual (revised 1985), all trenches and excavations that are deeper than 4 feet (and less than 20 feet) should be properly sloped or otherwise structurally retained to provide stable and safe working conditions. For the existing fill soils encountered at the site (conservatively classified as Type C), OSHA permits maximum slopes of 1.5H:1V. Otherwise, temporary earth retention techniques, such as sliding trench shields, shall be utilized in these materials.

Construction traffic and excavated material stockpiles shall be kept away from excavations by a minimum distance equal to the full depth of the excavation, unless they are accounted for in the design of the temporary earth retention system.

7.9 Utility Construction

Utility trench excavations are generally expected to encounter the existing fill or Stratum A soils. Where existing fill and/or Stratum A soils are present at the utility trench subgrade, these materials shall be evaluated by the on-site geotechnical representative for stability. Soft, loose, or otherwise unstable soils encountered at the trench subgrade shall be over-excavated a minimum depth of 6 inches and backfilled with granular material to provide uniform support. Utility trench backfill should meet the minimum requirements outlined in Section 7.2 - Load-Bearing Fill and Backfill Materials.

7.10 Construction Observation and Testing (Special Inspections)

Regardless of the thoroughness of a geotechnical exploration program, there is always a possibility that subsurface conditions between test borings may be different from those encountered at the test boring locations, that conditions are not as anticipated by the designers, or that the demolition or construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the guidance of a Geotechnical Engineer who is familiar with the intent of the recommendations presented in this report. Such observation services are recommended to evaluate whether the conditions anticipated in the design actually exist, or whether the recommendations presented in the report should be modified where necessary. CED can provide these services on your behalf. Therefore, we recommend that CED be retained to perform quality assurance observation, testing, and Special Inspection services on a full-time basis during (at a minimum) foundation installation and earthwork construction.

8. Conclusion

The conclusions and recommendations presented in this report are based solely on the geotechnical exploration program. The number, location, and depth of the explorations were completed within the constraints of geotechnical program budget and site access.

We emphasize that this exploration report should be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

"A geotechnical engineering report has been prepared for this project by Colliers Engineering & Design, Inc. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent their interpretation of the subsurface conditions, field and laboratory testing, and the results of analyses which they have conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own investigation, tests, and analyses."

9. Limitations

This report has been prepared in accordance with generally accepted geotechnical design practice for the exclusive use of the Owner, and their agents for specific application to this project. This report has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project Architect, Structural Engineer, and/or Civil Engineer. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available.

We recommend that the Architect, Civil Engineer, and Structural Engineer, along with any other design professionals involved in this project, carefully review the assumptions noted in this report regarding the proposed development so that they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention so that they do not affect the conclusions and recommendations provided in the report. The project plans and specifications should be submitted to us for review so that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted and are incorporated into the design.

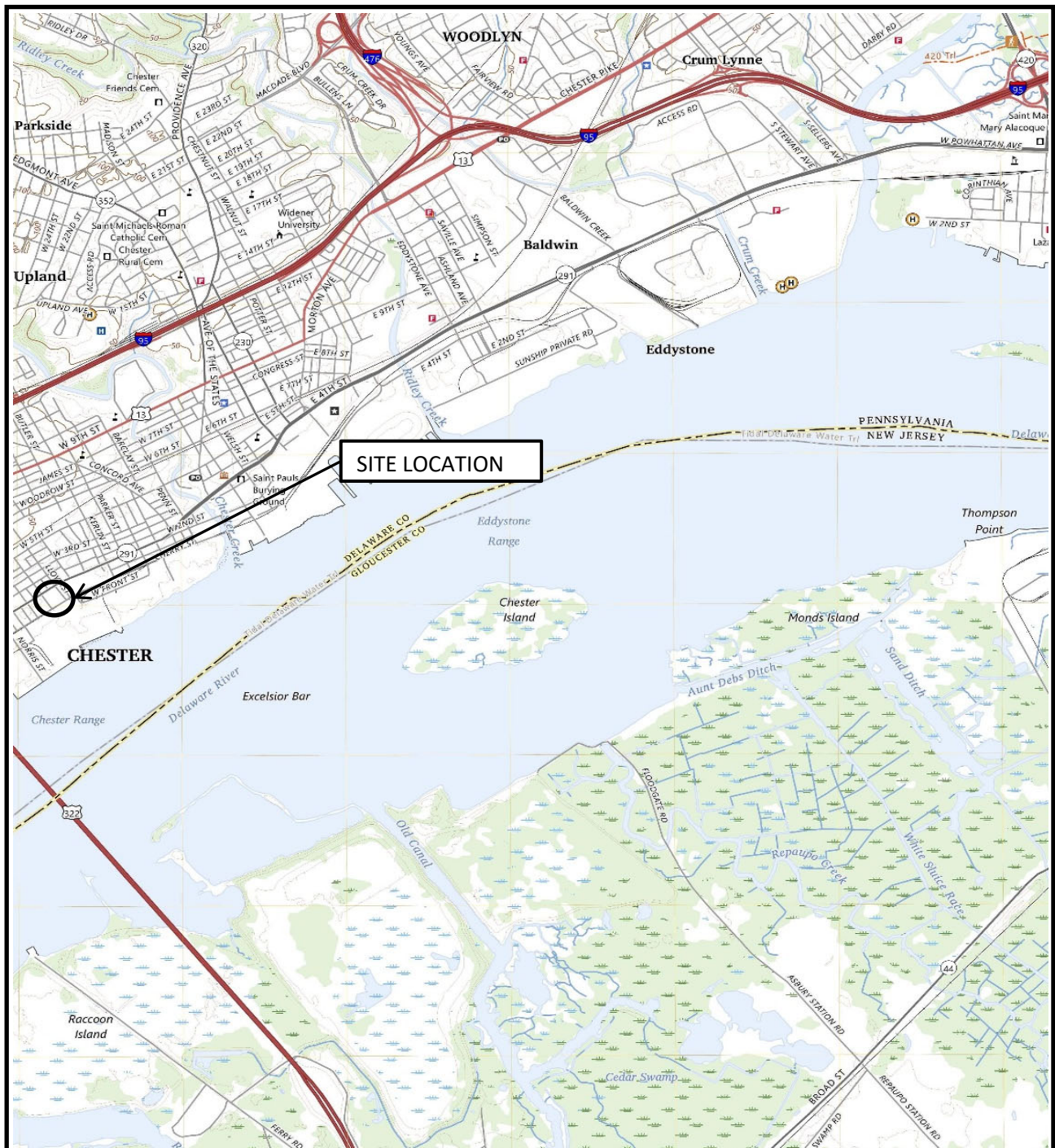
The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field investigation and by the number of borings that were made. It is understood that the number of borings made are consistent with good engineering practice but, given the nature of subsurface conditions, there is a possibility that actual conditions encountered may differ from those projected in this report. Should conditions arise which differ from those described in this report, CED should be notified immediately and provided with all relevant information when available regarding subsurface conditions.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for the observation of excavation operations, proofrolling, load-bearing fill placement, foundation installation, and all critical earthwork operations. CED has the capability of providing these services and would be pleased to present a proposal to perform the on-site quality assurance observation and materials testing.

The scope of this evaluation was limited to the evaluation of the load-carrying capabilities and load stability of the soils. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this exploration.

Appendices

Figures



NOTES:

- 1.) *SITE MAP OBTAINED FROM USGS TOPOGRAPHIC MAP, BRIDGEPORT, NJ, PA QUADRANGLE, DATED 2023.



**Engineering
& Design**

Title:

SITE LOCATION MAP

Project:

***Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA***

Drawn By:

*

Checked By:

MJK

Project No.:

COCD0004

Scale:

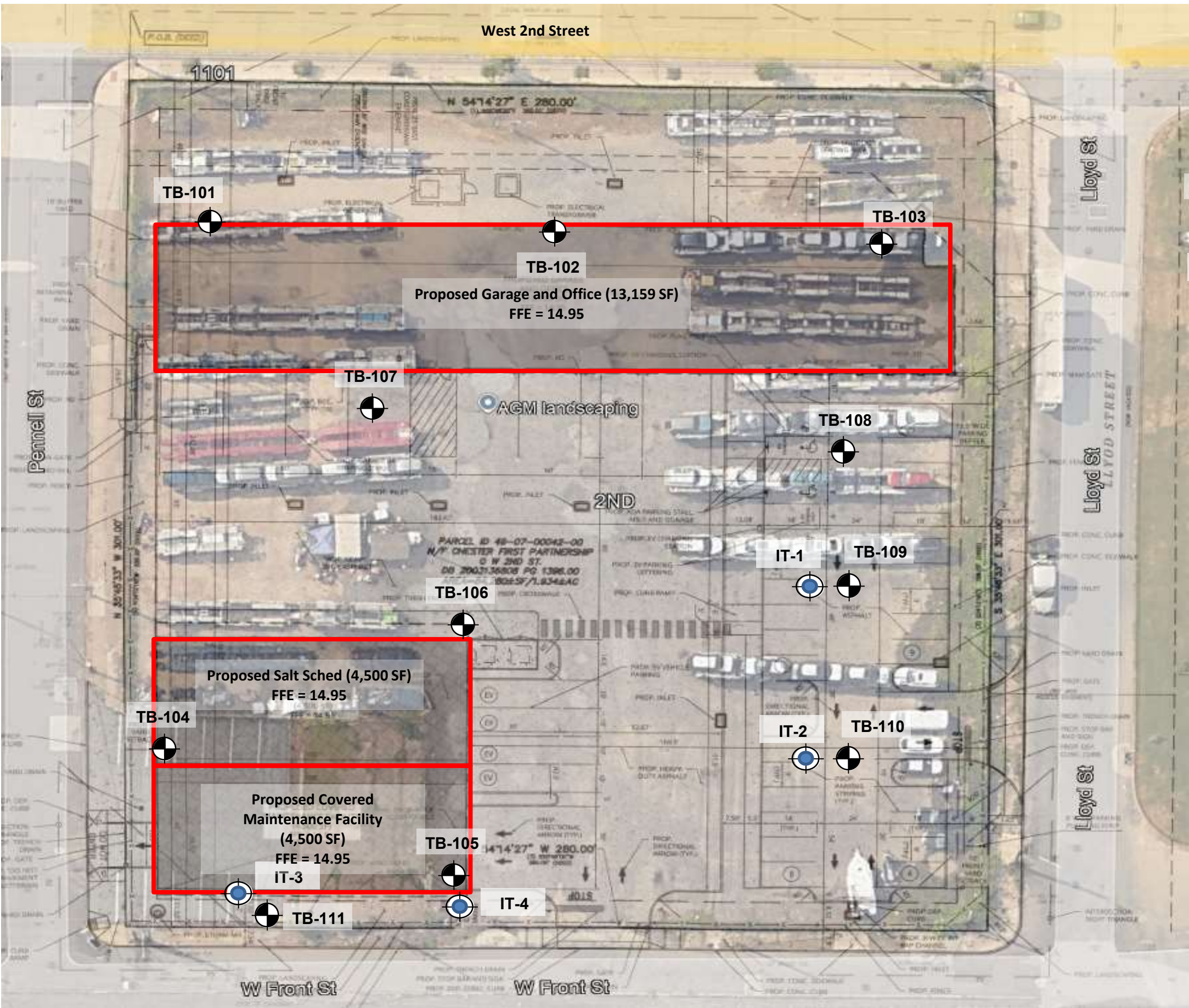
N.T.S.

Date:

10/22/2024

Figure No.:

1



LEGEND:

- TB-101** TEST BORING LOCATION (APPROXIMATE)
- IT-101** INFILTRATION TEST LOCATION (APPROXIMATE)
- PROPOSED BUILDING FOOTPRINT (APPROXIMATE)**

NOTES:

- 1.) BASE PLAN PREPARED FROM A GOOGLE EARTH AERIAL IMAGE WITH A SITE PLAN (DATED OCTOBER 11, 2024) OVERLAY.
- 2.) THIS DRAWING IS PART OF THE COLLIERS ENGINEERING & DESIGN, INC. GEOTECHNICAL REPORT (PROJECT NO. COCD0004) DATED NOVEMBER 2024.

Colliers

Engineering & Design

TITLE:

EXPLORATION LOCATION PLAN

PROJECT:

Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA

DRAWN BY:

*

CHECKED BY:

MJK

PROJECT NO.:

COCD0004

SCALE:

N.T.S.

DATE:

11/6/2024

FIGURE NO.:

2

Appendix A
Test Boring Logs



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-101

PAGE 1 OF 1

GROUND ELEVATION (ft): 16
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 7.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/14/2024

END OF DRILLING (0 hrs.) 14.3 10/14/2024

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|---|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | 18 | 21 | 23 | 50/4" | 7 | 1.5 | | | Existing Fill | S-1: Brown, Gray, Tan, cmf SAND and mf Gravel, little (+) Silt, (Fill) (Moist) |
| | 0.0'-1.8' | | | | | 2 | | | | | S-2: Tan, Gray, mf SAND and c Gravel (concrete), trace Silt, (Fill) (Moist) |
| | S-2 | 50/3" | - | - | - | 18 | | | | | S-3: (Top 8") Same as S-2, (Fill) (Moist) (Bottom 10") Brown, Yellowish Brown, SILT, some cmf Sand, trace mf Gravel, (Moist) |
| | S-3 | 3 | 5 | 5 | 8 | 19 | | | | | S-4: Yellowish Brown, Orange-Brown, cmf SAND, little (-) Silt, trace f Gravel, (Moist) |
| | 4.0'-6.0' | | | | | 16 | | | | | S-5: Gray, Tan, m(+)f GRAVEL and Clay & Silt, little (-) cmf Sand, (Very Moist to Wet) |
| 10 | S-4 | 7 | 8 | 7 | 13 | 14 | | | | Stratum A | S-6: Orange-Brown, Tan, Gray, SILT & CLAY, little (+) cmf Sand, trace f Gravel, (Very Moist) |
| | 6.0'-8.0' | | | | | 15 | | | | | S-7: Gray, White, Clayey SILT, some (+) cmf Sand, slightly micaceous, (Moist) |
| | S-5 | 2 | 1 | 5 | 16 | 22 | | | | | S-8: Greenish Gray, cmf SAND, little (+) Silt, trace f Gravel (friable RF), (Moist) |
| | 8.0'-10.0' | | | | | 23 | | | | | S-9: Greenish Gray, cmf(+) SAND, little Silt, trace (+) f Gravel (friable RF), (Moist) |
| | S-6 | 4 | 5 | 6 | 4 | 4 | | | | | S-10: Gray, cmf SAND, little friable RF, trace (+) Silt, slightly micaceous, (Moist) |
| 15 | 10.0'-12.0' | | | | | 5 | | | | Stratum B | S-11: Gray, cmf SAND, trace (+) friable RF, trace Silt, slightly micaceous, (Moist) |
| | S-7 | 4 | 6 | 7 | 10 | | | | | | END OF TEST BORING AT 34.5 FEET |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 20 | S-8 | 6 | 9 | 12 | 15 | | | | | Stratum C | |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | S-9 | 5 | 9 | 14 | 17 | | | | | | |
| | 23.0'-25.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | S-10 | 50/5" | - | - | - | | | | | | |
| | 28.0'-28.4' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-11 | 50/5" | - | - | - | | | | | | |
| | 33.0'-33.4' | | | | | | | | | | |
| | | | | | | | | | | | |
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| 40 | | | | | | | | | | | |
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NOTES: Hard Augering/Grinding through Fill (Concrete) 2 feet to 3.5 feet; Moderately Hard Augering 29 feet to 33 feet; Hard to Very Hard Augering/Grinding 33 feet to 34.5 feet; Auger Refusal at 34.5 feet.

End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.

Boring backfilled upon completion for safety considerations.

TEST BORING: TB-101

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-102

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.5

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED 9.0 10/14/2024
END OF DRILLING (0 hrs.) 26.4 10/14/2024

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | 15 | 13 | 8 | 9 | 19 | 3.5 | | | Existing Fill | S-1: Tan. mf SAND and Silt, trace (+) asphalt fragments, (Fill)) (Moist) |
| | 0.0'-2.0' | | | | | | | | | | |
| | S-2 | 10 | 8 | 11 | 11 | 19 | | | | | S-2: Tan, SILT, some (+) f Sand, (Moist) |
| | 2.0'-4.0' | | | | | | | | | | |
| 10 | S-3 | 10 | 22 | 21 | 17 | 22 | <0.25 | | | Stratum A | S-3: Orange-Brown, cmf SAND, some mf Gravel, trace (+) Silt, (Moist) |
| | 4.0'-6.0' | | | | | | | | | | |
| | S-4 | 8 | 5 | 3 | 3 | 15 | | | | | S-4: (Top 4") Same as S-3, (Moist) (Bottom 11") Tan, Gray, CLAY & SILT, little (-) mf(+) Sand, (Very Moist) |
| | 6.0'-8.0' | | | | | | | | | | |
| 15 | S-5 | 11 | 3 | 2 | 2 | 16 | 0.75 | | | Stratum B | S-5: Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (-) friable RF, (Very Moist) |
| | 8.0'-10.0' | | | | | | | | | | |
| | S-6 | 3 | 5 | 6 | 6 | 20 | | | | | S-6: Yellowish Brown, Gray, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 10.0'-12.0' | | | | | | | | | | |
| 20 | S-7 | 3 | 5 | 8 | 12 | 21 | | | | Stratum C | S-7: Gray, cmf SAND, little (+) Silt, slightly micaceous, (Moist) |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | S-8 | 18 | 16 | 13 | 47 | 23 | | | | Stratum C | S-8: Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Moist) |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | S-9 | 50 | 50/2" | - | - | 8 | | | | Stratum C | S-9: Gray, micaceous cmf SAND, trace (+) Silt, trace friable RF, (Moist) |
| | 23.0'-23.7' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-10 | 50/3" | - | - | - | 3 | | | | Stratum C | S-10: Gray, micaceous cmf SAND, little (-) friable RF, little (-) Silt, (Very Moist to Wet) |
| | 27.0'-27.3' | | | | | | | | | | |
| | | | | | | | | | | | |
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| 40 | | | | | | | | | | Stratum C | |
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NOTES: Moderately Hard Augering 20 feet to 23 feet; Hard Augering and Light to Moderate Auger Grinding 24 feet to 27 feet; Auger and Spoon Refusal at 27.3 feet.
End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.
Boring backfilled upon completion for safety considerations.

TEST BORING: TB-102

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-103

PAGE 1 OF 1

GROUND ELEVATION (ft): 13
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED 8.0 10/14/2024
END OF DRILLING (0 hrs.) 13.8 10/14/2024

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|--------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 0.0'-2.0' | 9 | 6 | 6 | 6 | 19 | 4.0 | | | Existing Fill | S-1: Brown, cmf SAND, some Silt, trace mf Gravel, trace (-) brick fragments, (Fill) (Moist) |
| | S-2 2.0'-2.8' | 6 | 50/4" | - | - | 7 | | | | | S-2: Dark Brown, Clayey SILT, little (+) cmf Sand, little brick fragments, (Fill) (Moist) |
| | S-3 4.0'-6.0' | 3 | 12 | 15 | 9 | 19 | | | | | S-3: (Top 9") Same as S-2 (Fill) (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (-) cmf Sand, little mf Gravel, (Moist) |
| | S-4 6.0'-8.0' | 6 | 7 | 9 | 8 | 20 | | | | Stratum A | S-4: Orange-Brown, cmf Sand, some (-) Silt, trace (+) mf(+) Gravel, (Moist) |
| 10 | S-5 8.0'-10.0' | 6 | 14 | 24 | 32 | 11 | | | | | S-5: Orange-Brown, Tan, Gray, cmf SAND, little (+) mf Gravel, little Silt, (Very Moist) |
| | S-6 10.0'-10.8' | 22 | 50/4" | - | - | 10 | | | | Stratum B | S-6: Yellowish Brown, Gray, Orange-Brown, cmf SAND, little Silt, trace (+) friable RF, slightly micaceous, (Moist) |
| | S-7 13.0'-13.3' | 50/3" | - | - | - | 3 | | | | | S-7: Yellowish-Brown, Gray, cmf SAND, some Silt, little friable and non-friable RF, slightly micaceous, (Very Moist to Wet) |
| 15 | | | | | | | | | | 15.5 | END OF TEST BORING AT 15.5 FEET |
| 20 | | | | | | | | | | -2.5 | |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
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NOTES: Moderate to Hard Augering through Fill 2.5 feet to 4 feet; Moderately Hard drilling 1.5 feet to 13 feet; Hard to Very Hard Augering/Grinding 13 feet to 15.5 feet; Auger Refusal at 15.5 feet.
End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.
Boring backfilled upon completion for safety considerations.

TEST BORING: TB-103

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-104

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi


DRILLING EQUIPMENT: Mobile B-57 Truck Rig


METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED  9.0 10/17/2024

END OF DRILLING (0 hrs.)  9.5 10/17/2024


DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (tsf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|---|------------------------------|-----------------|---|--|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | |
| 5 | S-1 | - | - | 4 | 6 | 7 | 3.25 | |  | Existing Fill | S-1: Asphalt +/- 2.5 inches; Concrete +/- 8.5 inches; Base +/- 3 inches Brown, Tan, mf SAND, some cmf Gravel, little Silt, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 2.0 | | | | | 12.5 |
| | S-2 | 10 | 7 | 13 | 10 | Stratum A | | | | S-3: Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (+) f Gravel, (Moist) | |
| | 2.0'-4.0' | | | | | | | | | S-4: Orange-Brown, cmf SAND, some Silt, trace mf Gravel, (Very Moist) | |
| 10 | S-3 | 10 | 8 | 7 | 10 | 15 | 2.0 | | | Stratum A | S-5: Orange-Brown, cmf SAND, some (-) mf Gravel, little (-) Silt, (Very Moist to Wet) |
| | 4.0'-6.0' | | | | | S-6: (Top 11") Same as S-5, (Wet) (Bottom 6") Gray, White, cmf SAND, some (+) Clayey Silt, slightly micaceous, (Very Moist to Wet) | | | | | |
| | S-4 | 10 | 7 | 19 | 13 | 18 | | | | Stratum B | S-7: Gray, White, micaceous cmf SAND, some (+) Silt, trace friable RF, (Very Moist) |
| | 6.0'-8.0' | | | | | 11.5 | | | | | 3.0 |
| 15 | S-5 | 3 | 10 | 9 | 13 | 18 | | | | Stratum B | S-9: Gray, White, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 8.0'-10.0' | | | | | S-10: Gray, micaceous cmf SAND, little Silt, trace friable RF, (Moist) | | | | | |
| | S-6 | 6 | 8 | 11 | 7 | 17 | | | | Stratum B | |
| | 10.0'-12.0' | | | | | 20 | | | | | |
| 20 | S-7 | 3 | 8 | 7 | 8 | 20 | | | | Stratum B | |
| | 13.0'-15.0' | | | | | 16 | | | | | |
| | S-8 | 7 | 9 | 11 | 15 | 23 | | | | Stratum B | |
| | 18.0'-20.0' | | | | | 22 | | | | | |
| 25 | S-9 | 9 | 11 | 15 | 22 | 23 | | | | Stratum B | |
| | 23.0'-25.0' | | | | | 22 | | | | | |
| | S-10 | 20 | 20 | 26 | 34 | 22 | | | | Stratum B | |
| | 28.0'-30.0' | | | | | 22 | | | | | |
| 35 | | | | | | | | | | Stratum B | |
| | | | | | | | | | | | |
| | | | | | | | | | | Stratum B | |
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| 40 | | | | | | | | | | Stratum B | |
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| 140 | | | | | | | | | | Stratum B | |
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| 270 | | | | | | | | | | Stratum B | |
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| 310 | | | | | | | | | | Stratum B | |
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| 315 | | | | | | | | | | Stratum B | |
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| 320 | | | | | | | | | | Stratum B | |
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| 325 | | | | | | | | | | Stratum B | |
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Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 1 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/15/2024

END OF DRILLING (0 hrs.) 8.7 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | - | 2 | 1 | 10 | 0.25 | | | 2.0 | Existing Fill S-1: Asphalt +/- 1.5 inches; Concrete +/- 6.5 inches; Base +/- 4 inches Orange-Brown, Tan, Gray, Clayey SILT, some (+) cmd Sand, trace (+) mf Gravel, (Fill) (Moist) S-2: Orange-Brown, SILT, some (+) mf Sand, (Moist) |
| | 0.0'-2.0' | | | | | 21 | >4.5 | | | 12.0 | |
| | S-2 | 4 | 4 | 6 | 11 | 18 | 3.25 | | | | |
| 10 | S-3 | 5 | 4 | 6 | 9 | | | | | | Stratum A S-3: Orange-Brown, Gray, SILT, some mf Sand, trace mf Gravel, (Moist) S-4: (Top 11") Same as S-3, (Moist) (Bottom 11") Orange-Brown, Tan, cmf SAND, little (+) mf Gravel, trace (+) Silt, (Very Moist) S-5: Orange-Brown, DARK Brown, c(+)mf SAND, little mf Gravel, trace (+) Silt, (Very Moist to Wet) S-6: (Top 10") Same as S-5, (Wet) (Bottom 12") Gray SILT and mf Sand, slightly micaceous, (Very Moist to Wet) |
| | 4.0'-6.0' | | | | | 22 | | | | | |
| | S-4 | 8 | 8 | 13 | 13 | 13 | | | | | |
| 15 | S-5 | 11 | 13 | 8 | 4 | | | | | | Stratum B S-7: Gray, Orange-Brown, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) S-8: (Top 8") Same as S-7, (Very Moist to Wet) (Bottom 8") White, Gray, Tan, cmf SAND, little Silt, trace (+) friable RF, trace phyllite, slightly micaceous, (Very Moist) |
| | 6.0'-8.0' | | | | | | | | | | |
| | S-6 | 2 | 2 | 2 | 3 | 20 | | | | | |
| 20 | 8.0'-10.0' | | | | | | | | | | Stratum C S-9: Gray, cmf(+) SAND, some (+) Silt, trace friable RF, slightly micaceous, (Very Moist to Wet) S-10: White, Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Very Moist) S-11: Gray, micaceous cmf SAND, some (-) Silt, trace friable RF, (Very Moist) S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | 10.0'-12.0' | | | | | | | | | | |
| | S-7 | 3 | 3 | 4 | 5 | 16 | | | | | |
| 25 | 13.0'-15.0' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-8 | 3 | 7 | 10 | 20 | 19 | | | | | |
| 30 | 18.0'-20.0' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-9 | 4 | 4 | 7 | 8 | 23 | | | | | |
| 35 | 23.0'-25.0' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-10 | 8 | 12 | 9 | 13 | 22 | | | | | |
| 40 | 28.0'-30.0' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-11 | 9 | 13 | 21 | 28 | 5 | | | | | |
| 45 | 33.0'-35.0' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-12 | 50/5" | - | - | - | 5 | | | | | |
| 50 | 38.0'-38.4' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
| | S-13 | 50/5" | - | - | - | 5 | | | | | |
| 55 | 43.0'-43.4' | | | | | | | | | | Stratum C S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | | | |
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NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 1 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 2 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED ∇ 9.0 10/15/2024
END OF DRILLING (0 hrs.) ∇ 8.7 10/17/2024

ASTM D-1586

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|---------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| | | | | | | | | | | Stratum C | |
| | | | | | | | | | | 48.3 | |
| 50 | S-14 48.0'-48.3' | 50/4" | - | - | - | 4 | | | | -34.3 | S-14: White, Light Gray, cmf SAND, little Silt, trace (+) friable RF, (Moist) END OF TEST BORING AT 48.3 FEET |
| | | | | | | | | | | | |
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| 55 | | | | | | | | | | | |
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| 85 | | | | | | | | | | | |
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NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 2 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-106

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi


DRILLING EQUIPMENT: Mobile B-57 Truck Rig


METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED  9.5 10/15/2024

END OF DRILLING (0 hrs.)  9.2 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 12 | 6 | 6 | 15 | >4.5 | | | | S-1: Asphalt +/- 5 inches; Base +/- 5 inches Brown, Clayey SILT, little cmf Sand, trace (-) f Gravel, (Moist) |
| | 0.0'-2.0' | | | | | 20 | 2.75 | | | | S-2: Orange-Brown, CLAY & SILT, some(-) cmf Sand, trace (-) f Gravel, (Moist) |
| | S-2 | 7 | 8 | 10 | 9 | 19 | | | | | S-3: (Top 10") Same as S-2, (Moist) (Bottom 9") Orange-Brown, cmf SAND, little (+) Silt, (Moist) |
| | S-3 | 16 | 14 | 12 | 10 | 19 | | | | | S-4: Orange-Brown, cmf Sand, some (-) Silt, trace (+) mf Gravel, (Moist) |
| | 4.0'-6.0' | | | | | 18 | | | | | S-5: (Top 12") Same as S-4, (Very Moist to Wet) (Bottom 6") Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (+) cmf Gravel, (Wet) |
| 10 | S-4 | 7 | 8 | 8 | 7 | 20 | | | | | S-6: Orange-Brown, Tan, Gray, cmf SAND, some Silt, slightly micaceous, (Very Moist to Wet) |
| | 6.0'-8.0' | | | | | 22 | | | | | S-7: Gray, White, cmf SAND, some (-) Silt, trace (-) friable RF, (Very Moist) |
| | S-5 | 12 | 12 | 9 | 4 | 23 | | | | | S-8: Gray, White, cmf SAND, some Silt, trace friable RF, slightly micaceous, (Very Moist) |
| 15 | 8.0'-10.0' | | | | | 22 | | | | | S-9: Gray, Greenish Gray, cmf SAND, some Silt, trace (+) friable RF, Slightly micaceous, (Very Moist) |
| | S-6 | 5 | 8 | 11 | 8 | 23 | | | | | S-10: Gray, White, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 10.0'-12.0' | | | | | 1 | | | | | S-11: Gray, mf SAND and friable/non-friable RF, trace Silt, slightly micaceous, (Moist) |
| 20 | S-7 | 5 | 7 | 10 | 13 | | | | | | |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | S-8 | 4 | 5 | 7 | 10 | | | | | | |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | S-9 | 9 | 10 | 8 | 50/4" | | | | | | |
| | 23.0'-24.8' | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-10 | 9 | 5 | 5 | 21 | | | | | | |
| | 28.0'-30.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 40 | S-11 | 50/1" | - | - | - | | | | | | |
| | 33.0'-33.1' | | | | | | | | | | |
| | | | | | | | | | | | |

NOTES: Moderately Hard to Hard Augering 24.5 feet to 28 feet; Hard Augering 30 feet to 32 feet; Very Hard Augering/Grinding 32 feet to 33.5 feet; Auger Refusal at 33.5 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-106

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-107

PAGE 1 OF 1

GROUND ELEVATION (ft): 15.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 6.5

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi


DRILLING EQUIPMENT: Mobile B-57 Truck Rig


METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED  9 10/18/2024

END OF DRILLING (0 hrs.)  * 10/18/2024

DATE STARTED 10/18/2024

DATE FINISHED 10/18/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 7 | 8 | 8 | 11 | 1.25 | | | | Existing Fill S-1: Asphalt +/- 4.5 inches; Base +/- 3 inches Gray, Brown, SILT, little (+) mf Sand, trace (+) f Gravel, (Fill) (Moist) S-2: (Top 7") Same as S-1, (Fill) (Moist) (Bottom 11") Gray, Orange-Brown, SILT, some (-) mf(+) Sand, (Moist) S-3: Orange-Brown, SILT & CLAY, little (+) cmf Sand, trace (-) f Gravel, (Moist) |
| | 0.0'-2.0' | | | | | 18 | 1.0 | | | 3.0 | |
| | S-2 | 7 | 7 | 8 | 9 | 19 | 1.75 | | | 12.5 | |
| | 2.0'-4.0' | | | | | 19 | 1.75 | | | 12.5 | |
| 10 | S-3 | 5 | 6 | 6 | 5 | 19 | 1.75 | | | | Stratum A S-4: Orange-Brown, Tan, Gray. Clayey SILT, some (-) mf Gravel, little (+) cmf Sand, (Moist) S-5: Orange-Brown, cmf SAND and cmf Gravel, trace (+) Silt, (Very Moist to Wet) S-6: (Top 7") Same as S-5, (Wet) (Bottom 8") Gray, White, cmf SAND, little (+) Silt, trace (-) friable RF, slightly micaceous, (Very Moist) |
| | 4.0'-6.0' | | | | | 17 | 0.75 | | | | |
| | S-4 | 7 | 19 | 8 | 4 | 19 | 0.75 | | | | |
| | 6.0'-8.0' | | | | | 19 | 0.75 | | | | |
| 15 | S-5 | 8 | 14 | 11 | 9 | 15 | | | | | Stratum B S-7: Gray, White, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Very Moist) |
| | 8.0'-10.0' | | | | | 15 | | | | 11.0 | |
| | S-6 | 8 | 10 | 12 | 15 | 15 | | | | 4.5 | |
| | 10.0'-12.0' | | | | | 15 | | | | 4.5 | |
| 20 | S-7 | 5 | 5 | 7 | 9 | 14 | | | | | END OF TEST BORING AT 15.0 FEET |
| | 13.0'-15.0' | | | | | 14 | | | | 15.0 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 40 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

NOTES: Moderately Hard Augering/Grinding through gravel layer 6.5 feet to 8 feet.
* Caved dry at 7.8 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-107

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-108

PAGE 1 OF 1

GROUND ELEVATION (ft): 13
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.6

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi


DRILLING EQUIPMENT: Mobile B-57 Truck Rig


METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED  10 10/15/2024

END OF DRILLING (0 hrs.)  8.4 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

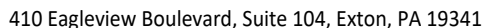
ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 5 | 6 | 13 | 10 | | | | | Existing Fill S-1: Asphalt +/- 2 inches, Base +/- 4 inches Reddish Brown, Brown, Tan, cmf SAND, little mf Gravel, trace brick fragments, (Fill) (Moist) S-2: Dark Brown, Reddish Brown, cmf SAND, Some (-) cmf Gravel, trace (+) Silt, trace brick fragments, (Fill) (Moist) S-3: Orange-Brown, White, Tan, mf SAND, Some Clayey Silt, little mf Gravel (possible concrete fragments), (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 13 | | | | | |
| | S-2 | 8 | 8 | 4 | 3 | | | | | | |
| | 2.0'-4.0' | | | | | 17 | | | | | |
| 10 | S-3 | 3 | 5 | 18 | 25 | | | | | | Stratum A S-4: Orange-Brown, Dark Brown, Tan, cmf SAND, some mf Gravel, little Silt, (Moist) S-5: Reddish-Brown, cmf SAND, some (+) Silt, some mf Gravel, (Moist) S-6: (Top 11") Same as S-5, (Moist to Wet) (Bottom 9") Brownish Gray, Orange-Brown, mf SAND, little (+) Silt, slightly micaceous, (Very Moist) S-7: Brownish Gray, Orange-Brown, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Moist) |
| | 4.0'-6.0' | | | | | 9 | | | | | |
| | S-4 | 7 | 9 | 12 | 9 | | | | | | |
| | 6.0'-8.0' | | | | | 18 | | | | | |
| 15 | S-5 | 3 | 8 | 12 | 33 | | | | | | Stratum B S-7: Brownish Gray, Orange-Brown, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Moist) |
| | 8.0'-10.0' | | | | | 20 | | | | | |
| | S-6 | 31 | 49 | 43 | 43 | | | | | | |
| | 10.0'-12.0' | | | | | 10 | | | | | |
| 20 | S-7 | 16 | 50/4" | - | - | | | | | | Stratum C END OF TEST BORING AT 13.8 FEET |
| | 13.0'-13.8' | | | | | | | | | | |
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| 25 | | | | | | | | | | | |
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| 35 | | | | | | | | | | | |
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| 40 | | | | | | | | | | | |
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NOTES: Moderately Hard Augering 11 feet to 13 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-108

PAGE 1 OF 1



PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.0

CONTRACTOR: Soil Borings, Inc.



DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

| METHOD: HSA | χ | Mud Rotary | Other |
|-------------|--------|------------|-------|
|-------------|--------|------------|-------|

| | | | |
|------------|--------|-----------|---|
| HAMMER: CH | Safety | Automatic | X |
|------------|--------|-----------|---|

| RODS: AW | X | NW | Other |
|----------|---|----|-------|
|----------|---|----|-------|

| GROUNDWATER: | DEPTH (ft) | DATE |
|--------------------------|---|-------------------|
| FIRST ENCOUNTERED |  <u>NE</u> | <u>10/17/2024</u> |
| END OF DRILLING (0 hrs.) |  8.5 | 10/18/2024 |






























































ASTM D-1586

DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (tsf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | | | | | | | | | | | | |
|---------------------------|---------------|--------------------|-------|--------|--------|---------------|------------------------|--------------|---|--|---|--|---|---|---|---|---|--|---|---|--|--|--|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | | | | | | | | | | | | | |
| 5 | S-1 | - | 4 | 6 | 7 | 15 | | |  | Existing Fill | S-1: Asphalt +/- 4 inches; Base +/- 3 inches Brown Gray, cmf SAND, some (+) Silt, trace cmf Gravel, (Fill) (Moist) | | | | | | | | | | | | |
| | 0.0'-2.0' | | | | | 0 | | | | | S-2: NO RECOVERY * Likely push of large gravel in Fill. | | | | | | | | | | | | |
| | S-2 | 4 | 2 | 2 | 2 | 14 | | | | | 4.5 | S-3: (Top 5") Same as S-1, (Fill) (Moist) | | | | | | | | | | | |
| | 2.0'-4.0' | | | | | | | | | | 8.0 | (Bottom 9") Orange-Brown, Tan, White, cmf SAND, some Silt, little (+) cmf Gravel, (Very Moist) | | | | | | | | | | | |
| S-3 | 3 | 8 | 10 | 11 | 12 | | | | | Stratum A | S-4: Orange-Brown, Dark Brown, cmf SAND, some (+) mf Gravel, little Silt, (Moist) | | | | | | | | | | | | |
| 4.0'-6.0' | | | | | | | | | | | S-5: Brown, Tan, cmf SAND, some (-) mf Gravel, little (-) Silt, (Moist) | | | | | | | | | | | | |
| S-4 | 10 | 7 | 11 | 8 | | 5 | | | | | Stratum B | S-6: (Top 5") Same as S-5, (Moist) | | | | | | | | | | | |
| 6.0'-8.0' | | | | | | | | | | | | 10.5 | (Bottom 17") Gray, Brown, mf SAND, some Silt, Slightly micaceous, (Moist) | | | | | | | | | | |
| S-5 | 2 | 2 | 2 | 4 | 2.0 | | | | | S-7: Gray, White, cmf SAND, little (+) Silt, slightly micaceous, (Moist) | | | | | | | | | | | | | |
| 8.0'-10.0' | | | | | 21 | | | | | Stratum B | | S-8: Gray, Light Gray, micaceous mf SAND, little (+) Silt, trace friable RF, (Moist) | | | | | | | | | | | |
| S-6 | 4 | 6 | 6 | 7 | | 20 | | | | | END OF TEST BORING AT 16.0 FEET | | | | | | | | | | | | |
| 10.0'-12.0' | | | | | | | | | | | | 16.0 | | | | | | | | | | | |
| S-7 | 4 | 5 | 9 | 11 | | | | | | | | -3.5 | | | | | | | | | | | |
| 12.0'-14.0' | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | S-8 | 7 | 9 | 10 | 13 | | | | | |  | | | | | | | | | | | | |
| | 14.0'-16.0' | | | | | | | | | | | | | | | | | | | | | | |
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NOTES: Boring backfilled and patched upon completion for safety considerations.

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-110

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 8.0 10/17/2024

END OF DRILLING (0 hrs.) 7.7 10/18/2024











DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|---|----------------|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | |
| 5 | S-1 | - | 2 | 4 | 4 | 15 | 2.0 | |  | Existing Fill | S-1: Asphalt +/- 1.5 inches; Base +/- 4.5 inches Dark Brown, Black, cmf SAND, some Silt, little mf Gravel, trace (-) brick fragments, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 13 | | | | | S-2: (Top 5") Same as S-1, (Fill) (Moist) |
| | S-2 | 2 | 2 | 1 | 2 | 15 | | | | | (Bottom 8") Grayish Brown, SILT & CLAY, little mf Sand, (Very Moist) |
| | 2.0'-4.0' | | | | | 20 | | | | | S-3: Yellowish Brown, SILT, trace mf Sand, trace (-) f Gravel, (Moist) |
| | S-3 | 2 | 3 | 4 | 8 | 15 | | | | | |
| 10 | 4.0'-6.0' | | | | | 20 | 1.0 | |  | Stratum A | S-4: (Top 10") Same as S-3, (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (+) cmf Sand, little (-) f Gravel, (Very Moist) |
| | S-4 | 12 | 13 | 8 | 7 | 12 | | | | | S-5: Orange-Brown, Tan, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) |
| | 6.0'-8.0' | | | | | 21 | | | | | S-6: Orange-Brown, Yellowish Brown, cmf SAND, trace (+) friable RF, Slightly micaceous, (Moist to Very Moist) |
| | S-5 | 2 | 2 | 3 | 4 | 7 | | | | | S-7: Gray, Orange-Brown, micaceous cmf SAND, little friable RF, trace (+) Silt, (Moist) |
| | 8.0'-10.0' | | | | | 7 | | | | | |
| 15 | S-6 | 4 | 6 | 20 | 50/4" | 21 | | |  | Stratum B | |
| | 10.0'-11.8' | | | | | 7 | | | | | |
| | S-7 | 48 | 50/2" | - | - | | | | | | |
| | 12.0'-12.7' | | | | | | | | | | |
| | | | | | | | | | | | |
| 20 | | | | | | | | |  | Stratum C | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| 25 | | | | | | | | |  | | |
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| 30 | | | | | | | | |  | | |
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| | | | | | | | | | | | |
| 35 | | | | | | | | |  | | |
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| | | | | | | | | | | | |
| 40 | | | | | | | | |  | | |
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| | | | | | | | | | | | |
| 45 | | | | | | | | |  | | |
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| | | | | | | | | | | | |
| 50 | | | | | | | | |  | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| END OF TEST BORING AT 12.7 FEET | | | | | | | | | | | |

NOTES: Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-110

PAGE 1 OF 1





PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

PAGE 1 OF 1

GROUNDWATER ELEV. (ft): 5.1

| GROUNDWATER: | DEPTH (ft) | DATE |
|--------------------------|---|------------|
| FIRST ENCOUNTERED |  9.0 | 10/17/2024 |
| END OF DRILLING (0 hrs.) |  8.9 | 10/17/2024 |

CHECKED BY: M. Kwiatkowski

NOTES: Boring backfilled and patched upon completion for safety considerations.

PAGE 1 OF 1

Appendix B

Laboratory Test Results



CLIENT: City of Chester Public Works
1 Fourth Street
Chester, PA 19013

PROJECT: West 2nd Street and Lloyd Street Garage/Shed

Project # COCD0004 **DATE:** October 30, 2024
PAGE: 1 of 1

CHECKED BY: Jason Veach
TITLE: Assistant Laboratory Manager

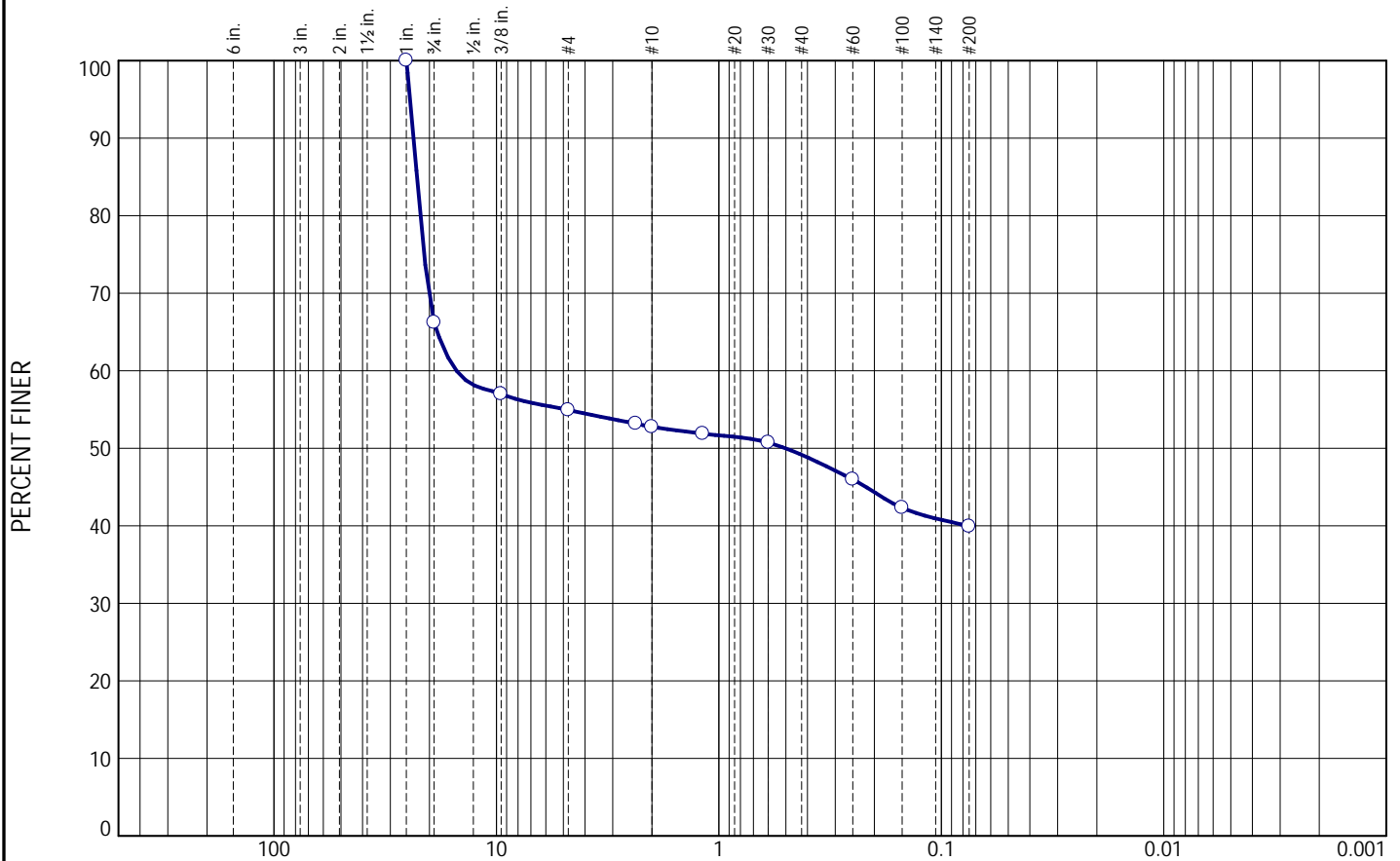
SAMPLES RECEIVED: October 22, 2024

SAMPLES TESTED: 10/22/24 - 10/30/24

LAB TECHNICIAN(S): K. Perry

Comments/Remarks: * See attached Plate(s)

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 43.0 | 4.2 | 2.1 | 4.7 | 6.1 | 39.9 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|--------------------|-----------------|
| 1 | 100.0 | | |
| .75 | 66.2 | | |
| .375 | 57.0 | | |
| #4 | 54.9 | | |
| #8 | 53.2 | | |
| #10 | 51.9 | | |
| #16 | 50.7 | | |
| #30 | 46.0 | | |
| #60 | 42.3 | | |
| #100 | 39.9 | | |
| #200 | | | |

* (no specification provided)

| Material Description | | |
|---|--|--|
| Light tan medium Gravel, and Clay & Silt, little coarse to fine Sand | | |
| <div> <div> Atterberg Limits </div> <div> LL= 30 </div> <div> PL= 19 </div> <div> PI= 11 </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 22.7448 </div> <div> D₆₀= 15.1019 </div> <div> D₃₀= </div> <div> D₁₅= </div> <div> D₁₀= </div> <div> C_u= </div> <div> C_c= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= GC </div> </div> | | |
| <div> <div> Remarks </div> <div> Water Content (WC): 32.8% </div> </div> | | |

Source of Sample: TB-101
Sample Number: S-5

Depth: 8'-10'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



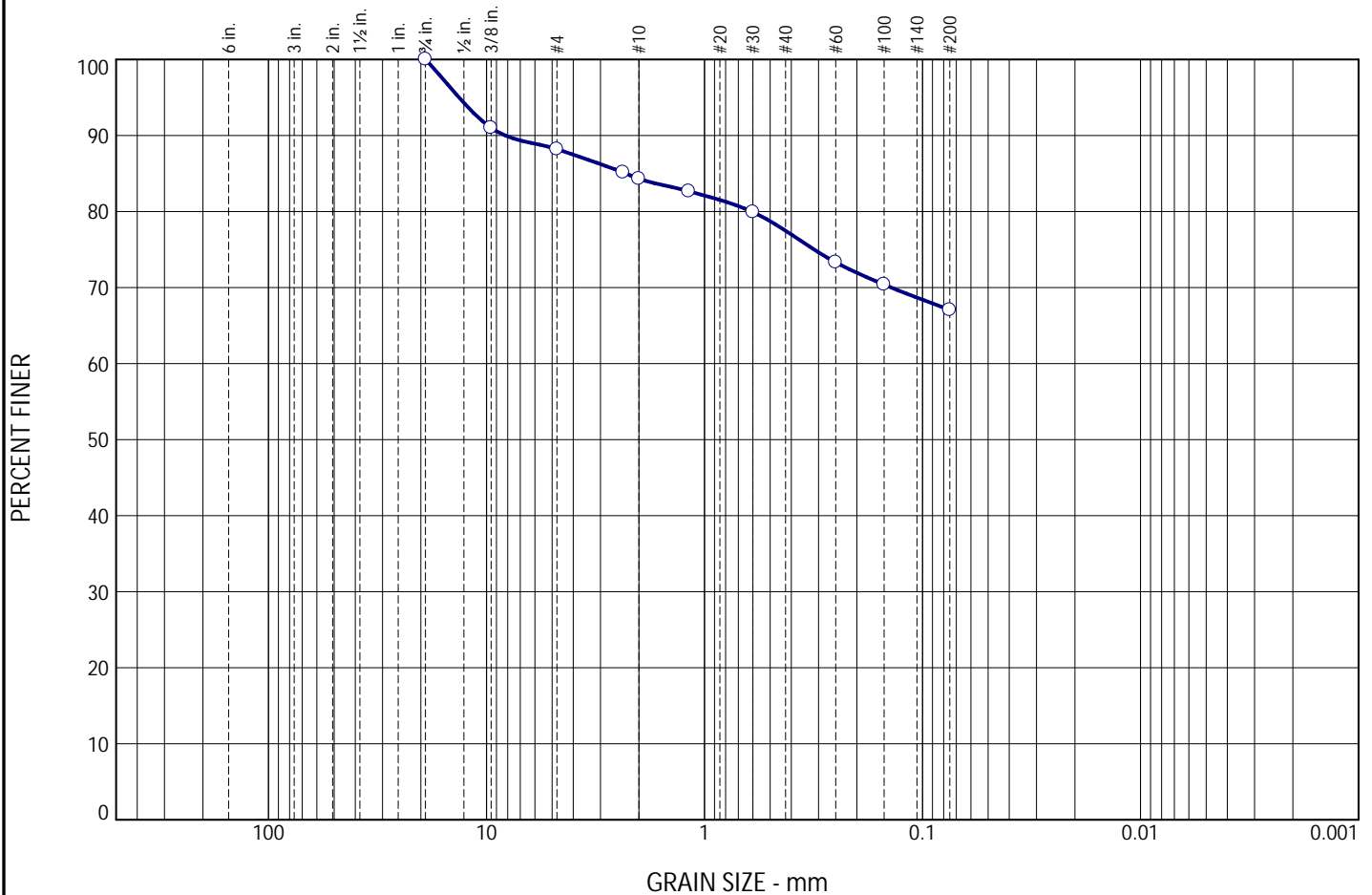
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-1

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 9.0 | 6.7 | 4.4 | 6.6 | 6.2 | 67.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 91.0 | | |
| #4 | 88.2 | | |
| #8 | 85.1 | | |
| #10 | 84.3 | | |
| #16 | 82.7 | | |
| #30 | 79.9 | | |
| #60 | 73.3 | | |
| #100 | 70.4 | | |
| #200 | 67.1 | | |

* (no specification provided)

Material Description
Dark gray [Fines: (SILT/CLAY)], some coarse to fine Sand, little medium to fine Gravel

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= 2.2938 D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 21.1%

Source of Sample: TB-103
Sample Number: S-2

Depth: 2'-2.8'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



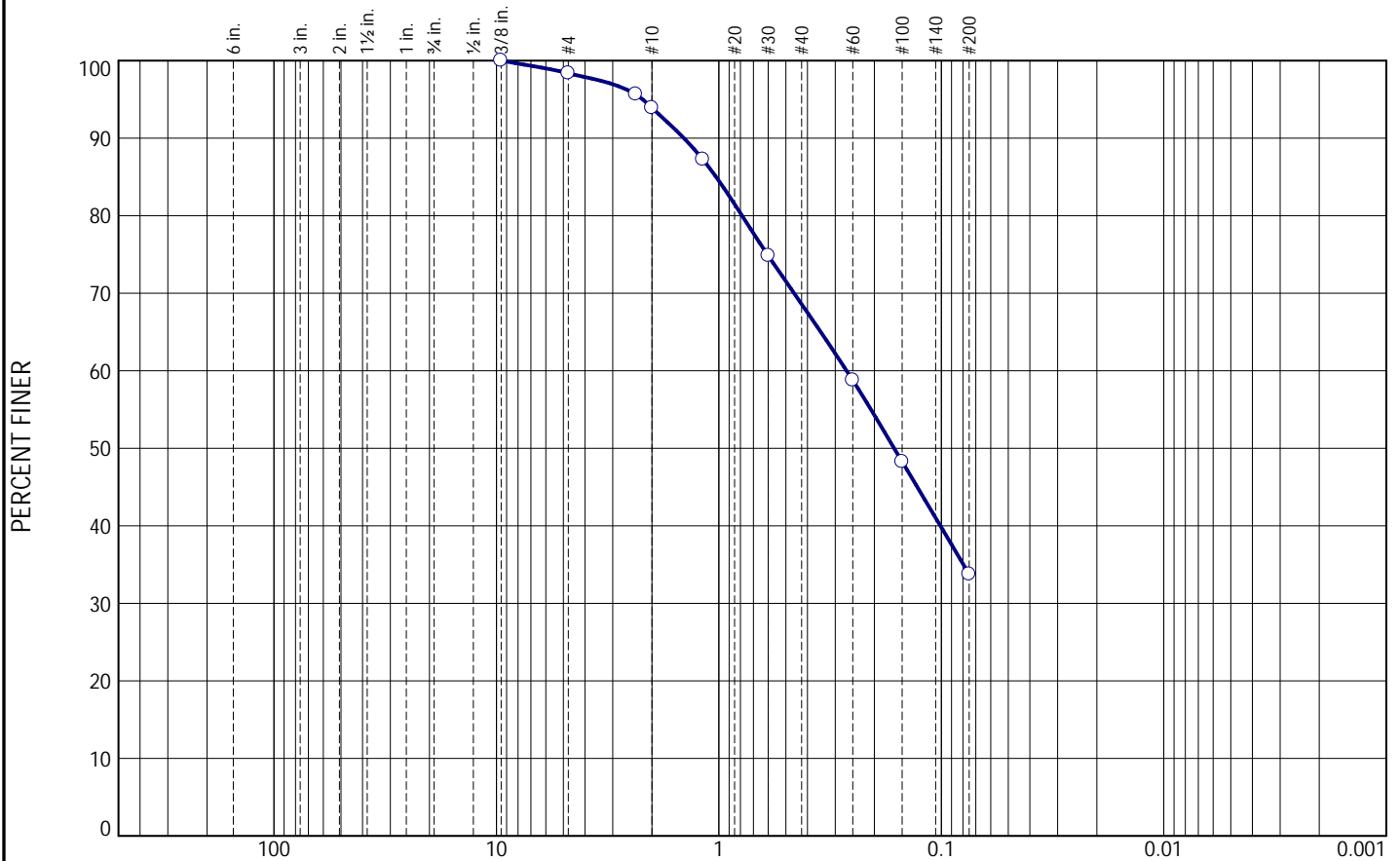
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-2**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 6.1 | 19.1 | 16.0 | 25.1 | 33.7 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 98.4 | | |
| #8 | 95.6 | | |
| #10 | 93.9 | | |
| #16 | 87.2 | | |
| #30 | 74.8 | | |
| #60 | 58.8 | | |
| #100 | 48.3 | | |
| #200 | 33.7 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some [Fines: (Silt/Clay)], trace fine Gravel | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 1.0298 | D ₆₀ = 0.2665 | D ₅₀ = 0.1630 |
| D ₃₀ = | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 20.1% | | |
| Trace Mica | | |

Source of Sample: TB-104
Sample Number: S-7

Depth: 13'-15'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



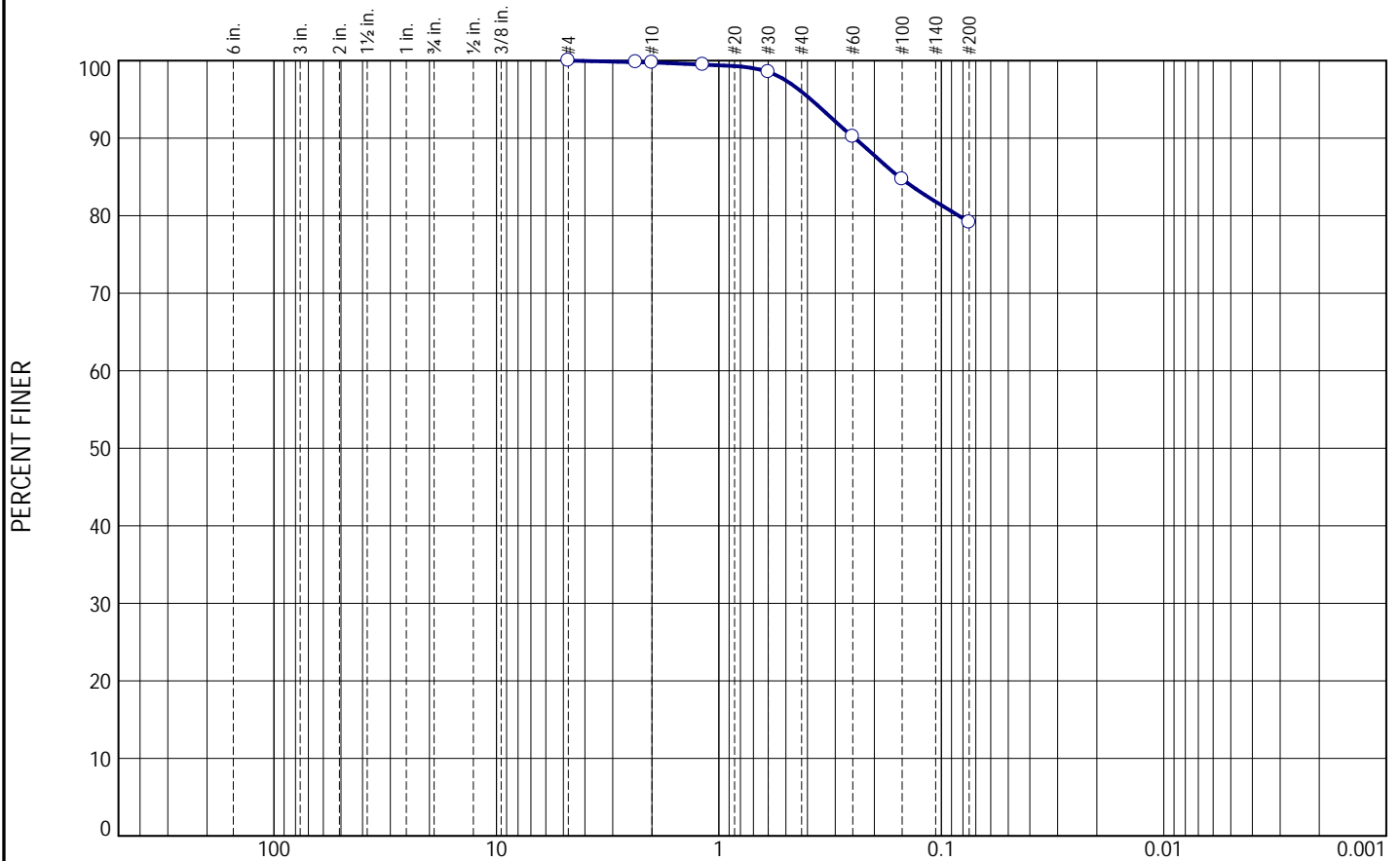
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-3

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.2 | 1.3 | 8.3 | 11.1 | 79.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 99.8 | | |
| #10 | 99.8 | | |
| #16 | 99.5 | | |
| #30 | 98.5 | | |
| #60 | 90.2 | | |
| #100 | 84.7 | | |
| #200 | 79.1 | | |

* (no specification provided)

Material Description
 Brown CLAY & SILT, some medium to fine Sand

Atterberg Limits
 LL= 30 PL= 20 PI= 10

Coefficients
 D₈₅= 0.1546 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= CL

Remarks
 WC: 19.6%

Source of Sample: TB-106
Sample Number: S-2

Depth: 2'-4'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



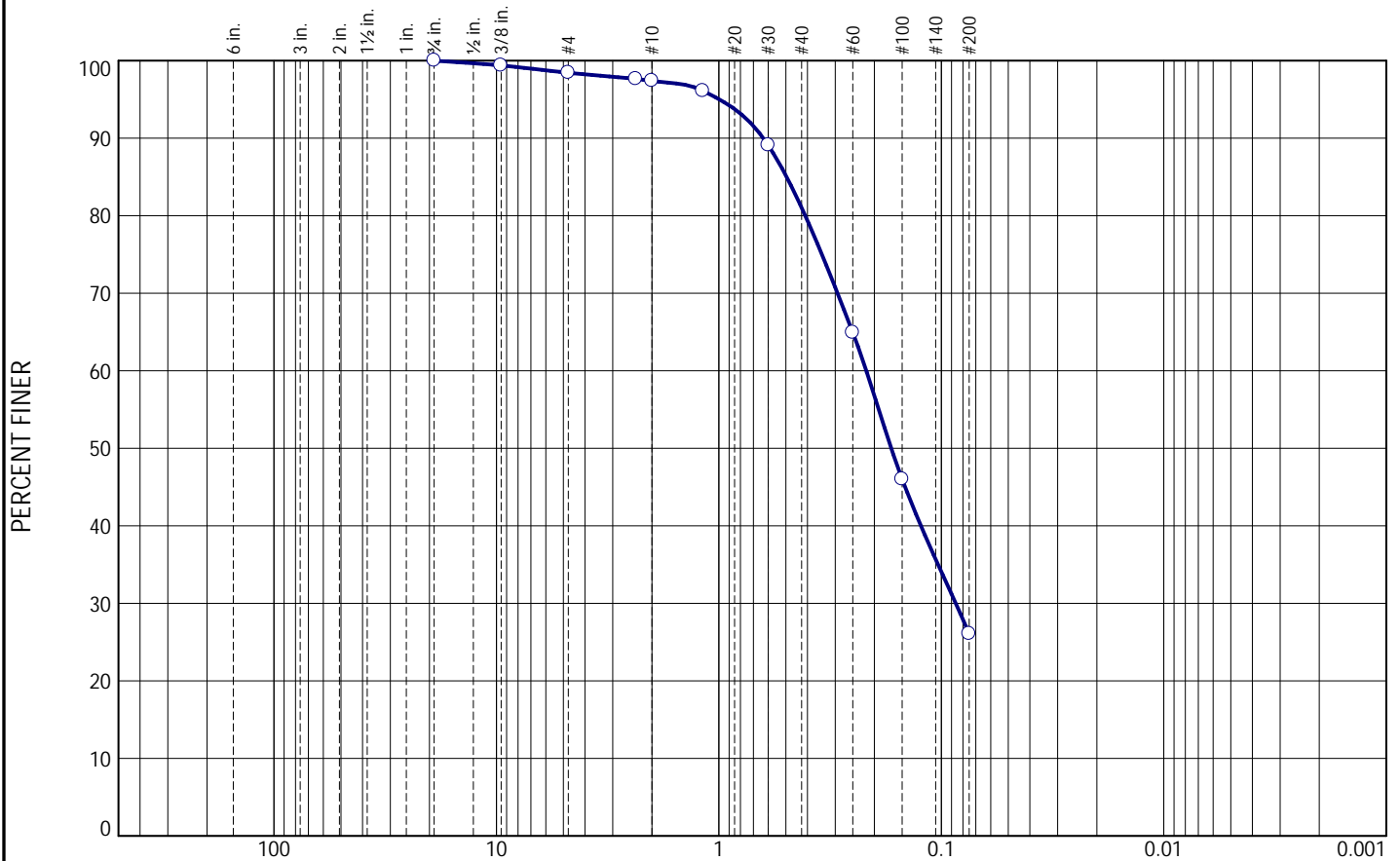
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-4

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.6 | 2.0 | 8.3 | 24.2 | 38.8 | 26.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 99.4 | | |
| #4 | 98.4 | | |
| #8 | 97.6 | | |
| #10 | 97.4 | | |
| #16 | 96.1 | | |
| #30 | 89.1 | | |
| #60 | 64.9 | | |
| #100 | 46.0 | | |
| #200 | 26.1 | | |

* (no specification provided)

| Material Description | | |
|--|--|--|
| Brown tan medium to fine SAND, some [Fines: (Silt/Clay)], trace medium to fine Gravel | | |
| <div> <div> Atterberg Limits </div> <div> LL= </div> <div> PL= </div> <div> PI= </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 0.4962 </div> <div> D₃₀= 0.0862 </div> <div> C_u= </div> <div> D₆₀= 0.2175 </div> <div> D₁₅= </div> <div> C_c= </div> <div> D₅₀= 0.1679 </div> <div> D₁₀= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= SM\SC </div> </div> | | |
| <div> <div> Remarks </div> <div> WC: 10.3% </div> <div> Trace Mica </div> </div> | | |

Source of Sample: TB-108
Sample Number: S-7

Depth: 13'-13.8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



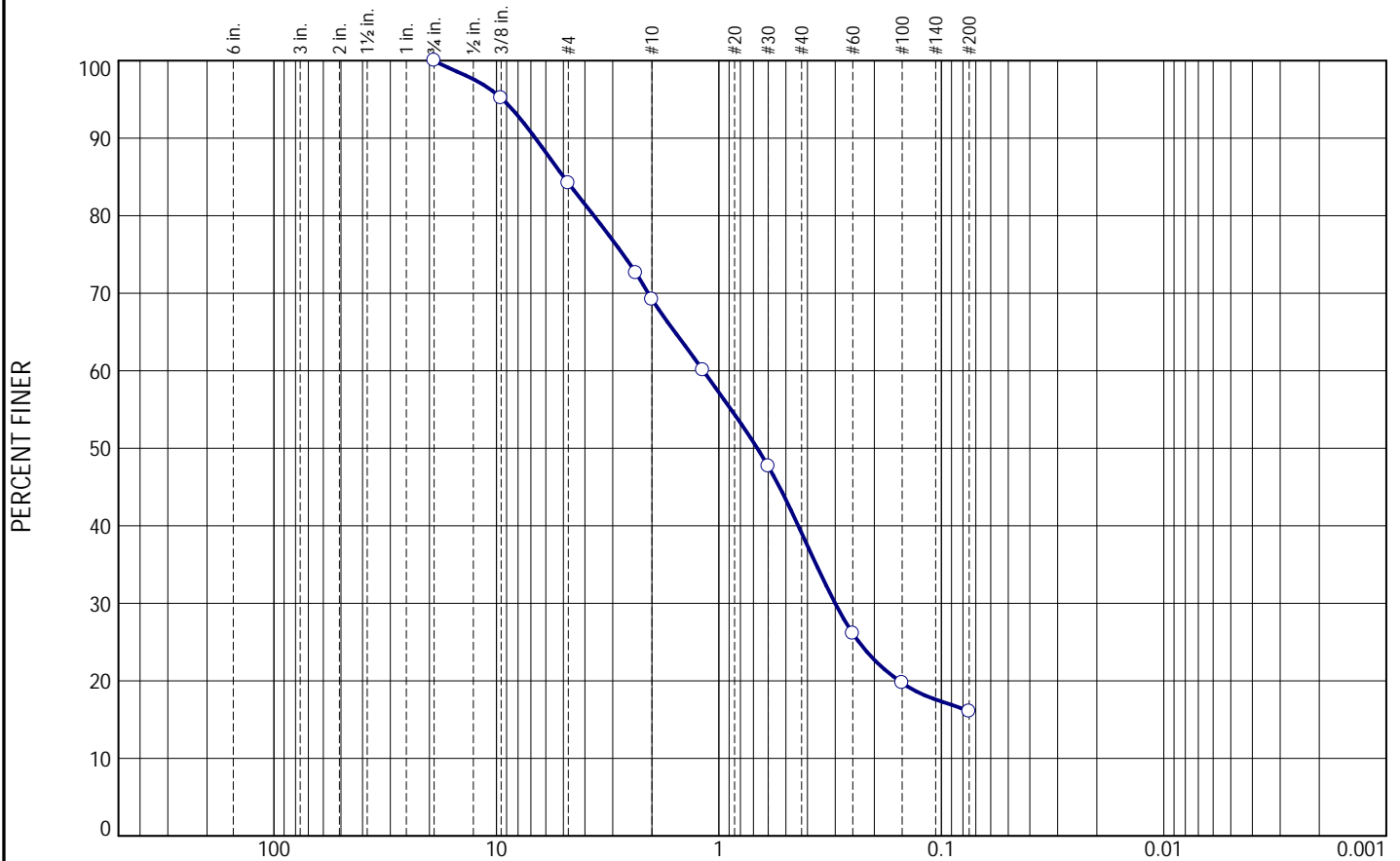
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-5

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 4.8 | 26.0 | 21.5 | 21.6 | 10.0 | 16.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 95.2 | | |
| #4 | 84.2 | | |
| #8 | 72.6 | | |
| #10 | 69.2 | | |
| #16 | 60.1 | | |
| #30 | 47.7 | | |
| #60 | 26.1 | | |
| #100 | 19.7 | | |
| #200 | 16.1 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some medium to fine Gravel, little [Fines: (Silt/Clay)] | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 4.9830 | D ₆₀ = 1.1751 | D ₅₀ = 0.6716 |
| D ₃₀ = 0.3000 | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 14.2% | | |
| Trace Mica | | |

Source of Sample: TB-109
Sample Number: S-4

Depth: 6'-8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



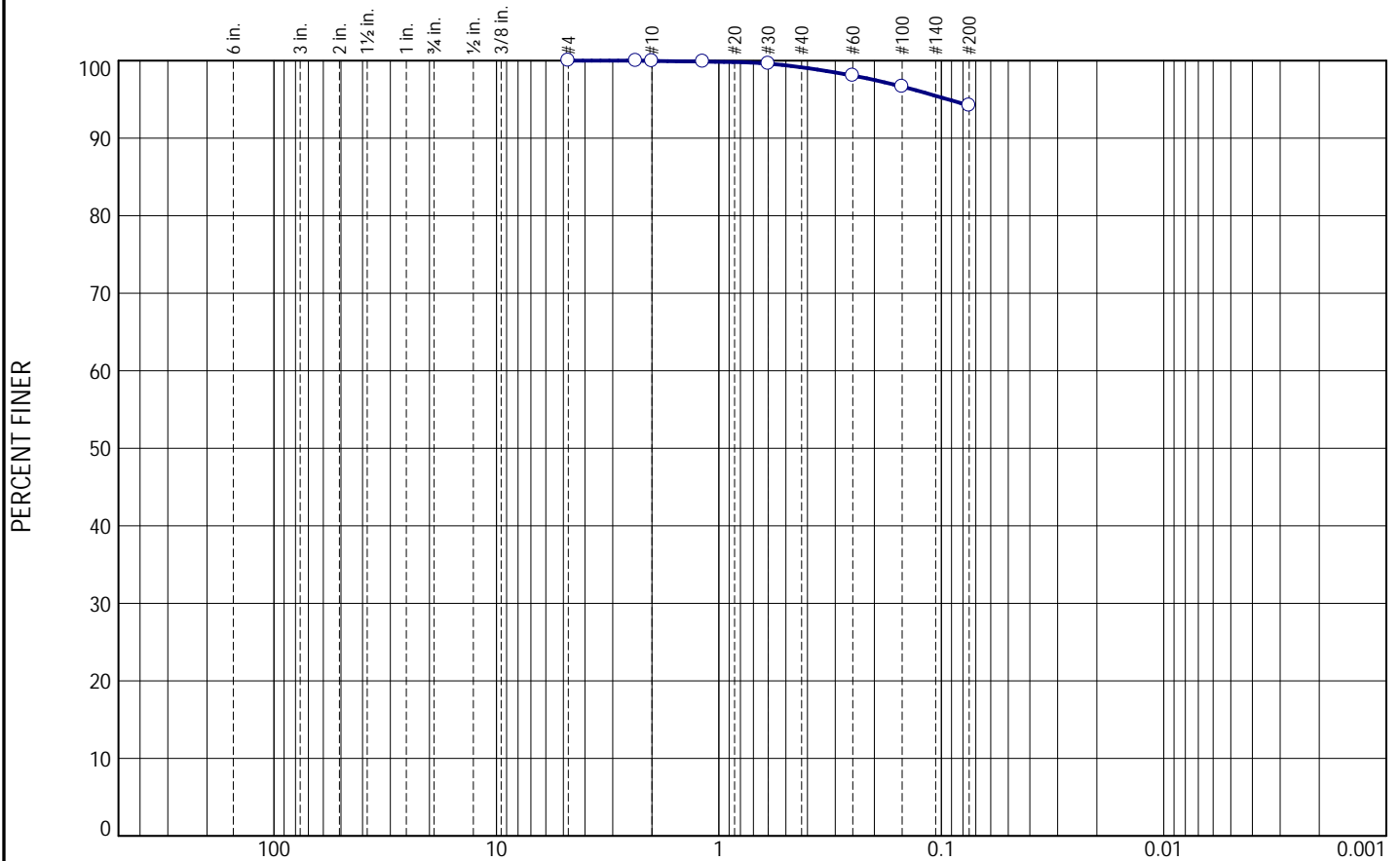
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-6

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 3.9 | 94.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 100.0 | | |
| #10 | 100.0 | | |
| #16 | 99.9 | | |
| #30 | 99.6 | | |
| #60 | 98.1 | | |
| #100 | 96.6 | | |
| #200 | 94.2 | | |

* (no specification provided)

Material Description
Brown [Fines: (SILT/CLAY)], trace medium to fine Sand

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 20.3%

Source of Sample: TB-110
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



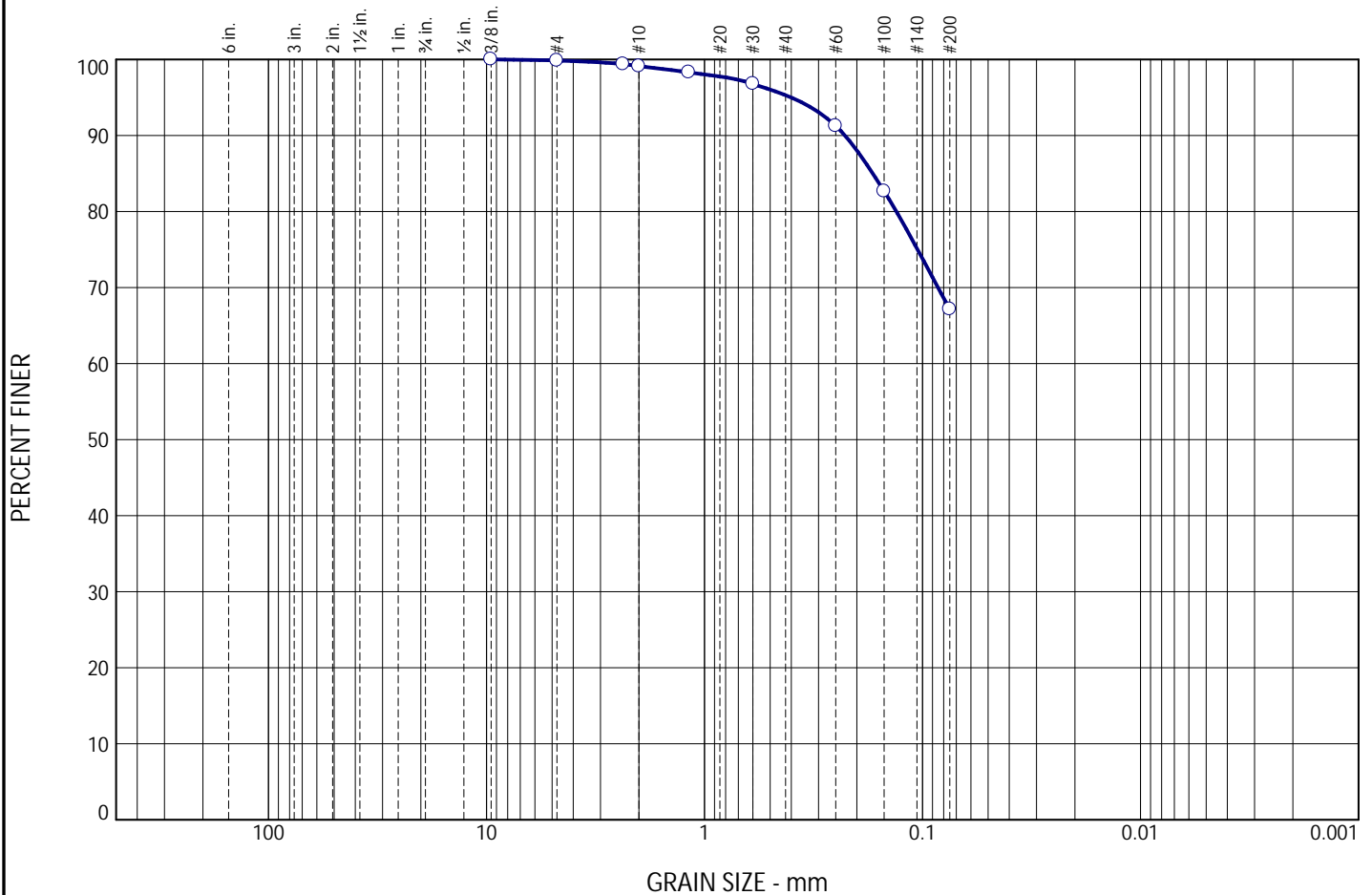
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-7**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.9 | 2.3 | 5.5 | 24.1 | 67.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 99.9 | | |
| #8 | 99.4 | | |
| #10 | 99.1 | | |
| #16 | 98.3 | | |
| #30 | 96.8 | | |
| #60 | 91.3 | | |
| #100 | 82.7 | | |
| #200 | 67.2 | | |

* (no specification provided)

Material Description
 Brown [Fines: (SILT/CLAY)], some medium to fine Sand

Atterberg Limits
 LL= PL= PI=

Coefficients
 D₈₅= 0.1692 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= CL:H\ML:H

Remarks
 WC: 21.3%

Source of Sample: TB-111
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-8



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Report of Stormwater Infiltration Exploration

November 14, 2024

Proposed Public Works Garage and Shed

West 2nd Street and Lloyd Street

City of Chester, Delaware County, Pennsylvania



Prepared for:

Mr. Leonard Lightner
Chief of Staff
City of Chester Public Works
1 4th Street
City of Chester, PA 19013

Prepared by:

Handwritten signature of Michael J. Kwiatkowski in blue ink.

Michael J. Kwiatkowski, PE
PA Professional Engineer
License No. PE076477

Handwritten signature of Timothy A. Hill in blue ink.

Timothy A. Hill, PE
PA Professional Engineer
License No. PE075682

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Philadelphia, PA 19102
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Project No. COCD0004

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Introduction

This report presents the results of the stormwater infiltration exploration performed in support of the proposed stormwater management system associated with the proposed public works garage and shed to be constructed at W. 2nd Street and Lloyd Street in the City of Chester, Pennsylvania. Specifically, this report presents a summary of observations related to the subsurface soil and groundwater conditions, as well as the results of infiltration testing completed within the footprint of the proposed stormwater management features. This exploration was conducted in accordance with our proposal COCD0004 (work order issued June 26, 2024) and the subsequent work requisition (approved July 15, 2024).

Site and Project Description

The subject site is located on the south side of West 2nd Street between Pennel Street and Lloyd Street in the City of Chester, Pennsylvania, as shown on the Site Location Map (Figure 1). The site is otherwise bordered by commercial developments to the north, south, east, and west. The Delaware River is located less than 0.25 miles to the south of the site.

The existing lot serves as a vehicle storage/parking for various commercial tracker trailer rigs and accompanying vehicle transport trailers. There is a small wood shack located in the western-central portion of the site. There is a relatively small loading dock platform (suspected remanence of a former structure) located in the southern-central portion of the subject property. The site is otherwise predominantly covered with asphalt pavement (existing parking lot), which is in poor condition with abundant cracking and potholes. The pavements in the northern portion of the site are completely dilapidated. There are partially vegetated landscape areas along the northern and eastern property boundaries. There are several small piles of scrap automotive parts (e.g. tires truck body parts, etc.) in the existing parking lot area, just north of the former loading dock area.

The overall site is relatively flat to gently sloping with elevations ranging from ± 16 to ± 12 , grading downward slightly from the northwest side of the site to the southeast. Utility mark-outs, including water, storm sewer, electric, and communications, were observed within and around the perimeter of the site. Other un-marked below-grade utilities may also exist at the site.

The overall project includes construction of a new office / garage structure and a separate new maintenance facility / salt shed. A below-grade stormwater management feature is proposed on the southeast side of the site, adjacent to Lloyd Street, in the vicinity of TB-109 and TB-110, as shown on the attached Exploration Location Plan (Figure 2). The proposed bottom elevation of the proposed stormwater management feature was not available at the time of our exploration program, however an estimated basin invert of about 5.5 feet to 6.5 feet below existing grades was assumed for the purposes of stormwater testing.

We note that a separate stormwater feature (potential stormwater drainage swale) was previously being considered along the southwest side of the site. However, this feature was subsequently eliminated from consideration after completion of our field exploration. The subsurface exploration

and infiltration testing performed as part of our field exploration and the results summarized in this report include both areas.

Scope of Services

CED performed the following scope of services to evaluate the subsurface conditions within the footprint of the proposed stormwater management area and to provide consultation regarding anticipated subsurface infiltration rates and estimated seasonal high-water levels (ESHWL):

- a) Engaged the services of a drilling contractor to advance three test borings for exploration of subsurface soil and groundwater conditions;
- b) Provided full-time technical observation of the test boring services;
- c) Obtained representative continuous soil samples from the test borings for classification purposes to a depth of 16 feet below existing grades;
- d) Evaluated the field data and prepared test boring logs showing the types of soils observed, depths to groundwater;
- e) Performed in-situ field infiltration testing using the cased borehole test method to evaluate groundwater infiltration rates for the subgrade soils; and
- f) Prepared this *Report of Stormwater Infiltration Exploration* that reviews potential soil infiltration rates for design and groundwater considerations for the proposed basin design.

Subsurface Exploration

Subsurface conditions for this infiltration evaluation were explored through the completion of four test borings, identified herein as TB-105 and TB-109 through TB-111. Test borings TB-109 and TB-110 were completed in the footprint of the planned below-grade basin on the southwest side of the site. Test borings TB-105 and TB-111 were performed in the area being considered for possible use as a drainage swale (which has since been eliminated from consideration). We note that test borings TB-101 through TB-104 and TB-106 through TB-108 were located in the footprints of either the proposed buildings or parking areas (outside of the footprint of the proposed stormwater management features), and are therefore excluded from this report.

The test borings were performed by Soil Borings Inc. of Haddonfield, New Jersey, at the locations shown on the Exploration Location Plan, Figure 2. The test locations were field located by Colliers Engineering & Design, Inc. (CED) and cleared for below-grade utilities by Level A Underground Solutions. The drilling was performed under the full-time technical supervision of CED. Elevations of the test locations were estimated using the Overall Grading, Drainage & Utility Plan (Sheet 3), by Colliers Engineering & Design, Inc., dated October 11, 2024.

The test borings were advanced using hollow-stem drilling techniques. Soil samples for strata identification and analyses were obtained from each of the test borings by means of a 2-inch OD split barrel sampler. This spoon is typically driven 18 inches or 24 inches by blows from a 140-pound hammer which free falls 30 inches (the Standard Penetration Test, ASTM D 1586). The boring logs are presented in the Appendix with descriptions of the soil horizons encountered and depth to encountered groundwater. The penetration resistance of the drive sampler has been

recorded on the test boring log adjacent to the sample locations as the number of hammer blows required for each 6 inches of sampler penetration or fraction thereof. The Standard Penetration Test values (N) are determined by totaling the blow counts required for the middle 12 inches of sampler penetration and are expressed as blows per foot. Upon completion, the test borings were backfilled with the cuttings, and the asphalt pavement was patched with asphalt cold patch.

The test borings were performed under the full-time technical observation of CED. Representative soil samples were collected and visually identified in accordance with the Burmister Soil Classification System. Details pertaining to the subsurface conditions encountered are presented on the test boring logs in Appendix A.

Soil samples obtained during this investigation will be retained by CED for 60 days from issuance of this report. At the end of this time, they will be discarded unless we receive other instructions from the City of Chester Public Works.

Subsurface Conditions

Regional Geology

The site for the proposed development is located within the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain physiographic province. Locally, the site is underlain by existing fill material, followed by fine- and coarse-grained alluvial deposits of the Trenton Gravel formation, followed by the decomposed and weathered remains of the Wissahickon Formation. These materials were encountered in the test borings, as described in the following paragraphs.

Subsurface Description

Based on the results of the test borings, the generalized subsurface conditions within the footprint of the proposed stormwater features may be described below, in order of depth. Please refer to the corresponding Report of Geotechnical Exploration for a summary of subsurface conditions elsewhere throughout the proposed development (i.e. the proposed building and parking lot areas).

- **Existing Pavements:** Asphalt pavement was encountered in each of the test borings ranging from about 1.5 to 4 inches, averaging about 2.25 inches thick. A concrete pavement/slab was encountered below the asphalt layer in test borings TB-105 and TB-111, measuring 6.5 inches and 6 inches thick, respectively. The asphalt and concrete layers are underlain by aggregate base materials, ranging from 3 to 4.5 inches, and averaging 3.8 inches in thickness.

Existing Fill Materials: Existing fill material was encountered beneath the surficial pavement layer at each test boring location within the stormwater management area, extending to depths ranging from approximately 2 to 4.5 feet, averaging about 2.5 feet below the existing grades. The existing fill layer generally consists of a sand with moderate to high percentages of silt/clay and lesser amounts of gravel. Occasional demolition debris was intermixed within the existing fill materials (i.e. brick and concrete fragments).

The Standard Penetration Test (SPT) 'N'-values for the existing fill layer range from 3 blows per foot (bpf) to 10 bpf, averaging about 5 bpf. The upper 2 feet of the existing fill layer is generally relatively dense immediately below the asphalt and concrete layer, but typically becomes loose thereafter nearing the transition with the underlying Stratum A soil layer. The existing fill does not appear to have been placed in a controlled/compacted manner.

- **Stratum A – Coarse-Grained and Fine-Grained Alluvial Soils:** Coarse-grained and fine-grained alluvial soils (intermixed layers) were encountered beneath the existing fill layer in each of the test borings performed within the proposed stormwater management areas, extending to depths ranging from 10 feet to 11.5 feet, averaging about 10.5 feet.

The predominantly coarse-grained Stratum A soils are generally comprised of a sand with moderate amounts of medium to fine gravel and lesser percentages of silt. Overall, the SPT N-values of the coarse-grained Stratum A soils range widely from 4 bpf to 44 bpf, averaging 17 bpf. However, they are typically loose to medium dense, with infrequent, isolated very loose and very dense layers.

The predominantly fine-grained Stratum A soils consist of clay and silt mixtures with moderate amounts of coarse to fine sand and lesser percentages of fine gravel. Overall, the SPT N-values range from 3 bpf to 24 bpf, averaging 11 bpf. However, they are typically medium to stiff, with less frequent soft or very stiff layers. Based on the results of field pocket penetrometer testing, the fine-grained Stratum A soils have unconfined compression values ranging from less than 1 ton per square foot (tsf) to 4.5 tsf, averaging about 2.75 tsf.

- **Stratum B – Decomposed Rock:** Decomposed rock was encountered beneath the Stratum A soils in each of the test borings. For purposes of this report, decomposed rock is defined as the completely weathered remains of the underlying bedrock (i.e. a soil-like material), which retains some of the relic rock structure. The decomposed rock at this site generally consists of loose to medium dense micaceous sand with moderate amounts of silt and trace amounts of friable rock fragments.

The test borings were either terminated in the Stratum B layer at a depth of 16 feet (TB-109 and TB-111) or the layer extended to the transition with the underlying Stratum C – Altered Rock materials (TB-105 and TB-110) at depths of 38 feet and 12 feet, respectively. In general, the decomposed rock layer appears to trend deeper from east to west.

Stratum B soils are generally loose to medium dense, with SPT 'N'-values ranging from 7 bpf to 26 bpf, averaging 15 bpf. We note that the loose conditions were only observed in TB-105 near the transition from Stratum A to B. The density generally increases with depth approaching the underlying Stratum C - Altered Rock layer.

- **Stratum C – Altered Rock:** Altered rock (a.k.a. saprolite) was encountered beneath the Stratum B – Decomposed Rock layer in test borings TB-105 and TB-110 extending to the maximum depths explored. For purposes of this report, altered rock is defined as the partially weathered remains of the parent bedrock. It is differentiated from the Stratum B – Decomposed Rock layer based on the increased resistance to split spoon sampling (typically resulting in split spoon refusal) and augering

(penetrable with some difficulty). The altered rock at this site generally consists of dense to very dense micaceous sand with moderate amounts of silt and lesser amounts of both friable and non-friable rock fragments.

The SPT “N” values for Stratum C are typically in excess of 100 blows for less than 1 foot of penetration.

Groundwater Conditions

Groundwater was encountered in each of the test borings. Groundwater readings were recorded at the depths first encountered during drilling, at the completion of the test borings, and (in some instances) at extended periods (e.g. 48 hours). Based on the groundwater readings obtained during the field exploration, the depth to groundwater at the site generally ranges from about 7.7 feet to 8.9 feet, averaging about 8.5 feet below existing grades (elevations ranging from 4.0 to 5.3, and averaging elevation 4.7).

CED did not observe evidence of staining or redox (i.e. oxidation / reduction due to varying states of saturation or water seepage through a soil stratum) in the soil samples that might otherwise indicate a fluctuating or seasonal high groundwater condition. However, fluctuations in groundwater levels can occur due to several factors, including variations in precipitation, seasonal changes, tidal fluctuations (i.e. of the Delaware River), and site development activities, which can alter surface water drainage paths.

| TABLE 1 DEPTH TO GROUNDWATER AND ESHWL SUMMARY | | | | | | |
|---|----------------------|--------------|-------------------|------------|---------------------|---------------|
| Basin Type | Test Boring Location | GS EL (ft) * | Depth to GWT (ft) | GW EL (ft) | Depth to ESHWL (ft) | ESHWL EL (ft) |
| Infiltration Basin | TB-109 | 12.5 | 8.5 | 4.0 | NE | NA |
| | TB-110 | 12.0 | 7.7 | 4.3 | NE | NA |
| Drainage Swale** | TB-111 | 14.0 | 8.9 | 5.1 | NE | NA |
| | TB-105 | 14.0 | 8.7 | 5.3 | NE | NA |

*Ground surface elevations are interpolated from the project plans and should be considered approximate.

**Eliminated from consideration after completion of the field exploration.

Soil Infiltration Evaluation

Four infiltration tests (IT-1 through IT-4) were performed at the locations shown on the attached Figure 2 – Exploration Location Plan. The tests were performed using the Borehole Infiltration Test method. The results of the infiltration testing are summarized below in Table 2. Please refer to the attached Infiltration Testing Logs (Appendix B), as well as the laboratory test results on select soil samples at the infiltration test depth (Appendix C) for additional information.

| TABLE 2 SUMMARY OF INFILTRATION TEST RESULTS | | | | | | | |
|---|-----------------------------|--------------------|--------------------|----------------------|--------------------------|---------------------------|---------------------|
| Basin Type | Infiltration Test ID | GS EL (ft)* | GW EL (ft)* | ESHWL EL (ft) | Inf. Test EL (ft) | Inf Rate (in/hr)** | Soil Stratum |
| Infiltration Basin | IT-1 | 12.5 | 4.0 | NE | 6.2 | 1.0 | Stratum A |
| | IT-2 | 12.0 | 4.3 | NE | 6.5 | 0.5 | Stratum A |
| Drainage Swale*** | IT-3 | 14.0 | 5.1 | NE | 7.7 | 0.0 | Stratum A |
| | IT-4 | 14.0 | 5.3 | NE | 7.4 | 0.0 | Stratum A |

*Ground surface and corresponding groundwater elevations are interpolated from the project plans and should be considered approximate.

**Infiltration rates do not include a factor of safety.

***Eliminated from consideration after completion of the field exploration.

Discussion

In general, infiltration practices appear feasible for the proposed infiltration basin located in the southeast region of the site. The soils encountered at the test depths (planned bottom of basin elevation) contained appreciable coarse-grained materials, which was reflected in the observed infiltration rates. We note that the possibility exists for finer-grained (e.g. lower permeability) Stratum A soils to also be present elsewhere at the basin bottom in areas not explored. We that this be accounted for in the design infiltration rate (e.g. increased factor of safety) and/or managed during construction through over-excavation and replacement of fine-grained seams, construction-phase infiltration testing to confirm the design infiltration rates, etc.

We recognize that the drainage swale previously being considered in the southwestern area of the site has been eliminated from consideration; however, it's worth mentioning that the soils in this area appear less favorable for infiltration practices. The soils encountered at the test depth were relatively fine-grained in this area, resulting in negligible infiltration.

We recommend that the proposed stormwater infiltration basin located in the southeast corner of the site be designed based on the more conservative rates measured, and that the design rate include an appropriate factor of safety to account for possible variability of the subsurface conditions and other factors such as clogging. If the area located in the southwest is to be considered for stormwater management, alternate design strategies will likely be required for the such as bio-retention feature planned on the southwest portion of the site.

Closing

We emphasize that the conclusions summarized in this report are based on the results of the test boring explorations and field infiltration testing. Additional infiltration testing may be required once final design and basin size is prepared to meet local code requirements.

Successful construction of the project will require competent field observation of the construction operations. Earthwork, including clearing and grubbing, subgrade identification, grading, and fill placement, should be observed by a competent individual familiar with the recommendations contained in this report, to confirm that the underlying soils are not artificially disturbed or compacted. We are available to perform construction observation services, if requested. Furthermore, we recommend a pre-construction meeting be attended by the construction team, stormwater design professionals, and field observation team to review construction procedures and outline requirements to be implemented and/or avoided during construction of the stormwater facilities and subgrade preparation.

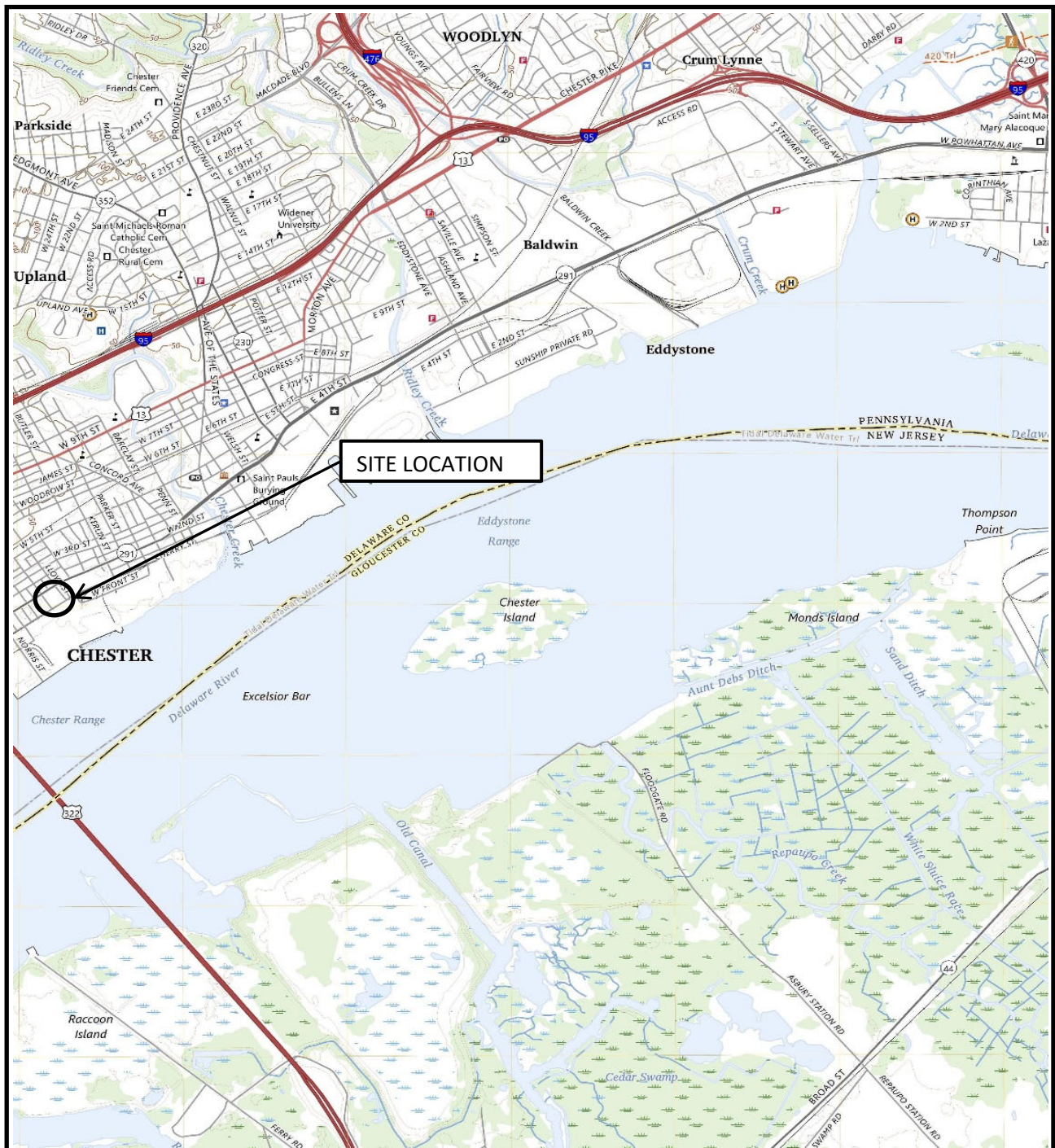
The recommendations contained in this report are contingent upon the actual field conditions being consistent with those encountered during our field exploration. Should any variation in the anticipated conditions be encountered, or should site regrading be proposed, CED should be notified to determine what impact the changed conditions may have upon the presented recommendations.

Limitations

Services performed by CED during this project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended in the services provided.

Figures

Figure 1 Site Location Map



NOTES:

- 1.) *SITE MAP OBTAINED FROM USGS TOPOGRAPHIC MAP, BRIDGEPORT, NJ, PA QUADRANGLE, DATED 2023.



**Engineering
& Design**

Title:

SITE LOCATION MAP

Project:

***Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA***

Drawn By:

*

Checked By:

MJK

Project No.:

COCD0004

Scale:

N.T.S.

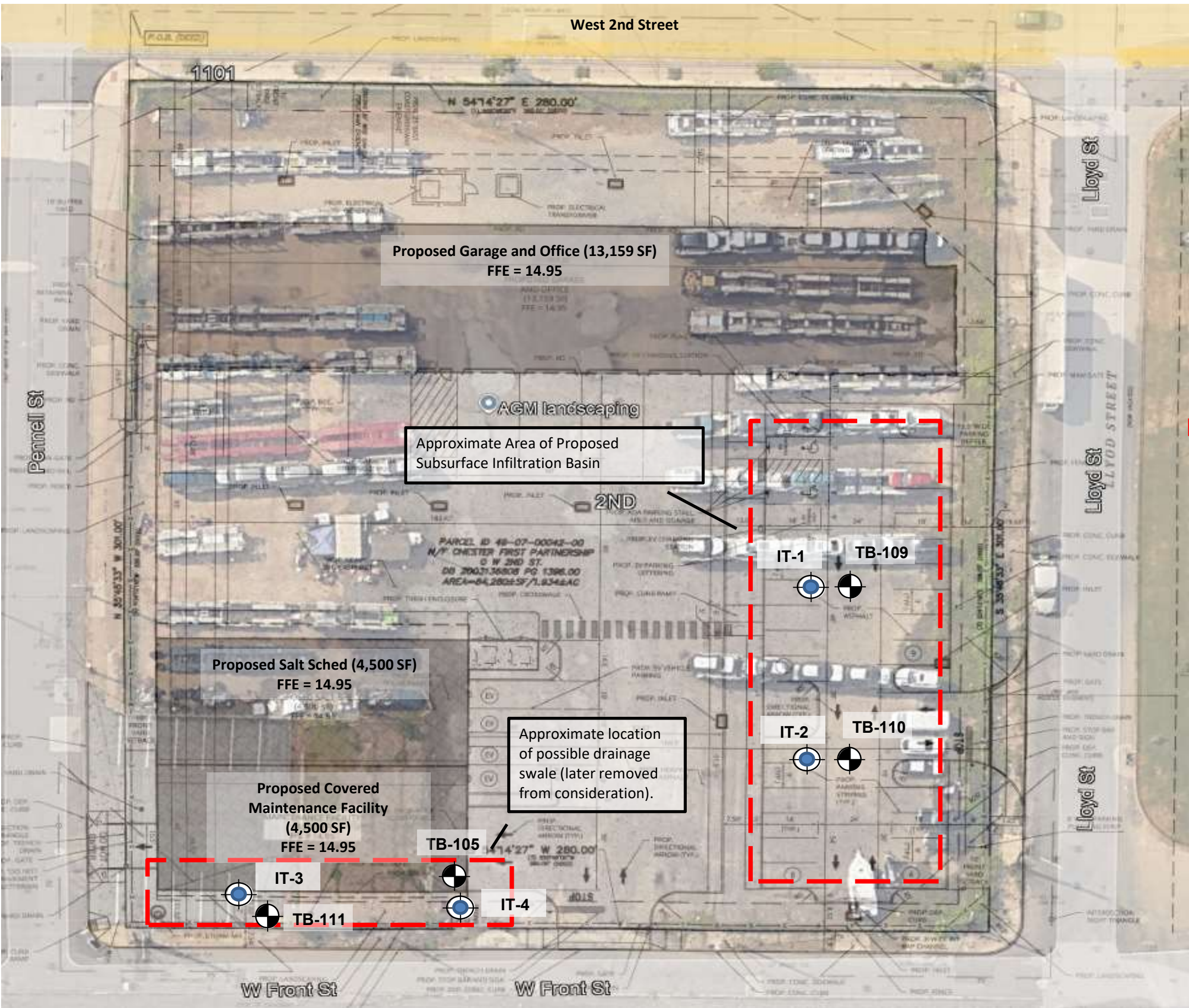
Date:

10/22/2024

Figure No.:

1

Figure 2 Exploration Location Plan




LEGEND:

- TB-101** TEST BORING LOCATION (APPROXIMATE)
- IT-101** INFILTRATION TEST LOCATION (APPROXIMATE)
- APPROXIMATE FOOTPRINT OF PROPOSED STORMWATER INFILTRATION BASIN
- APPROXIMATE FOOTPRINT OF PROPOSED DRAINAGE SWALE AREA (LATER REMOVED FROM CONSIDERATION)

NOTES:

- 1.) BASE PLAN PREPARED FROM A GOOGLE EARTH AERIAL IMAGE WITH A SITE PLAN (DATED OCTOBER 11, 2024) OVERLAY.
- 2.) THIS DRAWING IS PART OF THE COLLIER'S ENGINEERING & DESIGN, INC. REPORT OF STORMWATER INFILTRATION EXPLORATION (PROJECT NO. COCD0004) DATED NOVEMBER 2024.



Engineering & Design

| | | | |
|--|-----------------|--------------|----------|
| TITLE: EXPLORATION LOCATION PLAN | | | |
| PROJECT: Proposed Development West 2nd Street and Lloyd Street Chester, Delaware County, PA | | | |
| DRAWN BY: * | CHECKED BY: MJK | PROJECT NO.: | COCD0004 |
| SCALE: N.T.S. | DATE: 11/6/2024 | FIGURE NO.: | 2 |

Appendix

Appendix A Test Boring Logs



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 1 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/15/2024

END OF DRILLING (0 hrs.) 8.7 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | | |
|---------------------------|---------------|--------------------|-------|--------|--------|---------------|--|--------------|--------------|---------------|---|---|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | | | |
| 5 | S-1 | - | - | 2 | 1 | 10 | 0.25 | | | Existing Fill | S-1: Asphalt +/- 1.5 inches; Concrete +/- 6.5 inches; Base +/- 4 inches Orange-Brown, Tan, Gray, Clayey SILT, some (+) cmd Sand, trace (+) mf Gravel, (Fill) (Moist) | | |
| | 0.0'-2.0' | | | | | 21 | >4.5 | | | | 2.0 | 12.0 | S-2: Orange-Brown, SILT, some (+) mf Sand, (Moist) |
| | S-2 | 4 | 4 | 6 | 11 | 18 | 3.25 | | | Stratum A | S-3: Orange-Brown, Gray, SILT, some mf Sand, trace mf Gravel, (Moist) | | |
| | 2.0'-4.0' | | | | | 22 | | | | | S-4: (Top 11") Same as S-3, (Moist) (Bottom 11") Orange-Brown, Tan, cmf SAND, little (+) mf Gravel, trace (+) Silt, (Very Moist) | | |
| S-3 | 5 | 4 | 6 | 9 | 13 | | S-5: Orange-Brown, DArk Brown, c(+)mf SAND, little mf Gravel, trace (+) Silt, (Very Moist to Wet) | | | | | | |
| 4.0'-6.0' | | | | | 1.75 | | S-6: (Top 10") Same as S-5, (Wet) (Bottom 12") Gray SILT and mf Sand, slightly micaceous, (Very Moist to Wet) | | | | | | |
| S-4 | 8 | 8 | 13 | 13 | | | 11.0 | | | | 3.0 | S-7: Gray, Orange-Brown, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) | |
| 6.0'-8.0' | | | | | 20 | | Stratum B | | | | S-8: (Top 8") Same as S-7, (Very Moist to Wet) (Bottom 8") White, Gray, Tan, cmf SAND, little Silt, trace (+) friable RF, trace phyllite, slightly micaceous, (Very Moist) | | |
| S-5 | 11 | 13 | 8 | 4 | | | | | | | S-9: Gray, cmf(+) SAND, some (+) Silt, trace friable RF, slightly micaceous, (Very Moist to Wet) | | |
| 8.0'-10.0' | | | | | 19 | | | | | | Stratum C | S-10: White, Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Very Moist) | |
| S-6 | 2 | 2 | 2 | 3 | | | | | | | | | S-11: Gray, micaceous cmf SAND, some (-) Silt, trace friable RF, (Very Moist) |
| 10.0'-12.0' | | | | | | | | | | | | | S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) |
| 15 | S-7 | 3 | 3 | 4 | 5 | 5 | | | | | | Stratum C | S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | 13.0'-15.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 20 | S-8 | 3 | 7 | 10 | 20 | 16 | | | | | | | |
| | 18.0'-20.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 25 | S-9 | 4 | 4 | 7 | 8 | 19 | | | | | | | |
| | 23.0'-25.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 30 | S-10 | 8 | 12 | 9 | 13 | 23 | | | | | | | |
| | 28.0'-30.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 35 | S-11 | 9 | 13 | 21 | 28 | 22 | | | | | | | |
| | 33.0'-35.0' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 40 | S-12 | 50/5" | - | - | - | 5 | | | | | | | |
| | 38.0'-38.4' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 45 | S-13 | 50/5" | - | - | - | 5 | | | | | | | |
| | 43.0'-43.4' | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 1 OF 2



PROJECT: City of Chester Public Works
Garage and Shed



LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

PAGE 2 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

| GROUNDWATER: | DEPTH (ft) | DATE |
|--------------------------|---|-------------------|
| FIRST ENCOUNTERED |  9.0 | <u>10/15/2024</u> |
| END OF DRILLING (0 hrs.) |  8.7 | 10/17/2024 |

ASTM D-1586

| | |
|---------------|------------|
| DATE FINISHED | 10/15/2024 |
|---------------|------------|

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

PAGE 2 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-110

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 8.0 10/17/2024

END OF DRILLING (0 hrs.) 7.7 10/18/2024











DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (tsf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | | |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|---|----------------|---|---|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | | | |
| 5 | S-1 | - | 2 | 4 | 4 | 15 | 2.0 | |  | Existing Fill | S-1: Asphalt +/- 1.5 inches; Base +/- 4.5 inches Dark Brown, Black, cmf SAND, some Silt, little mf Gravel, trace (-) brick fragments, (Fill) (Moist) | | |
| | 0.0'-2.0' | | | | | 13 | | | | | 3.0 | S-2: (Top 5") Same as S-1, (Fill) (Moist) | |
| | S-2 | 2 | 2 | 1 | 2 | 15 | | | | | 9.0 | (Bottom 8") Grayish Brown, SILT & CLAY, little mf Sand, (Very Moist) | |
| | 2.0'-4.0' | | | | | 2.5 | | | | | S-3: Yellowish Brown, SILT, trace mf Sand, trace (-) f Gravel, (Moist) | | |
| | S-3 | 2 | 3 | 4 | 8 | 1.0 | | | | | Stratum A | S-4: (Top 10") Same as S-3, (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (+) cmf Sand, little (-) f Gravel, (Very Moist) | |
| 10 | 4.0'-6.0' | | | | | 20 | 1.0 | |  | Stratum A | S-5: Orange-Brown, Tan, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) | | |
| | S-4 | 12 | 13 | 8 | 7 | 12 | | | | | 10.0 | S-6: Orange-Brown, Yellowish Brown, cmf SAND, trace (+) friable RF, Slightly micaceous, (Moist to Very Moist) | |
| | 6.0'-8.0' | | | | | 21 | | | | | 2.0 | Stratum B | S-7: Gray, Orange-Brown, micaceous cmf SAND, little friable RF, trace (+) Silt, (Moist) |
| | S-5 | 2 | 2 | 3 | 4 | 7 | | | | | 12.0 | Stratum C | |
| | 8.0'-10.0' | | | | | 0.0 | | | | | 12.7 | | |
| 15 | S-6 | 4 | 6 | 20 | 50/4" | 7 | | |  | | | | |
| | 10.0'-11.8' | | | | | | | | | | 12.7 | | |
| | S-7 | 48 | 50/2" | - | - | | | | | | -0.7 | | |
| | 12.0'-12.7' | | | | | | | | | | | | |
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NOTES: Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-110

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-111

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.1

CONTRACTOR: Soil Borings, Inc.



DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED  9.0 10/17/2024
END OF DRILLING (0 hrs.)  8.9 10/17/2024


DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|---|---------------------------|---|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | - | 4 | 5 | 8 | >4.5 | 2.5 |  | 2.0 Existing Fill | S-1: Asphalt +/- 2.5 inches; Concrete +/- 6 inches; Base +/- 3.5 inches Brown, Tan, cmf SAND, little (+) Silt, trace (+) mf Gravel, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 23 | | | | | S-2: Orange-Brown, SILT & CLAY, little cmf Sand, trace (-) f Gravel, (Moist) |
| | S-2 | 4 | 5 | 7 | 8 | 19 | | | | 11.5 2.5 Stratum A | S-3: Orange-Brown, Clayey SILT, some (+) cmf Sand, trace (=) f Gravel, (Moist) |
| | 2.0'-4.0' | | | | | 19 | | | | | S-4: (Top 14") Same as S-3, (Moist) (Bottom 5") Dark Orange-Brown, cmf SAND, little (+) mf Gravel, trace (+) Silt, (Moist) |
| 10 | S-3 | 11 | 10 | 14 | 8 | 14 | | | | | S-5: Orange-Brown, cmf SAND, some (-) mf Gravel, little Silt, (Very Moist to Wet) |
| | 4.0'-6.0' | | | | | 22 | | | | | S-6: (Top 16") Same as S-5, (Wet) (Bottom 6") Gray, White, mf SAND, some Silt, slightly micaceous, (Very Moist to Wet) |
| | S-4 | 5 | 6 | 14 | 25 | 16 | | | | 16.0 -2.0 Stratum B | S-7: Gray, White, mf SAND, some (+) Silt, slightly micaceous, (Very Moist to Wet) |
| | 6.0'-8.0' | | | | | 13 | | | | | S-8: Gray, White, mf(+) SAND and Silt, slightly micaceous, (Very Moist to Wet) |
| 15 | S-5 | 22 | 20 | 24 | 11 | | | | | | END OF TEST BORING AT 16.0 FEET |
| | 8.0'-10.0' | | | | | | | | | | |
| | S-6 | 7 | 5 | 4 | 5 | | | | | | |
| | 10.0'-12.0' | | | | | | | | | | |
| 20 | S-7 | 3 | 5 | 6 | 9 | | | | | | |
| | 12.0'-14.0' | | | | | | | | | | |
| | S-8 | 6 | 7 | 7 | 11 | | | | | | |
| | 14.0'-16.0' | | | | | | | | | | |
| 25 | | | | | | | | | | | |
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| 30 | | | | | | | | | | | |
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| 35 | | | | | | | | | | | |
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| | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
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NOTES: Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-111

PAGE 1 OF 1

Appendix B Infiltration Testing Logs

Infiltration Testing Log

Project Name: City of Chester Public Works Garage & Shed SWM **Date:** 10/18/2024
Project Address: West 2nd Street and Lloyd Street Chester, PA **Weather:** Sunny / 60's
Testing Company: Colliers Engineering & Design **Tester's Name:** T. Hill
Phone Number: 267.318.0664 **Email Address:** tim.hill@collierseng.com

Test Number: IT-1 **Test Pit/Boring Hole Number:** TB-109 **Test Method:** Cased Borehole
Test Depth (feet): 6.3 **Surface Elevation (feet):** 12.5 **Instrument Diameter (inches):** 4"

Soil Characterization

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|---|
| 0 to 0.5 | Asphalt and Base Materials | |
| 0.5 to 4.5 | Loamy Sand, 0 to 5% cmf Gravel (Fill) | |
| 4.5 to 10.5 | Loamy Sand, 10% to 25% mf Gravel (Alluvial Soils) | Groundwater at 8.5 feet |
| 10.5 to 16.0 | Loamy Sand, 5% to 15% friable RF (Residual Soils) | |
| | | |
| | | |
| | | |

Presoak

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 12:06 | 0 | 98.375 | --- |
| 12:36 | 30 | 100 | 1.625 |
| 13:06 | 30 | 100.5 | 0.5 |
| | | | |

Infiltration Testing

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|---------------------------------|---------------------------------|-----------------------------------|--|----------|
| 13:08 | 0 | 99.25 | --- | | |
| 13:38 | 30 | 99.75 | 0.5 | 1.0 | |
| 14:08 | 30 | 100.25 | 0.5 | 1.0 | |
| 14:38 | 30 | 100.75 | 0.5 | 1.0 | |
| | | | | | |
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| | | | | | |
| Stabilized Infiltration Testing Rate (inches per hour): | | | | 1.0 | |

| | | | | |
|---------------------------|--|-------------------------------------|--|---|
| Project Name: | City of Chester Public Works Garage & Shed SWM | | Date: | 10/18/2024 |
| Project Address: | West 2nd Street and Lloyd Street Chester, PA | | Weather: | Sunny / 60's |
| Testing Company: | Colliers Engineering & Design | Tester's Name: | T. Hill | |
| Phone Number: | 267.318.0664 | Email Address: | tim.hill@collierseng.com | |
| Test Number: | IT-2 | Test Pit/Boring Hole Number: | TB-110 | Test Method: Cased Borehole |
| Test Depth (feet): | 5.5 | Surface Elevation (feet): | 12 | Instrument Diameter (inches): 4" |

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|--|
| 0 to 0.5 | Asphalt and Base Materials | |
| 0.5 to 3.0 | oamy Sand, 10% to 15% mf Gravel & brick frag (Fil | |
| 3.0 to 8.0 | Silt Loam, 0% to 10% f Gravel (Alluvial Soils) | Groundwater at 7.7 feet |
| 8.0 to 10.0 | Loamy Sand, 0% to 5% f Gravel (Alluvial Soils) | |
| 10.0 to 12.0 | Loamy Sand, 0% to 5% friable RF (Residual Soils) | |
| 12.0 to 12.7 | micaceous Loamy Sand, 5% to 10% friable RF (WR) | Very Dense Weathered Rock at 12.5 feet |
| | | |

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 12:11 | 0 | 95.125 | --- |
| 12:41 | 30 | 95.5 | 0.375 |
| 13:11 | 30 | 95.875 | 0.375 |

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|------------------------------|------------------------------|--------------------------------|--------------------------------------|----------|
| 13:13 | 0 | 94.125 | --- | | |
| 13:43 | 30 | 94.5 | 0.375 | 0.75 | |
| 14:13 | 30 | 94.75 | 0.25 | 0.5 | |
| 14:43 | 30 | 95 | 0.25 | 0.5 | |
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| | | | | | |
| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0.5 | |

| | | | | |
|---------------------------|--|-------------------------------------|--|---|
| Project Name: | City of Chester Public Works Garage & Shed SWM | | Date: | 10/18/2024 |
| Project Address: | West 2nd Street and Lloyd Street Chester, PA | | Weather: | Sunny / 60's |
| Testing Company: | Colliers Engineering & Design | Tester's Name: | T. Hill | |
| Phone Number: | 267.318.0664 | Email Address: | tim.hill@collierseng.com | |
| Test Number: | IT-3 | Test Pit/Boring Hole Number: | TB-111 | Test Method: Cased Borehole |
| Test Depth (feet): | 6.3 | Surface Elevation (feet): | 14 | Instrument Diameter (inches): 4" |

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|--|
| 0 to 1.0 | Asphalt, Concrete, and Base Materials | |
| 1.0 to 2.0 | Loamy Sand, 5% to 10% mf Gravel (Fill) | |
| 2.0 to 7.5 | andy Clay Loam, 5% to 10% f Gravel (Alluvial Soils) | |
| 7.5 to 11.5 | Loamy Sand, 10% to 25% mf Gravel (Alluvial Soils) | Groundwater at 8.9 feet |
| 11.5 to 16.0 | Loamy Sand, <5% friable RF (Residual Soils) | |
| | | |
| | | |

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 9:55 | 0 | 69.5 | --- |
| 10:25 | 30 | 70 | 0.5 |
| 10:55 | 30 | 70.125 | 0.125 |

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|------------------------------|------------------------------|--------------------------------|--------------------------------------|--|
| 10:57 | 0 | 68.5 | --- | | |
| 11:27 | 30 | 68.5 | 0 | 0 | |
| 11:57 | 30 | 68.5 | 0 | 0 | *Test stopped due to lack of infiltration. |
| | | | | | |
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| | | | | | |
| | | | | | |
| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0 | |

| | | | | |
|---------------------------|--|-------------------------------------|--|---|
| Project Name: | City of Chester Public Works Garage & Shed SWM | | Date: | 10/18/2024 |
| Project Address: | West 2nd Street and Lloyd Street Chester, PA | | Weather: | Sunny / 60's |
| Testing Company: | Colliers Engineering & Design | Tester's Name: | T. Hill | |
| Phone Number: | 267.318.0664 | Email Address: | tim.hill@collierseng.com | |
| Test Number: | IT-4 | Test Pit/Boring Hole Number: | TB-105 | Test Method: Cased Borehole |
| Test Depth (feet): | 6.6 | Surface Elevation (feet): | 14 | Instrument Diameter (inches): 4" |

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|--|
| 0 to 1.0 | Asphalt, Concrete, and Base Materials | |
| 1.0 to 2.0 | Sandy Loam, 5% to 10% mf Gravel (Fill) | |
| 2.0 to 7.0 | Silt Loam, 0% to 5% mf Gravel (Alluvial Soils) | |
| 7.0 to 11.0 | Loamy Sand, 10% to 15% mf Gravel (Alluvial Soils) | Groundwater at 8.7 feet |
| 11.0 to 18.0 | Loamy Sand, <5% friable RF (Residual Soils) | |
| | | |
| | | |

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 9:59 | 0 | 77.5 | --- |
| 10:29 | 30 | 79.5 | 2 |
| 10:59 | 30 | 79.75 | 0.25 |

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|------------------------------|------------------------------|--------------------------------|--------------------------------------|--|
| 11:02 | 0 | 77.5 | --- | | |
| 11:32 | 30 | 77.5 | 0 | 0 | |
| 12:02 | 30 | 77.5 | 0 | 0 | *Test stopped due to lack of infiltration. |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0 | |

Appendix C Laboratory Test Results



CLIENT: City of Chester Public Works
1 Fourth Street
Chester, PA 19013

PROJECT: West 2nd Street and Lloyd Street Garage/Shed

Project # COCD0004 **DATE:** October 30, 2024
PAGE: 1 of 1

CHECKED BY: Jason Veach
TITLE: Assistant Laboratory Manager

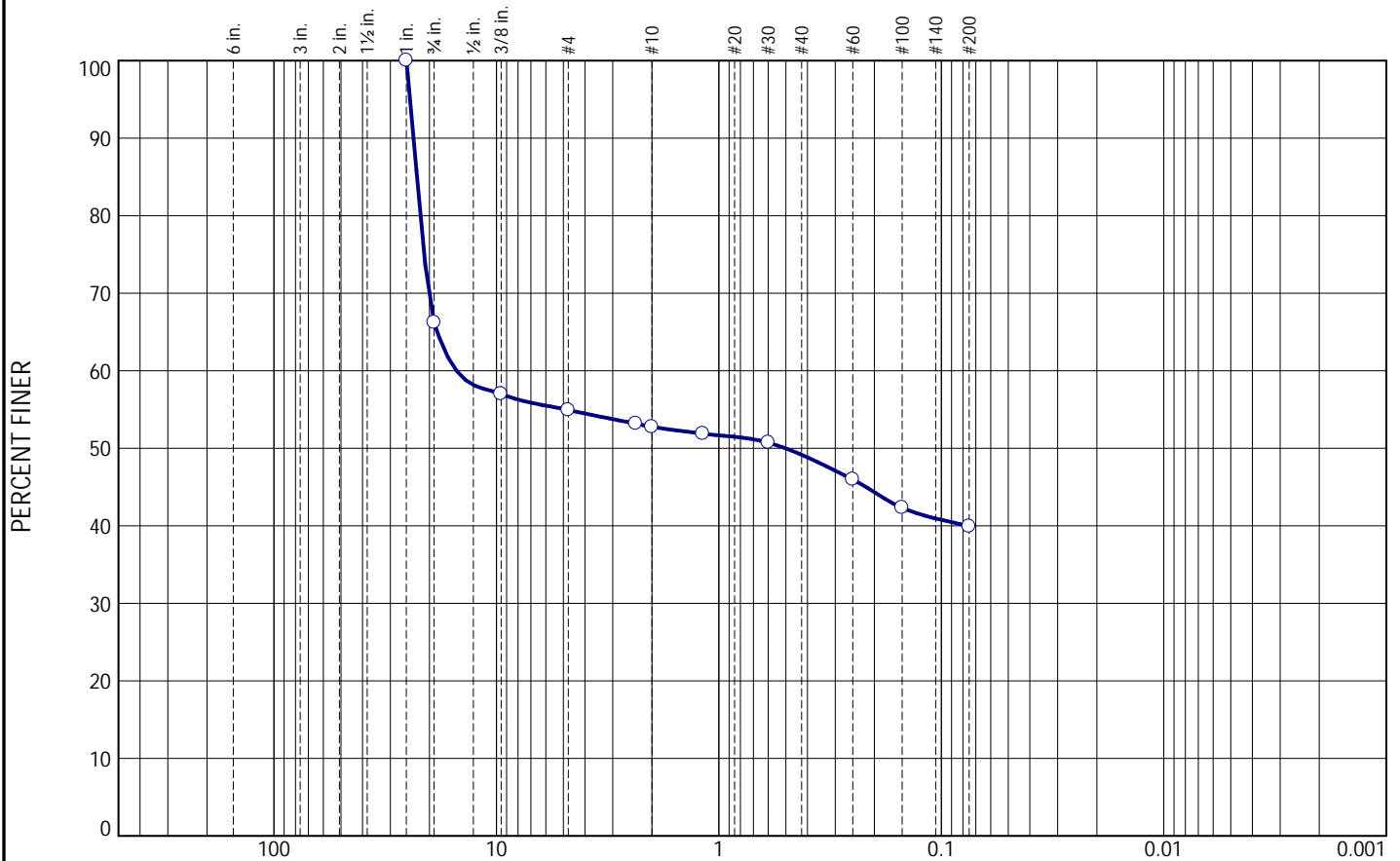
SAMPLES RECEIVED: October 22, 2024

SAMPLES TESTED: 10/22/24 - 10/30/24

LAB TECHNICIAN(S): K. Perry

Comments/Remarks: * See attached Plate(s)

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 43.0 | 4.2 | 2.1 | 4.7 | 6.1 | 39.9 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|--------------------|-----------------|
| 1 | 100.0 | | |
| .75 | 66.2 | | |
| .375 | 57.0 | | |
| #4 | 54.9 | | |
| #8 | 53.2 | | |
| #10 | 51.9 | | |
| #16 | 50.7 | | |
| #30 | 46.0 | | |
| #60 | 42.3 | | |
| #100 | 39.9 | | |
| #200 | | | |

* (no specification provided)

| Material Description | | |
|---|--|--|
| Light tan medium Gravel, and Clay & Silt, little coarse to fine Sand | | |
| <div> <div> Atterberg Limits </div> <div> LL= 30 </div> <div> PL= 19 </div> <div> PI= 11 </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 22.7448 </div> <div> D₆₀= 15.1019 </div> <div> D₃₀= </div> <div> D₁₅= </div> <div> D₁₀= </div> <div> C_u= </div> <div> C_c= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= GC </div> </div> | | |
| <div> <div> Remarks </div> <div> Water Content (WC): 32.8% </div> </div> | | |

Source of Sample: TB-101
Sample Number: S-5

Depth: 8'-10'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



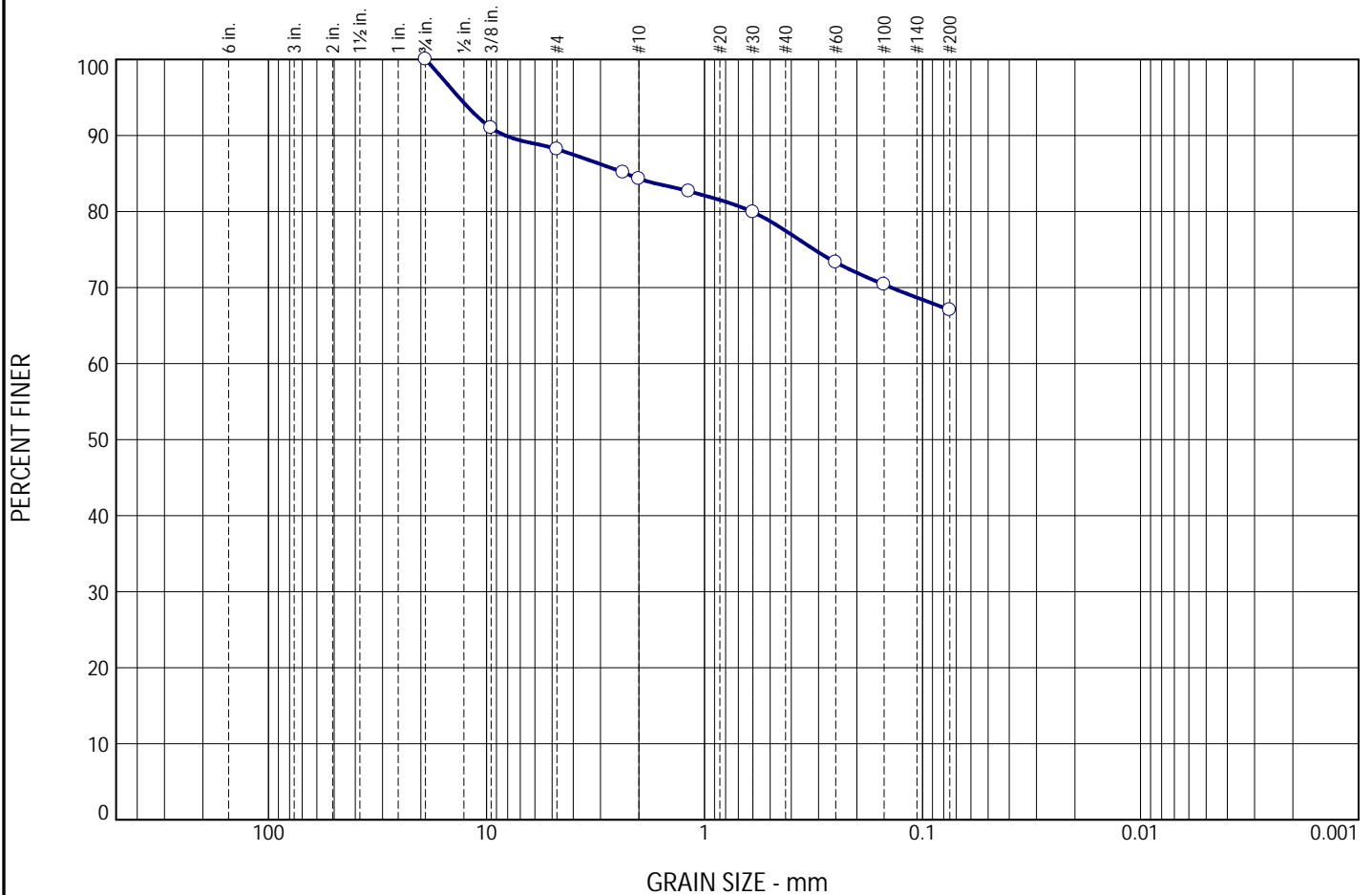
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-1

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 9.0 | 6.7 | 4.4 | 6.6 | 6.2 | 67.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 91.0 | | |
| #4 | 88.2 | | |
| #8 | 85.1 | | |
| #10 | 84.3 | | |
| #16 | 82.7 | | |
| #30 | 79.9 | | |
| #60 | 73.3 | | |
| #100 | 70.4 | | |
| #200 | 67.1 | | |

* (no specification provided)

Material Description
 Dark gray [Fines: (SILT/CLAY)], some coarse to fine Sand, little medium to fine Gravel

Atterberg Limits
 LL= PL= PI=

Coefficients
 D₈₅= 2.2938 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= CL:H\ML:H

Remarks
 WC: 21.1%

Source of Sample: TB-103
 Sample Number: S-2

Depth: 2'-2.8'

Date: 10/29/24

5439 Harding Highway
 Mays Landing New Jersey 08330
 Main: 877 627 3772

Geotechnical Laboratory



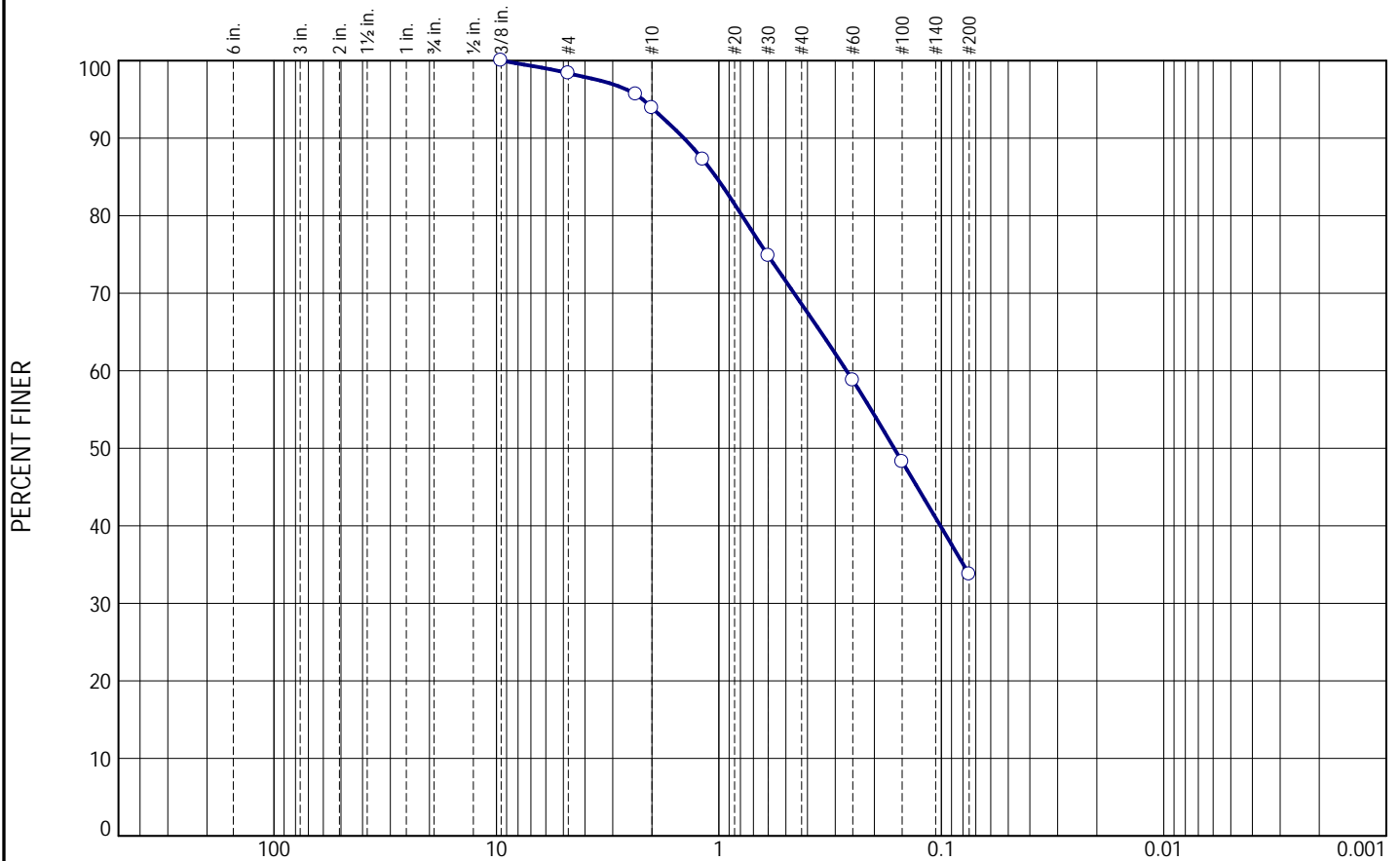
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-2**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 6.1 | 19.1 | 16.0 | 25.1 | 33.7 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 98.4 | | |
| #8 | 95.6 | | |
| #10 | 93.9 | | |
| #16 | 87.2 | | |
| #30 | 74.8 | | |
| #60 | 58.8 | | |
| #100 | 48.3 | | |
| #200 | 33.7 | | |

* (no specification provided)

Material Description

Brown coarse to fine SAND, some [Fines: (Silt/Clay)], trace fine Gravel

Atterberg Limits

LL= PL= PI=

Coefficients

D₈₅= 1.0298 D₆₀= 0.2665 D₅₀= 0.1630
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= SM\SC

Remarks

WC: 20.1%
Trace Mica

Source of Sample: TB-104
Sample Number: S-7

Depth: 13'-15'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory



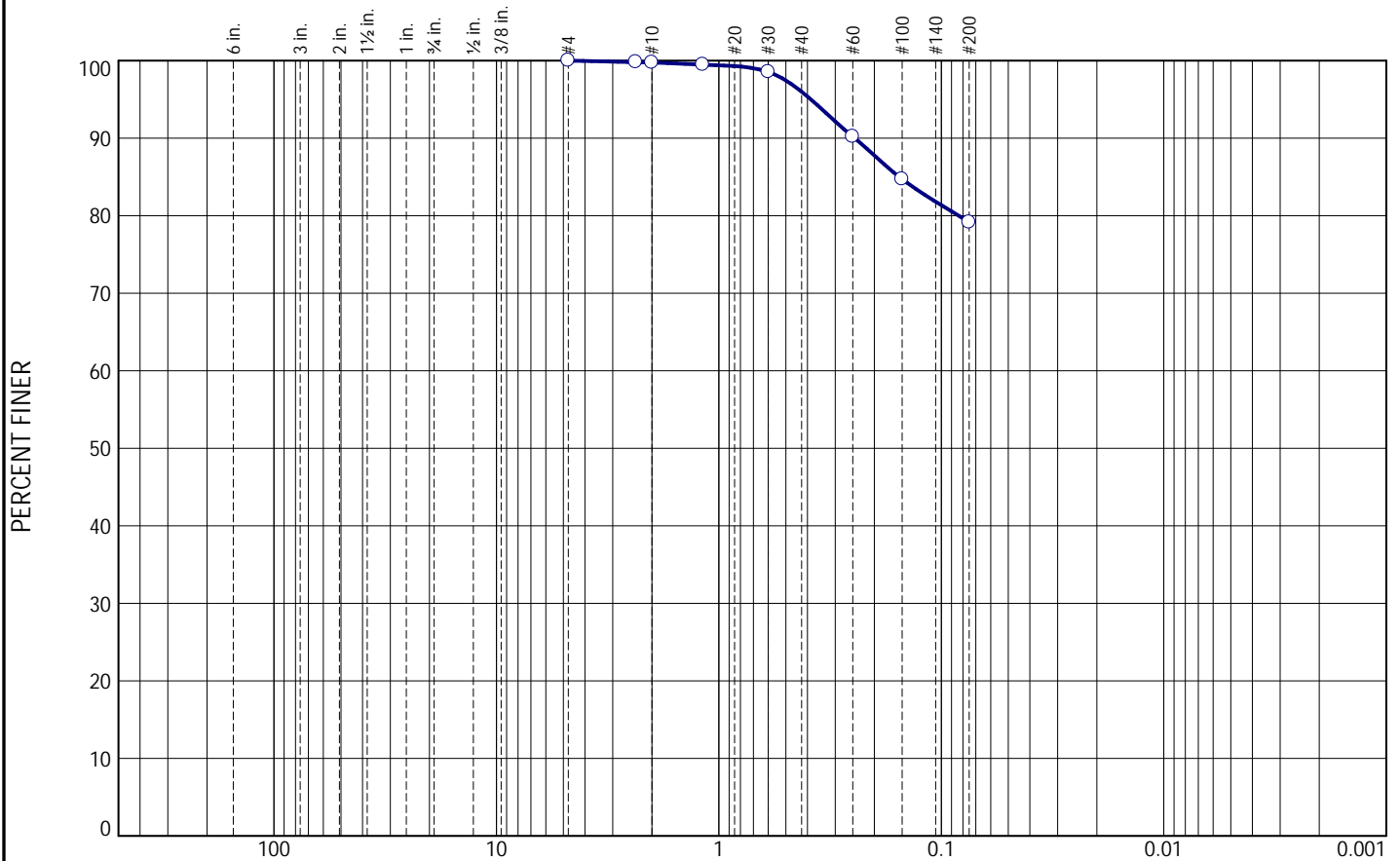
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-3

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.2 | 1.3 | 8.3 | 11.1 | 79.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 99.8 | | |
| #10 | 99.8 | | |
| #16 | 99.5 | | |
| #30 | 98.5 | | |
| #60 | 90.2 | | |
| #100 | 84.7 | | |
| #200 | 79.1 | | |

* (no specification provided)

Material Description
 Brown CLAY & SILT, some medium to fine Sand

LL= 30 Atterberg Limits PL= 20 PI= 10

D₈₅= 0.1546 Coefficients D₆₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

USCS= CL Classification

WC: 19.6% Remarks

Source of Sample: TB-106
Sample Number: S-2

Depth: 2'-4'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



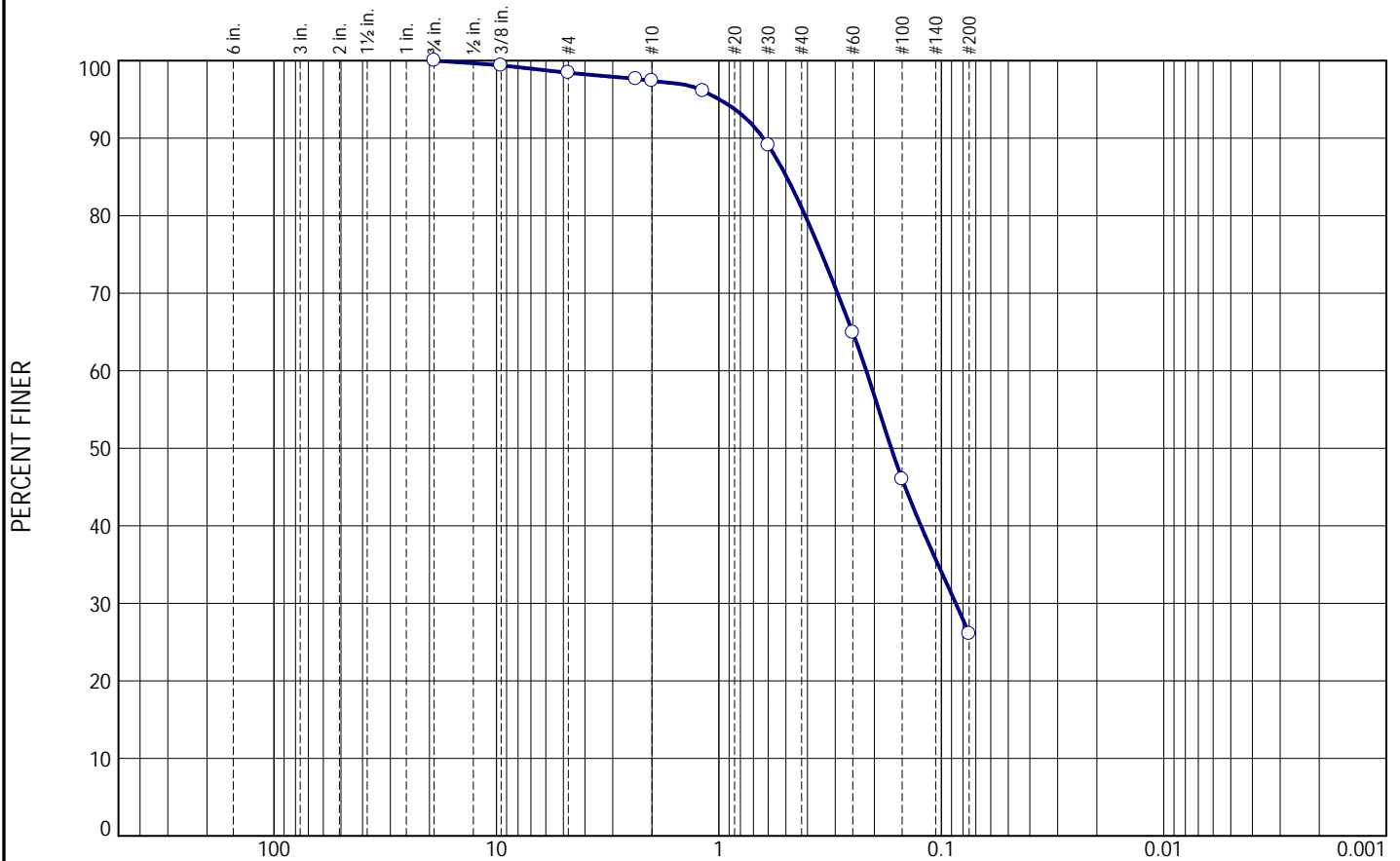
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-4

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.6 | 2.0 | 8.3 | 24.2 | 38.8 | 26.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 99.4 | | |
| #4 | 98.4 | | |
| #8 | 97.6 | | |
| #10 | 97.4 | | |
| #16 | 96.1 | | |
| #30 | 89.1 | | |
| #60 | 64.9 | | |
| #100 | 46.0 | | |
| #200 | 26.1 | | |

* (no specification provided)

Material Description
Brown tan medium to fine SAND, some [Fines: (Silt/Clay)], trace medium to fine Gravel

Atterberg Limits
 LL= PL= PI=

Coefficients
 D₈₅= 0.4962 D₆₀= 0.2175 D₅₀= 0.1679
 D₃₀= 0.0862 D₁₅= D₁₀=
 C_u= C_c=

Classification
USCS= SM\SC

Remarks
WC: 10.3%
Trace Mica

Source of Sample: TB-108
Sample Number: S-7

Depth: 13'-13.8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical Laboratory



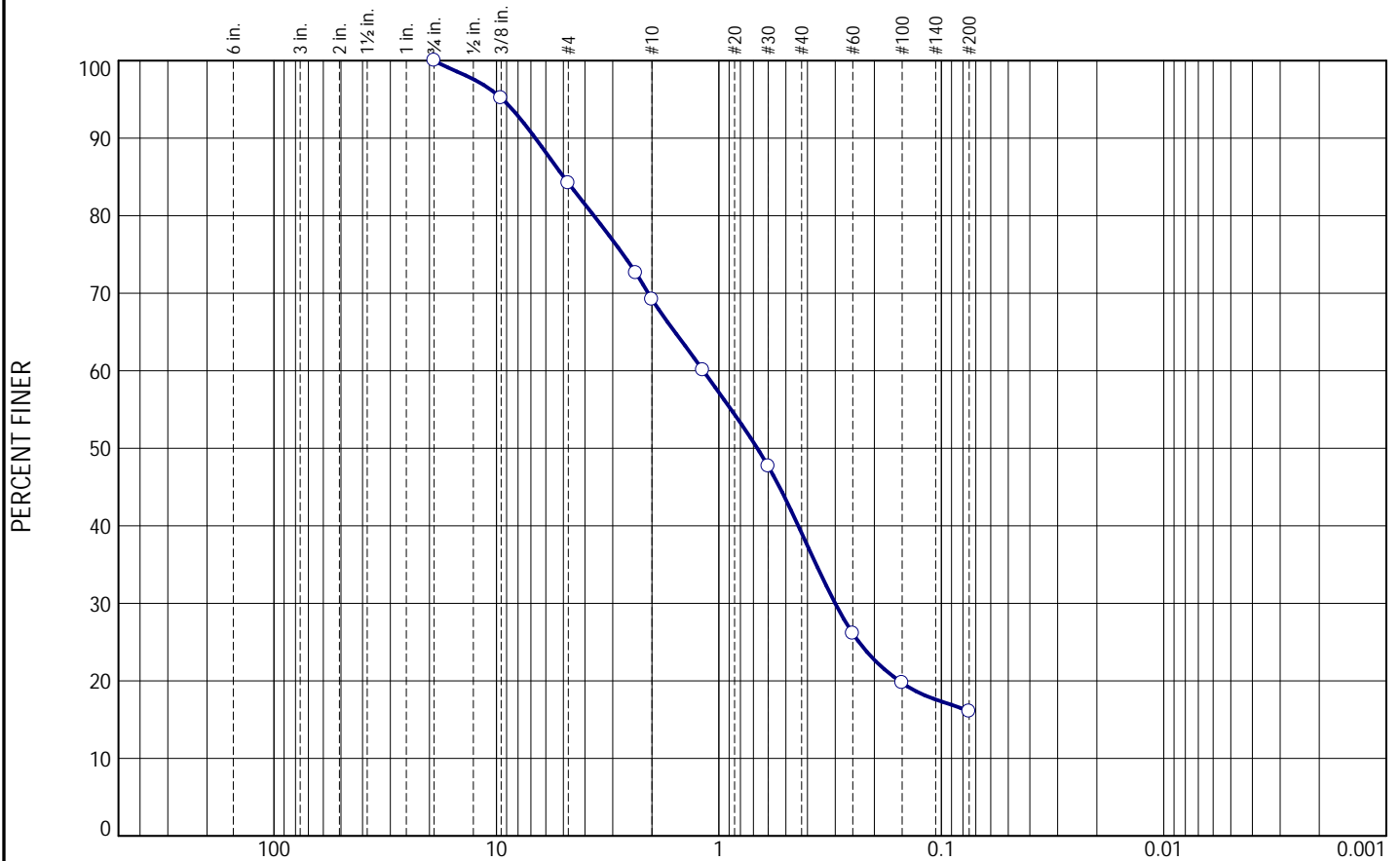
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-5**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 4.8 | 26.0 | 21.5 | 21.6 | 10.0 | 16.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 95.2 | | |
| #4 | 84.2 | | |
| #8 | 72.6 | | |
| #10 | 69.2 | | |
| #16 | 60.1 | | |
| #30 | 47.7 | | |
| #60 | 26.1 | | |
| #100 | 19.7 | | |
| #200 | 16.1 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some medium to fine Gravel, little [Fines: (Silt/Clay)] | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 4.9830 | D ₆₀ = 1.1751 | D ₅₀ = 0.6716 |
| D ₃₀ = 0.3000 | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 14.2% | | |
| Trace Mica | | |

Source of Sample: TB-109
Sample Number: S-4

Depth: 6'-8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory

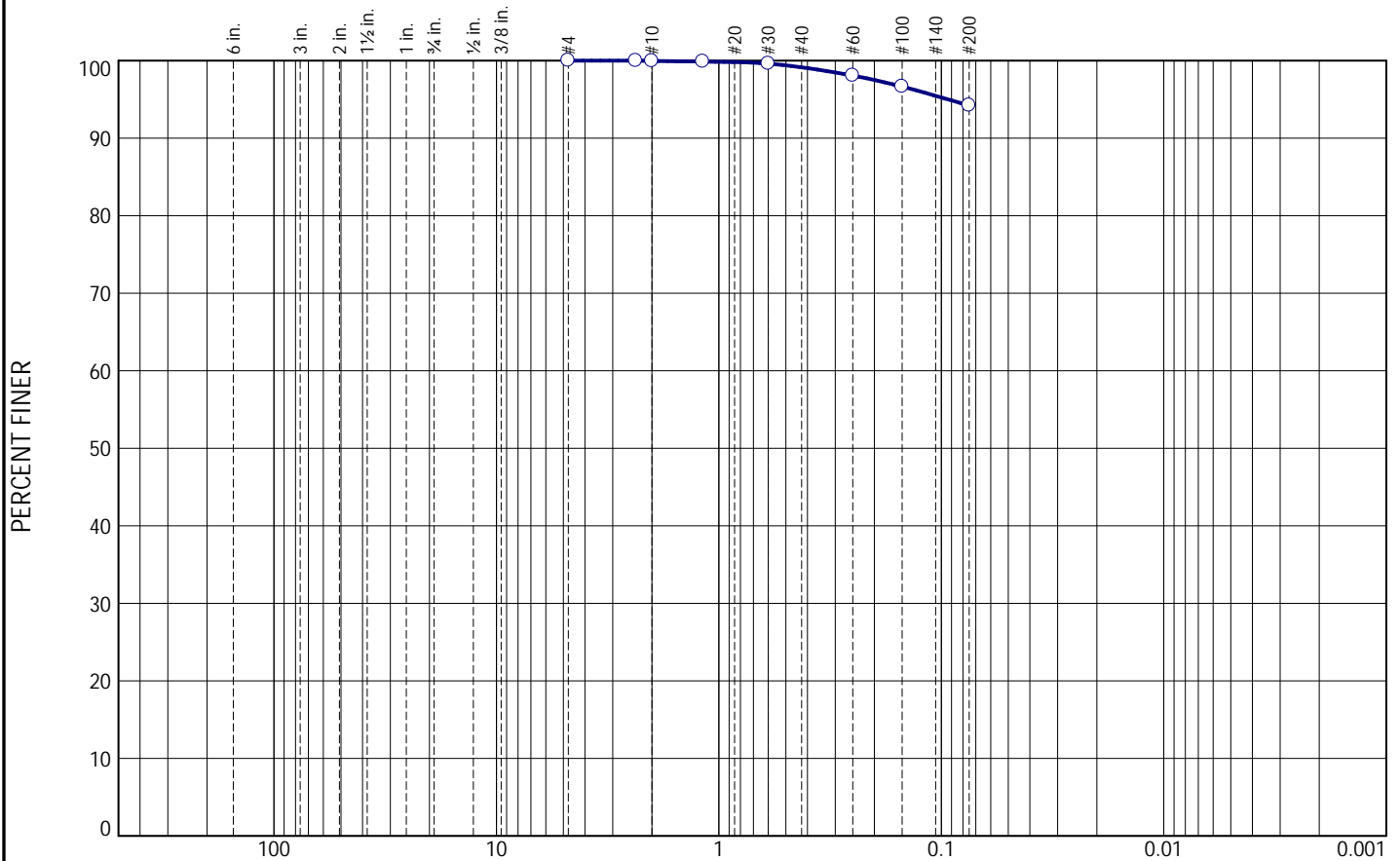


Client: City of Chester Public Works
Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-6

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 3.9 | 94.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 100.0 | | |
| #10 | 100.0 | | |
| #16 | 99.9 | | |
| #30 | 99.6 | | |
| #60 | 98.1 | | |
| #100 | 96.6 | | |
| #200 | 94.2 | | |

* (no specification provided)

Material Description

Brown [Fines: (SILT/CLAY)], trace medium to fine Sand

Atterberg Limits

LL= PL= PI=

Coefficients

D₈₅= D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= CL:H\ML:H

Remarks

WC: 20.3%

Source of Sample: TB-110
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory

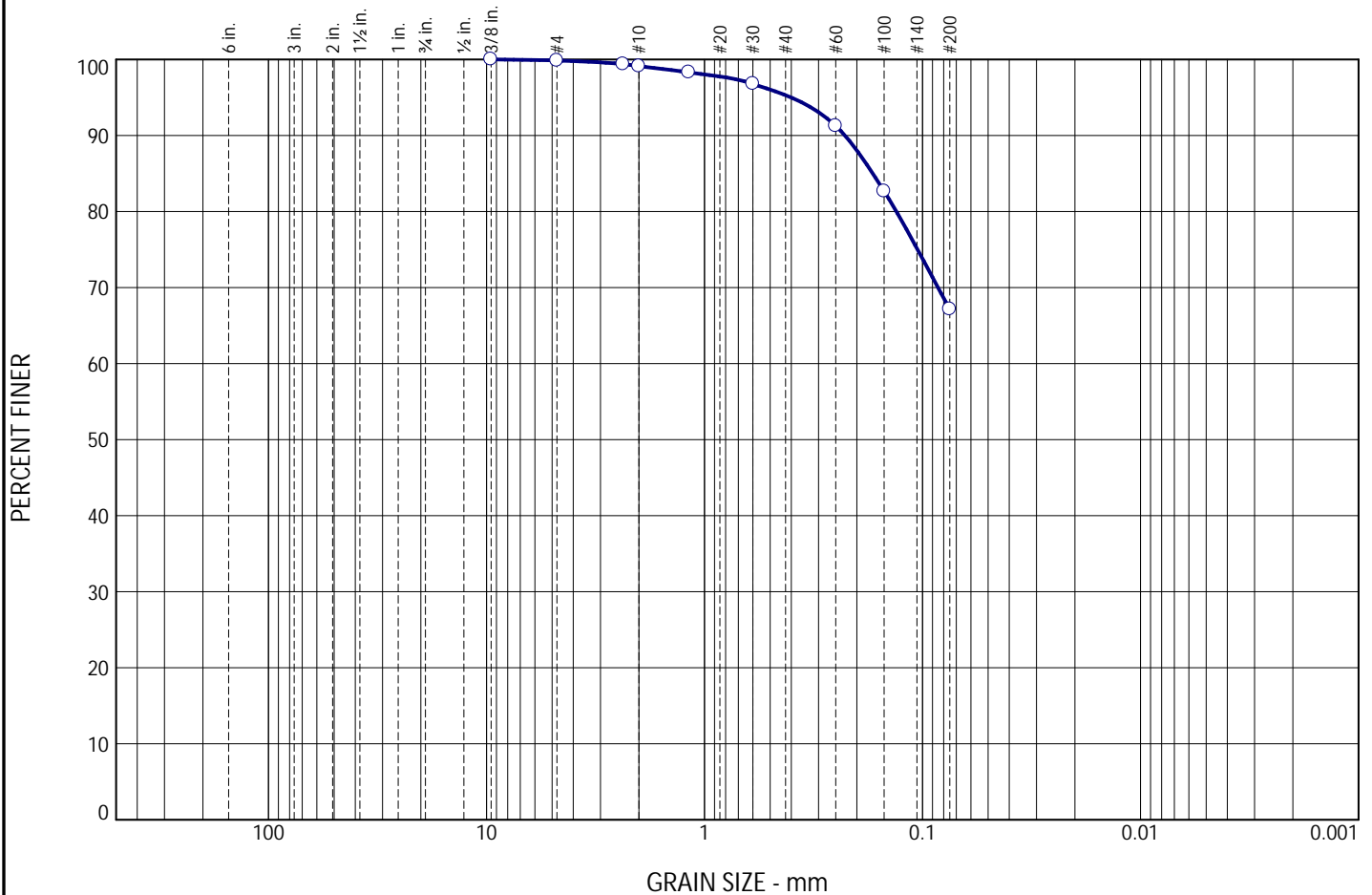


Client: City of Chester Public Works
Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-7

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.9 | 2.3 | 5.5 | 24.1 | 67.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 99.9 | | |
| #8 | 99.4 | | |
| #10 | 99.1 | | |
| #16 | 98.3 | | |
| #30 | 96.8 | | |
| #60 | 91.3 | | |
| #100 | 82.7 | | |
| #200 | 67.2 | | |

* (no specification provided)

Material Description
Brown [Fines: (SILT/CLAY)], some medium to fine Sand

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= 0.1692 D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 21.3%

Source of Sample: TB-111
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



Client: City of Chester Public Works
Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-8**



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Infrastructure • Geotechnical/Environmental • Telecommunications • Utilities/Energy*

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected site elements.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for restrictions on use of the premises and Owner-occupancy requirements.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 4. Review areas where existing construction is to remain and requires protection.

1.5 ACTION SUBMITTALS

- A. Shoring Design: Provide shoring designs, including plans, details, and calculations, prepared and sealed by a professional engineer licensed in the Commonwealth of Pennsylvania.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
- C. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

- D. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 2. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: As indicated on the Drawings, including but not limited to:
 1. Vegetation, planters, soils, gravel, asphalt and concrete pavement, pavers, curbs, storm piping, site furnishings.

END OF SECTION 024119

CONTAMINATED SITE MATERIAL REMOVAL & SOIL CAPPING

PART 1 GENERAL

- 02 60 00.01 **GENERAL CONDITIONS:** All of the Project “General Documents” apply to work specified in this Section; consult them in detail for applicable instructions.

PART 2 PRODUCTS

- 02 60 00.02 **WORK INCLUDED:** Provide all labor, materials, plant, tools, equipment and management services necessary for proper soil capping of pervious area (approximately 26,164 square feet) located at the proposed City of Chester Department of Public Works (DPW) facility as described on the following documents which are part of “Preliminary/Final Land Development Plan for City of Chester – Project Type: Public Works Facilities – Location: 2nd St. & Pennell St., City of Chester, PA 19013” prepared by Colliers Engineering & Design, Inc. (CED) dated April 28, 2025 (included in bid package):
- a. Sheet Title: Site Plan – Sheet Number: 3.0
 - b. Sheet Title: Grading Plan – Sheet Number: 4.0
 - c. Sheet Title: Utilities Plan – Sheet Number: 5.0
 - d. Sheet Title: Landscape Details – Sheet Number: 8.1

PART 3 EXECUTION

- 02 60 00.03 **CODES AND STANDARDS:** The Contractor shall abide by all rules, regulations, codes, and industry standards for the remediation of soil in Pennsylvania.
- 02 60 00.04 **SCOPE OF WORK:** The Contractor’s scope of work shall be as follows:
- a. The Contractor shall have all underground utilities and piping in the vicinity of the soil capping area located.
 - b. The Contractor shall verify the location of soil capping area prior to capping.
 - c. The Contractor shall prepare a Health and Safety Plan (HASP).
 - d. The Contractor shall select an off-site soil recycling/disposal facility per the CED Cut/Fill Plan and obtain approval of the CED Environmental Consultant.
 - e. The Contractor shall complete removal of the impacted soil in the soil capping area to a depth of two (2) feet below surface grade and then install an orange geotextile demarcation fabric barrier per Pennsylvania Department of Environmental Protection

(PADEP) "Land Recycling Program Technical Guidance Manual (Document No. 261-0300-101 dated March 27, 2021) Section II "Act 2 Remediation Process" Appendix II-A "The Use of Caps as Activity and Use Limitations". The Contractor shall observe soils (stockpiled, excavation floor and excavation sidewalls) for environmental impact. If environmental impact is discovered, the Contractor shall contact the CED Environmental Consultant immediately. The Contractor shall abide by the handling and storage procedures in PADEP Appendix II-A described above.

- f. The contractor shall stockpile soils removed from the excavation, and cover with a tarp top and bottom.
- g. Upon approval by the CED Environmental Consultant, Contractor shall:
 - Place an orange geotextile demarcation fabric barrier (Mirafi 140NL/O Orange Delineation Geotextile Fabric <https://www.paramountmaterials.com/products/mirafi-140nl-o-orange-geotextile-fabric-15-x-360-roll-tencate> or equivalent) over the entire bottom of the pervious area excavation
 - Prior to backfill, perform a survey by a PA-Licensed Land Surveyor of the pervious area including the orange geotextile demarcation fabric barrier
 - Backfill excavation with material meeting the definitions of "clean fill" and "clean fill concentration limits (CFCLs)" per PADEP "Management of Fill Policy" (Document No. 258-2182-773 dated January 16, 2021); Contractor shall provide a copy of a completed PADEP Form FP-001 "Certification of Clean Fill" (including electronic acknowledgements from PADEP for signatures by the donor site and by the City of Chester DPW facility construction site) to the CED Environmental Consultant prior to import of clean fill material to City of Chester DPW facility construction site
- h. Contractor shall restore the area per Site Plan.
- i. Contractor shall collect waste classification (soil) samples as required by the approved off-site recycling/disposal facility.
- j. Upon approval from the off-site recycling/disposal facility and CED Environmental Consultant, Contractor shall load and transport impacted soil to the off-site recycling/disposal facility.

The Contractor is required to obtain all permits to perform the work, including but not limited to, a PADEP Act 90 Residual Waste Transporter license.

02 60 00.05 **SUBMITTALS:**

- a. Health and Safety Plan (HASP) per 29 CFR 1910.120

- b. Recycling/Disposal Facility: Submit name and location of off-site recycling/disposal facility for impacted soil for approval by the CED Environmental Consultant prior to export from the site
- c. Material Source: Submit name and location of imported materials source for clean fill material for pervious area excavation via completed PADEP Form FP-001 "Certification of Clean Fill" (including electronic acknowledgements from PADEP for signatures by the donor site and by the City of Chester DPW facility construction site) per PADEP "Management of Fill Policy" (Document No. 258-2182-773 dated January 16, 2021)
- d. Disposal documentation for the impacted soils removed shall be provided per PADEP "Land Recycling Program Technical Guidance Manual (Document No. 261-0300-101 dated March 27, 2021) Section II "Act 2 Remediation Process"

02 60 00.06 **WORK BY CED ENVIRONMENTAL CONSULTANT:** The CED Environmental Consultant shall be responsible for the following during the course of the above work:

- a. Observe excavation and removal operations in the field
- b. Review and approval of clean fill materials proposed for import
- c. Review and approval of off-site soil recycling/disposal facility
- d. Perform the required site assessment of supervising same if the Owner retains others for such purposes
- e. Prepare reports documenting the excavation, removal and clean fill backfill of the pervious area

END OF SECTION 026000

GEOTECHNICAL INVESTIGATIONS

PART I - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, technical specifications and general provisions of the Contract, including information for bidders, Bidding and General Requirements and other specification sections, apply to this section.

1.2 SUMMARY

- A. This section provides information to the Contractors on geotechnical conditions at the site as contained in the November 14, 2024 Report of Geotechnical Exploration for the proposed Proposed Public Works Garage and Shed, West 2nd Street and Lloyd Street, City of Chester, Delaware County, Pennsylvania, attached at the end of this section.
- B. This section provides information to the Contractors on stormwater conditions at the site as contained in the November 14, 2024 Report of Stormwater Infiltration Exploration for the proposed Proposed Public Works Garage and Shed, West 2nd Street and Lloyd Street, City of Chester, Delaware County, Pennsylvania, attached at the end of this section.
- C. The Contractors are responsible to provide additional site investigation as required to perform the Work. No allowance or adjustments to the Contract will be considered, based on the Contractor's lack of site investigation above the exploration work listed herein.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTIONS (Not Applicable)

END OF SECTION 023200



Engineering
& Design

Report of Geotechnical Exploration

November 14, 2024

Proposed Public Works Garage and Shed

West 2nd Street and Lloyd Street

City of Chester, Delaware County, Pennsylvania



Prepared for:

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Project No. COCD0004

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Appendices

Figures

Appendix A

Test Boring Logs

Appendix B

Laboratory Test Results

1. Introduction

We are pleased to present this report regarding the geotechnical exploration performed for the proposed public works garage and shed to be constructed at W. 2nd Street and Lloyd Street in the City of Chester, Pennsylvania. This exploration was conducted in accordance with our proposal COCD0004 (work Order Issued June 26, 2024) and the subsequent Work Requisition (approved July 15, 2024).

Our scope of services for this exploration included the completion of eight test borings for the proposed structure and parking improvements (TB-101 through TB-108); three test borings and complimentary infiltration testing for the proposed underground stormwater management features (TB-109 through TB-111; IT-1 through IT-4); laboratory testing of representative soil samples; engineering analyses of the subsurface data obtained from this field exploration program; and the preparation of this report. The intent of this report is to provide geotechnical-related design recommendations for the proposed garage and shed structures. The conclusions and recommendations related to the stormwater infiltration testing are summarized in a report under separate cover (Report of Stormwater Infiltration Exploration).

2. Site Description

The subject site is located on the south side of West 2nd Street between Pennel Street and Lloyd Street in the City of Chester, Pennsylvania, as shown on the Site Location Map (Figure 1). The site is otherwise bordered by commercial developments to the north, south, east, and west. The Delaware River is located less than 0.25 miles to the south of the site.

The existing lot serves as a vehicle storage/parking for various commercial tractor trailer rigs and accompanying vehicle transport trailers. There is a small wood shack located in the western-central portion of the site. There is a relatively small loading dock platform (suspected remnant of a former structure) located in the southern-central portion of the subject property. The site is otherwise predominantly covered with asphalt pavement (existing parking lot), which is in poor condition with abundant cracking and potholes. The pavements in the northern portion of the site are completely dilapidated. There are partially vegetated landscape areas along the northern and eastern property boundaries. There are several small piles of scrap automotive parts (e.g. tires, truck body parts, etc.) in the existing parking lot area, just north of the former loading dock area.

The overall site is relatively flat to gently sloping with elevations ranging from ± 16 to ± 12 , grading downward slightly from the northwest side of the site to the southeast. Utility mark-outs, including water, storm sewer, electric, and communications, were observed within and around the perimeter of the site. Other un-marked below-grade utilities may also exist at the site.

Historical Review

Based on review of historical aerial images and topographic maps, the subject site appears to have been partially developed since the early 1900's. The type and extent of the development was not apparent from the historical images/maps. However, based on the variations in the aerial images, it appears that the site was manipulated / disturbed in the late 1930's and early 1940's. Aerial images from 1940 suggest that a through street traversing the site from Front Street to W 2nd Street was removed and modifications to Lloyd Street were made. At some point in the early to mid-1950's, a loading dock structure was added to the southwest portion of the site and the subject property appeared to be utilized as material storage and shipping yard. Between the early to mid-1960's and early 1980's, the site appeared to be relatively vacant and unused. In the early to late-1990's the property appeared to be utilized for tractor trailer storage. Between the late 1990's and mid-2000's the property appeared to be unutilized. Between the late 2000's and present day there was a small shed structure added to the western-central portion of the property and the property appears to be utilized for vehicle and transport tractor trailer parking / storage.

3. Proposed Development

The site for the proposed development is located on the parcel situated southwest of the intersection formed by W. 2nd Street and Lloyd Street in the City of Chester, Delaware County, PA, as shown on the Exploration Location Plan, Figure 2. The current design concept includes a 13,152 square-foot (SF), single-story office and garage building on the north side of the site, and a 9,000 SF, single-story, high bay maintenance facility/salt shed on the southwest side of the site. We assume that the proposed building additions will consist of steel framing with CMU block walls. The proposed structures are planned to have a finished floor elevation (FFE) of 14.95. No basement levels are proposed.

Based on discussions with the design team, proposed maximum column and wall loads for the proposed office/garage building are estimated at 45 kips and 4 kips per linear foot (klf), respectively. The maximum column and wall loads for the proposed maintenance facility/salt shed building are estimated at 80 kips and 7 klf, respectively. We assume that maximum total and differential post-construction settlements on the order of 1 inch and 0.5 inches, respectively, are within tolerable limits.

The current concept plan includes one underground stormwater management (SWM) feature located in the southeastern portion of the site. We understand that the type of SWM feature will be determined based on the results of the infiltration testing and related subsurface exploration. Discussions and recommendations regarding the stormwater management aspects of the project are submitted under separate cover.

4. Field Exploration and Laboratory Testing

Subsurface conditions for this geotechnical exploration related to the proposed development were explored through the completion of eleven test borings, identified as TB-101 through TB-111. The test borings were performed by Soil Borings Inc. of Haddonfield, New Jersey, at the locations shown on the Exploration Location Plan, Figure 2. The test locations were field located by Colliers Engineering & Design, Inc. (CED) and cleared for below-grade utilities by Level A Underground Solutions. The drilling was performed under the full-time technical supervision of CED. Elevations of the test locations were estimated using the Overall Grading, Drainage, and Utility Plan (Sheet No. 3), dated October 11, 2024, by Colliers Engineering & Design, Inc. Please refer to the Logs of Test Borings included in Appendix A of this report.

The test borings were advanced using hollow-stem drilling techniques. Soil samples for strata identification and analyses were obtained from each of the test borings by means of a 2-inch OD split barrel sampler. This spoon is typically driven 18 inches or 24 inches by blows from a 140-pound hammer which free falls 30 inches (the Standard Penetration Test, ASTM D 1586). The boring logs are presented in the Appendix with descriptions of the soil horizons encountered and depth to encountered groundwater. The penetration resistance of the drive sampler has been recorded on the test boring log adjacent to the sample locations as the number of hammer blows required for each 6 inches of sampler penetration or fraction thereof. The Standard Penetration Test values (N) are determined by totaling the blow counts required for the middle 12 inches of sampler penetration, and are expressed as blows per foot. Upon completion, the test borings were backfilled with the cuttings and repaired with asphalt cold patch where applicable.

The test borings were performed under the full-time technical observation of CED. Representative soil samples were collected and visually identified in accordance with the Burmister Soil Classification System. Details pertaining to the subsurface conditions encountered are presented on the test boring logs in Appendix B.

Laboratory testing was performed on representative samples to evaluate the physical properties of the subsoils, as well as augment the field exploration. Laboratory testing was performed at our accredited facility located in Mays Landing, New Jersey. The stratigraphic continuity and physical characteristics of the subsoils were tested for determination of water content, Atterberg Limits, and grain size distribution by weight (GS). The test results are presented on the laboratory test reports included in Appendix C.

Soil samples obtained during this exploration will be retained by CED for 60 days from issuance of this report. At the end of this time, they will be discarded unless we receive other instructions from the City of Chester Public Works.

5. Subsurface Conditions

The site for the proposed development is located within the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain physiographic province. Locally, the site is underlain by existing

fill material, followed by fine- and coarse-grained alluvial deposits of the Trenton Gravel formation, followed by the decomposed and weathered remains of the Wissahickon Formation. These materials were encountered in the test borings, as described in the following paragraphs.

5.1 Subsurface Description

Based on the results of the test borings, the generalized subsurface conditions at the site are described below, in order of depth.

- **Surface Cover Material:** Asphalt pavement was encountered in eight of the eleven test borings (TB-104 through TB-111) at thicknesses ranging from about 1.5 to 5.0 inches, averaging about 2.9 inches thick. A concrete pavement/slab ranging from about 6 to 8.5 inches, and averaging 7 inches, was encountered below the asphalt layer in test borings TB-104, TB-105, and TB-111. The asphalt and concrete layers are underlain by aggregate base materials, ranging from 3 to 5 inches, and averaging about 3.8 inches in thickness. Dilapidated pavements and/or existing fill materials were encountered at the surface of test borings TB-101 through TB-103.
- **Existing Fill Materials:** Existing fill material was encountered at the ground surface (i.e. dilapidated pavements) or beneath the surficial cover materials at each test boring location within the proposed building and pavement areas (except TB-106), extending to depths ranging from approximately 2 to 6 feet, averaging about 3.5 feet below the existing grades. The existing fill layer generally consists of a sand with moderate to high percentages of gravel and low to moderate amounts of silt/clay. Some of the near surface fill materials were comprised of silt/clay with moderate percentages of sand and lesser amounts of gravel. Occasional demolition debris was intermixed within the existing fill materials (i.e. brick, asphalt, and concrete fragments).

The Standard Penetration Test (SPT) 'N'-values for the existing fill layer range from 3 blows per foot (bpf) to greater than 100 bpf, averaging about 23 bpf. The upper 2 to 3 feet of the existing fill layer is generally relatively dense immediately below the asphalt and concrete layer, but typically becomes loose to medium dense thereafter nearing the transition with the underlying Stratum A soil layer. The existing fill generally appears to have been placed in a controlled/compacted manner.

- **Stratum A – Coarse-Grained and Fine-Grained Alluvial Soils:** Coarse-grained and fine-grained alluvial soils (intermixed layers) were encountered beneath the surface cover materials and/or existing fill layer in each of the test borings performed within the proposed building and pavement areas, extending to depths ranging from 8 feet to 13 feet, averaging about 10.5 feet.

The predominantly coarse-grained Stratum A soils are generally comprised of a sand with moderate to high amounts of silt and low to moderately high percentages of medium to fine gravel. Overall, the SPT 'N'-values of the coarse-grained Stratum A soils range widely from 4 bpf to 44 bpf, averaging 20 bpf. However, they are typically loose to medium dense, with infrequent, isolated very loose and very dense layers.

The predominantly fine-grained Stratum A soils consist of clay and silt mixtures with moderate amounts of coarse to fine sand and lesser percentages of fine gravel. Overall, the SPT 'N'-values of

the fine-grained Stratum A soils range widely from 3 bpf to 27 bpf, averaging 13 bpf. However, they are typically medium to stiff, with less frequent soft or very stiff layers. Based on the results of field pocket penetrometer testing, the fine-grained Stratum A soils have unconfined compression values ranging from less than 0.25 tons per square foot (tsf) to 4.5 tsf, averaging about 2.3 tsf.

- **Stratum B – Decomposed Rock:** Decomposed rock was encountered beneath the Stratum A soils in each of the test borings. For purposes of this report, decomposed rock is defined as the completely weathered remains of the underlying bedrock (i.e. a soil-like material), which retains some of the relic rock structure. The decomposed rock at this site generally consists of loose to very dense micaceous sand with moderate amounts of silt and trace amounts of friable rock fragments. See below for additional details regarding trends in relative density with depth.

The test borings were either terminated (i.e. auger refusal or end of test boring depth) in the Stratum B layer in test borings TB-104, TB-107, TB-109, and TB-111 at depths ranging from 15 feet to 30 feet, or the layer extended to the transition with the underlying Stratum C – Altered Rock materials (TB-101 through TB-103, TB-105, TB-106, TB-108, and TB-110) at depths ranging from 10.5 feet to 38 feet below the existing ground surface. In general, the decomposed rock layer appears to trend deeper from northeast to southwest towards the Delaware River.

Stratum B soils are generally loose to very dense, with SPT 'N'-values ranging from 7 bpf to 92 bpf, averaging 21 bpf. We note that the loose conditions were only observed in TB-105 near the transition from Stratum A to B. The density of Stratum B generally increases with depth approaching the underlying Stratum C - Altered Rock layer and that the very dense conditions were identified in TB-108 at a depth of 12 feet (near the Stratum C interface).

- **Stratum C – Altered Rock:** Altered rock (a.k.a. saprolite) was encountered beneath the Stratum B – Decomposed Rock layer in test borings TB-101, TB-102, TB-103, TB-105, TB-106, TB-108, and TB-110, extending to the maximum depths explored. For purposes of this report, altered rock is defined as the partially weathered remains of the parent bedrock. It is differentiated from the Stratum B – Decomposed Rock layer based on the increased resistance to split spoon sampling (typically resulting in split spoon refusal) and augering (penetrable with some difficulty). The altered rock at this site generally consists of dense to very dense micaceous sand with moderate amounts of silt and lesser amounts of both friable and non-friable rock fragments.

The SPT "N" values for Stratum C are typically in excess of 100 blows for less than 1 foot of penetration.

5.2 Groundwater Conditions

Groundwater or very moist soil conditions (indicating the presence of groundwater) was encountered in each of the test borings. Groundwater readings obtained at completion of the test borings ranged from depths of 7.7 feet to 9.2 feet, averaging about 8.7 feet below existing grades (elevations ranging from 4.3 to 7.7, averaging 5.2). In general, groundwater levels at the site are expected to fluctuate slightly based on seasonal and man-made influences, as well as variations of the Delaware River water levels.

6. Development Issues

Based on our geotechnical exploration, we are highlighting the following the following geotechnical design considerations that merit further discussion:

6.1 Foundation / Slab Subgrade Preparation

Based on the finished floor elevations, spread footing foundations for the proposed buildings are expected to bear within either the existing fill or Stratum A soils. The slab will be supported on-grade by the existing fill and/or newly placed load-bearing fill. Some of the existing fill soils and Stratum A materials may be soft / loose and unstable. To limit risks of excessive post-construction settlement, we are recommending the following foundation / slab subgrade preparation procedure:

- Following excavation and prior to foundation construction, compact the exposed bearing subgrades using trench compaction equipment. The foundation subgrades shall be evaluated by a qualified geotechnical representative during compaction and probed using a conical tipped hand probe. Loose or otherwise unstable materials at the bearing elevations shall be stabilized in place by compaction, or over-excavated to more stable bearing materials and backfilled with load-bearing fill. Where over-excavations are required, they shall extend a minimum of 1 foot laterally beyond the perimeter edges of the foundation for every 2 feet in depth of over-excavation.
- Immediately prior to slab construction (e.g. aggregate base placement), we recommend that the exposed subgrade surface be thoroughly compacted and proofrolled using as large as practical construction equipment. Loose or otherwise unstable existing fill materials identified during the subgrade compaction and proofroll shall be improved in place or selectively removed and replaced with load-bearing fill to mitigate excessive total and/or differential settlement.
- Deleterious materials (e.g. wood, asphalt fragments, plastic, cinders, etc.) and nested pockets of over-sized inert debris (e.g. bricks, concrete, etc.), where encountered, shall be removed and chased out laterally a minimum of 5 feet beyond the footprint of the building / foundation.

6.2 Potential for Historic / Buried Features

There is some limited risk for encountering unanticipated historic remnant buried features associated with prior site development. The site has a limited history of prior site development based on our review of historic aerial images. Furthermore, we encountered some difficulty augering through the existing fill zone within test borings TB-101 and TB-103, indicating the possible presence of occasional zones of buried debris and/or unknown historic site features.

If existing foundations or slabs associated with historic site features are encountered during construction, we recommend that they be demolished and removed to a minimum of 3 feet below the proposed subgrade / bearing elevations to minimize interference with the proposed

development and to reduce the effect of hard points. Similarly, nested zones of inert debris (e.g. brick, concrete, etc.) should be over-excavated and replaced with load-bearing fill. Deleterious materials (e.g. wood, metal, plastic, cinders, etc.), if encountered, should be similarly removed, as discussed in Section 6.1.

7. Summary of Conclusions and Recommendations

Conclusions and recommendations pertaining to the design and construction of the proposed development are summarized in the following paragraphs.

7.1 Site Preparation

The purpose of these site preparation procedures is to provide stable and uniform bearing conditions for the proposed building foundations and slab-on-grade. The following procedures should be performed under the technical supervision of the Geotechnical Engineer.

- Install soil erosion and sedimentation control devices as specified by others. Maintain positive drainage conditions throughout construction, avoiding unnecessary ponding of stormwater in excavations or low areas of the site. Utilize temporary sump pits and pumping (e.g. dewatering system) in excavated areas of the site. Seal-roll exposed soil or subgrade surfaces prior to rain or snow events, and promptly remove any standing water afterwards.
- Remove the asphalt pavement from the area of proposed construction and dispose offsite.
- Existing underground or above-ground utility locations should be verified in the field and relocated or abandoned as necessary, prior to construction. If the option to abandon utilities in-place is chosen, we recommend a lean cement grout (1,000 psi) be used to fill the utility lines.
- Excavate the existing subsurface soil materials, as necessary, to achieve the proposed subgrade elevations. In general, the existing fill soils may be excavated using conventional construction equipment. Larger excavators and/or hydraulic pecking equipment may be more productive excavating and removing larger debris or potential buried concrete pavements/slabs and historic buried features (if present) within the existing fill.
- Perform the foundation and slab-on-grade subgrade preparation procedures outlined in Section 6.1, including over-excavation and replacement of the soft, loose, or otherwise unstable existing fill soils at the foundation bearing elevations, as well as the proofrolling procedure for the slab-on-grade subgrade. Refer to Sections 6.1 and 6.2 for additional details.
- Place and compact load-bearing fill as needed to achieve the final subgrade elevations.

7.2 Load Bearing Fill and Backfill Materials

The excavated site soils can be reused as compacted structural fill with some limitations. Some debris (e.g. brick, concrete, and asphalt fragments) was encountered within the existing fill at boring locations TB-101, T-102, TB-103, and TB-108 during the explorations; however, there is potential to encounter larger debris and/or deleterious materials (e.g. wood, plastic, metal, etc.) in unexplored

portions of the property. As such, the on-site geotechnical representative should assess the existing fill soils prior to reuse. The Contractor shall be prepared to screen over-sized debris and/or deleterious material from the existing fill prior to reuse as structural fill.

The near surface soils (Stratum A and portions of the existing fill) contain high percentages of silt/clay and will be subject to moisture-related compaction problems. Additionally, excavated soils left unprotected during precipitation events will become unsuitable for compaction. As such and depending on the prevailing weather conditions at the time earthwork is performed, moisture conditioning of the excavated soils will likely be required prior to their reuse as fill or backfill. If air-drying of the soil is not possible due to precipitation and/or colder temperatures, or if the project schedule cannot accommodate the time required for air-drying of the soil, the Contractor should anticipate that unsuitable soils will have to be exported from the site and suitable structural fill materials will have to be imported. The Contractor shall consider the use of tarps or similar protective cover over stockpiles prior to precipitation events to help reduce the amount of moisture conditioning and/or soil amendment that may be required prior to reuse.

If imported material is required for use as structural fill, the material should consist of well-graded, predominantly granular material and be tested and approved by the Geotechnical Engineer prior to use. If open-graded stone must be used as structural fill or backfill, the stone should be separated from surrounding soils with geotextile filter fabric to limit particle migration.

Fill materials supporting loads from the proposed buildings and pavements are considered structural fill and should be installed under the observation of the Geotechnical Engineer. Mass structural fill consisting of predominantly fine-grained soil (silt and clay) should be placed in maximum 8-inch-thick loose lifts. Predominantly granular fill materials can be placed in lifts ranging up to 12 inches in loose thickness and compacted using a smooth drum roller in vibratory mode. Backfill placed in confined areas, such as utility and foundation excavations, should be spread in thinner layers and compacted using the largest equipment possible without damaging the utilities. Backfill placed within 3 feet of below-grade walls or retaining walls should be compacted with manually operated compaction equipment. Fill and backfill should be compacted to the following minimum requirements:

TABLE 1
COMPACTION RECOMMENDATIONS BY SUPPORT TYPE
Proposed Public Works Garage and Shed
Chester, PA

| Type of Support | Percent of Maximum Dry Density (ASTM D-1557) |
|---|--|
| Structural fill below foundations, slabs-on-grade, and pavements | 95% |
| Backfill for retaining walls, below-grade walls, and utility trenches | 92% |
| General fill for landscaped and other non-structural areas | 90% |

Subgrades should be evaluated for stability by the Geotechnical Engineer prior to fill placement, and the compactive effort for each lift of fill should be verified by in-place density testing prior to placement of subsequent lifts. Adjustments to the lift thickness and/or compaction equipment may be required, as directed by the Geotechnical Engineer, based on prevailing weather conditions at the time of fill placement and performance of the compacted soils.

7.3 Foundation Recommendations

We recommend that the proposed garage/office and shed structures be supported using a conventional shallow foundation system. Assuming a finished floor elevation of 14.95, the proposed building foundations will typically bear at or about elevation 11.95. Assuming the subgrade preparation techniques outlined below (and in Section 6.2) are performed, the foundations may be proportioned assuming an allowable bearing capacity of 3,000 pounds per square foot (psf).

Prior to foundation construction, we recommend that the foundation bearing surface be compacted using trench compaction equipment. The bearing surface shall be evaluated by the on-site geotechnical representative during compaction and probed using a conical tipped hand probe. Loose or otherwise unstable materials identified shall be compacted in place or over-excavated to more stable materials and backfilled with load-bearing fill. Over-excavations, where required, shall extend a minimum 1 foot laterally beyond the perimeter edge of the proposed foundation for every 2 feet vertically of over-excavation. This procedure is intended to remove marginal quality, potentially unstable existing fill materials or soft Stratum A soils and to provide a uniform bearing surface for support of the foundations. Please refer to Section 6.1 for additional foundation subgrade preparation procedures.

We expect foundation settlement will generally be limited to 1 inch total and 0.5 inches differential between adjacent columns. We expect the primary settlement will occur relatively quickly following construction of the proposed structures.

The minimum width of all wall footings should be 24 inches, and the minimum horizontal dimension of all spread footings should be 36 inches, regardless of the bearing pressure developed. All exterior footings subject to frost action should be based at least 36 inches below the adjacent exterior grade. Interior foundations in permanently heated portions of the building may be established at convenient depths below the floor slab that will not interfere with subsequent floor slab construction.

The contractor should be prepared to encounter trapped groundwater in the foundation excavations, particularly if construction occurs during wet periods. Based on our experience at similar sites, infiltrating surface runoff tends to become trapped within the more granular materials above the finer-grained Stratum A layer. If trapped groundwater is encountered, we expect that the groundwater can be managed through conventional sump and pump techniques.

7.4 Seismic Considerations

In accordance with the provisions of the 2018 International Building Code, the site has a Site Class Definition of "D" for the existing subsurface soil and groundwater conditions. This classification was determined by utilizing the Standard Penetration Test (SPT) blow count data through the upper 50 feet of the subsurface profile with assumptions thereafter to a depth of 100 feet.

7.5 Floor Slabs-on-Grade

Assuming the proposed building subgrades are prepared under the observation of a Geotechnical Engineer as described below (and Section 6.1), the floor slabs may be supported on-grade. The floor slab subgrade should be compacted with a smooth-drum roller just prior to installation of the aggregate base to re-compact any materials disturbed by previous construction activities or adverse weather conditions. Any unstable zones detected that cannot be stabilized by additional compaction should be removed, and the excavated area backfilled with load-bearing fill. Deleterious materials (e.g. wood, metal, plastic, etc.) and/or nested zones of brick and concrete debris should be removed and "chased out" laterally a minimum of 5 feet beyond the footprint of the building.

Immediately prior to slab construction, we recommend that a minimum 4-inch layer of dense-graded aggregate conforming to PADOT 2A be placed and compacted over the prepared subgrade. For interior portions of the buildings to receive floor coatings such as carpeting, floor tile, or epoxy-based finishes, we recommend that a 10-mil vapor retarder be placed over the subgrade, followed by the minimum 4-inch layer of dense-graded aggregate. The aggregate should be dampened just prior to concrete placement. These procedures are intended to provide uniform concrete curing conditions.

Reinforced concrete floor slabs should be simply supported at wall and column junctures to allow unrestricted rotation of the slab edges. Alternatively, the slabs should be free to undergo vertical deflections at the edges. We anticipate that, following proper site preparation, the existing fill materials and Stratum A materials can achieve a Modulus of Subgrade Reaction on the order of 120 pounds per cubic inch (pci). A coefficient of sliding friction of 0.20 may be used for design of a floor slab with a polyethylene vapor retarder over soil. A coefficient of sliding friction of 0.40 may be used for design of a floor slab without a vapor retarder.

7.6 Lateral Earth Pressure Parameters

We are not aware of any proposed site retaining walls or permanent below-grade features (e.g. basement levels) that will act as earth retention structures. However, we understand that portions of the CMU walls (particularly on the north side of the garage / office building may have unbalanced loads based on the site grades. The lateral earth pressure parameters presented in this section are intended for use in the design of those features, as well as temporary support of excavation features, if required.

The excavated predominantly fine-grained (silt / clayey silt) on-site soils are not well-suited for backfill of below-grade walls and should be avoided. These soils will be sensitive to moisture-related compaction problems and their inherently poor drainage characteristics typically result in hydrostatic pressures exerted on the back-face of walls. Predominantly granular portions of the excavated site soils or imported well-graded granular soils will be better suited for use as wall backfill material, though their availability on site will be very limited. The maximum particle size in wall backfill materials should be limited to 3 inches, and the backfill should be free of deleterious matter and debris. Recommended soil parameters for design of below-grade walls are presented in the following table.

TABLE 2
LATERAL EARTH PRESSURE COEFFICIENTS
Proposed Public Works Garage and Shed
Chester, PA

| Subsurface Material | Total Unit Weight (pcf) | Internal Friction Angle | Wall Condition | Earth Pressure Coefficient | Equivalent Fluid Pressure |
|--------------------------|-------------------------|-------------------------|----------------|----------------------------|---------------------------|
| Existing Fill | 120 | 30° | At Rest, K_o | 0.50 | 60 |
| | | | Active, K_a | 0.33 | 40 |
| | | | Passive, K_p | 3.00 | 360 |
| Granular Stratum A Soils | 125 | 32° | At Rest, K_o | 0.47 | 59 |
| | | | Active, K_a | 0.31 | 39 |
| | | | Passive, K_p | 3.25 | 405 |
| Structural Fill | 130 | 34° | At Rest, K_o | 0.44 | 58 |
| | | | Active, K_a | 0.28 | 37 |
| | | | Passive, K_p | 3.54 | 455 |

*Values based on industry standard empirical correlations. Specific values should be confirmed via lab testing prior to final design.

Walls restrained from lateral movement at the top of the wall and/or intermediate points should be designed using the at-rest earth pressure coefficient. Walls that are not restrained from lateral displacement (free to rotate) should be designed using active earth pressure coefficients. We recommend that passive earth pressures be omitted from the wall designs. Surcharge loads

imposed by sloping backfill, pavements, terraced walls, material stockpiles, construction equipment, etc. must be considered in the wall designs. Retaining wall design should consider internal stability and external global stability at all critical stages during and following construction. Retaining wall foundations should be designed assuming a maximum allowable net bearing pressure of 3,000 psf (provided the recommendations for the building foundations subgrade preparation are applied for the retaining wall foundations).

Light pole bases can be designed assuming a coefficient of friction against sliding of 0.25 and a maximum allowable lateral soil pressure of 120 psf per foot of base depth below the ground surface. Light pole bases should extend below the Existing Fill into suitable Stratum A soils.

7.7 Pavements

New pavements can be constructed on suitable site soils or newly placed and compacted load-bearing fill. Immediately prior to pavement construction, the exposed pavement subgrade should be compacted with a minimum 10-ton smooth-drum roller and be proof-rolled with a loaded tandem-axle dump truck under the observation of the geotechnical engineer to evaluate stability. Subgrade areas that are observed to be unstable or contain debris/deleterious matter should be selectively excavated and replaced with compacted load-bearing fill or granular subbase material.

As previously indicated, some of the site soils have high percentages of sensitive fine-grained soils and will be susceptible to disturbance from exposure to moisture and construction equipment. Depending on the timing between pavement subgrade preparation and pavement section construction, the contractor should anticipate that remedial work could be required to achieve a stable subgrade prior to paving, even if the subgrade soils had previously been compacted to the required densities. Prudent scheduling of pavement construction and control of construction equipment traffic will reduce the need for potential remedial work.

Provided the pavement subgrade is prepared in accordance with the recommendations contained herein, we have assumed a California Bearing Ratio (CBR) of 3 to account for variability of fine-grained soils throughout the site (CBR value to be confirmed via laboratory testing prior to pavement construction). We expect that the standard duty pavements will be exposed to passenger vehicle traffic only. As such, we have conservatively assumed a typical minimum pavement section for the standard duty section, which is expected to be suitable for the traffic expected in the office parking lot area (ESAL value of about 40,000).

We anticipate that the heavy-duty asphalt pavement sections will be used in the areas of the proposed maintenance building, garage, and salt shed, and that they will be exposed to heavier truck traffic associated with trash trucks as well as periodic dump trucks and rubber-tire front end loader equipment (for during winter salting operations). As a result, we have assumed up to 10 single-axle trucks and 5 double-axle trucks per day for heavy duty pavements (ESAL value of 310,000). CED can review and modify the pavement sections based on actual anticipated vehicle traffic, if this information later becomes available.

The following tables present recommended minimum flexible and rigid pavement sections. We note that the rigid (concrete) pavement section may be better suited in the heavy-duty truck traffic areas

compared to the heavy duty flexible (asphalt) pavement, particularly where the pavements will be exposed to tight turning, long-term staging of vehicles, etc., which can cause premature deterioration of flexible (asphalt) pavements. If rigid pavements are considered for the area near the salt sheds, the concrete design shall consider the anticipated high concentration of salt exposure and associated implications on the concrete to prevent premature deterioration.

TABLE 3
RECOMMENDED MINIMUM FLEXIBLE (ASPHALT) PAVEMENT SECTIONS
Proposed Public Works Garage and Shed
Chester, PA

| STANDARD-DUTY ASPHALT PAVEMENT (Automobile Traffic Only) | |
|---|----------------------------------|
| Asphalt Pavement Element | Thickness (inches) |
| 9.5MM PG64-22 HMA Wearing Course | 1.5 |
| 19MM PG64-22 HMA Base Course | 2.5 |
| PennDOT 2A Stone (1) | 6.0 |
| Improved Subgrade (2) | 12.0 |
| HEAVY-DUTY ASPHALT PAVEMENT (Automobile and Truck Traffic) | |
| Asphalt Pavement Element | Thickness (inches) |
| 9.5MM PG64-22 HMA Wearing Course | 1.5 |
| 25MM PG64-22 HMA Base Course | 5.0 |
| PennDOT 2A Stone (1) | 6.0 |
| Improved Subgrade (2) | 12.0 |
| Flexible Pavement Design Parameters | |
| Light Duty Traffic: 40,000 ESAL's | Reliability: 90 percent |
| Heavy Duty Traffic: 310,000 ESAL's | Overall Standard Deviation: 0.45 |
| Service Life: 20 years | Initial Serviceability: 4.25 |
| Design CBR = 3 | Terminal Serviceability: 2.0 |
| (1) Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557. | |
| (2) Subgrade soil to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 3. The moisture content of the material should also be maintained within +/- 2 percent of the optimum moisture content. | |

TABLE 4
RECOMMENDED MINIMUM FLEXIBLE (CONCRETE) PAVEMENT SECTIONS
Proposed Public Works Garage and Shed
Chester, PA

| HEAVY-DUTY CONCRETE PAVEMENT (Truck Traffic) | |
|---|----------------------------------|
| Concrete Pavement Element | Thickness (inches) |
| 4,500 psi Air Entrained Concrete (1) | 7.0 |
| PennDOT 2A Stone (2) | 6.0 |
| Improved Subgrade (3) | 12.0 |
| Rigid Pavement Design Parameters | |
| Heavy Duty Traffic: 310,000 ESAL's | Reliability: 90 percent |
| Service Life: 20 years | Overall Standard Deviation: 0.45 |
| Design CBR = 3 | Initial Serviceability: 4.25 |
| | Terminal Serviceability: 2.0 |

- (1) Concrete reinforcement (rebar, welded wire fabric, or macro-fibers) shall be designed by others.
- (2) Aggregate base course to be dense-graded aggregate conforming to PennDOT 2A stone, with less than 10 percent finer than the No. 200 sieve and all fines to be non-plastic (PI=0). Aggregate base course to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557.
- (3) Subgrade soil to be compacted to a minimum of 95 percent of the maximum dry density, as determined by the Modified Proctor test, ASTM D 1557 and shall consist of load-bearing fill and/or existing materials capable of achieving a CBR value of 3. The moisture content of the material should also be maintained within +/- 2 percent of the optimum moisture content.

7.8 Excavation Safety

In accordance with the Occupational Safety and Health Administration (OSHA) "Excavating and Trenching Operations" manual (revised 1985), all trenches and excavations that are deeper than 4 feet (and less than 20 feet) should be properly sloped or otherwise structurally retained to provide stable and safe working conditions. For the existing fill soils encountered at the site (conservatively classified as Type C), OSHA permits maximum slopes of 1.5H:1V. Otherwise, temporary earth retention techniques, such as sliding trench shields, shall be utilized in these materials.

Construction traffic and excavated material stockpiles shall be kept away from excavations by a minimum distance equal to the full depth of the excavation, unless they are accounted for in the design of the temporary earth retention system.

7.9 Utility Construction

Utility trench excavations are generally expected to encounter the existing fill or Stratum A soils. Where existing fill and/or Stratum A soils are present at the utility trench subgrade, these materials shall be evaluated by the on-site geotechnical representative for stability. Soft, loose, or otherwise unstable soils encountered at the trench subgrade shall be over-excavated a minimum depth of 6 inches and backfilled with granular material to provide uniform support. Utility trench backfill should meet the minimum requirements outlined in Section 7.2 - Load-Bearing Fill and Backfill Materials.

7.10 Construction Observation and Testing (Special Inspections)

Regardless of the thoroughness of a geotechnical exploration program, there is always a possibility that subsurface conditions between test borings may be different from those encountered at the test boring locations, that conditions are not as anticipated by the designers, or that the demolition or construction process has altered the subsurface conditions. Therefore, geotechnical engineering construction observation should be performed under the guidance of a Geotechnical Engineer who is familiar with the intent of the recommendations presented in this report. Such observation services are recommended to evaluate whether the conditions anticipated in the design actually exist, or whether the recommendations presented in the report should be modified where necessary. CED can provide these services on your behalf. Therefore, we recommend that CED be retained to perform quality assurance observation, testing, and Special Inspection services on a full-time basis during (at a minimum) foundation installation and earthwork construction.

8. Conclusion

The conclusions and recommendations presented in this report are based solely on the geotechnical exploration program. The number, location, and depth of the explorations were completed within the constraints of geotechnical program budget and site access.

We emphasize that this exploration report should be made available to prospective bidders for informational purposes. We would recommend that the project specifications contain the following statement:

"A geotechnical engineering report has been prepared for this project by Colliers Engineering & Design, Inc. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the Geotechnical Engineer and represent their interpretation of the subsurface conditions, field and laboratory testing, and the results of analyses which they have conducted. Should the data contained in this report not be adequate for the Contractor's purposes, the Contractor may make, prior to bidding, his own investigation, tests, and analyses."

9. Limitations

This report has been prepared in accordance with generally accepted geotechnical design practice for the exclusive use of the Owner, and their agents for specific application to this project. This report has not been prepared to serve as the plans and specifications for actual construction without the appropriate interpretation by the project Architect, Structural Engineer, and/or Civil Engineer. This report has been based on assumed conditions and characteristics of the proposed development where specific information was not available.

We recommend that the Architect, Civil Engineer, and Structural Engineer, along with any other design professionals involved in this project, carefully review the assumptions noted in this report regarding the proposed development so that they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention so that they do not affect the conclusions and recommendations provided in the report. The project plans and specifications should be submitted to us for review so that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted and are incorporated into the design.

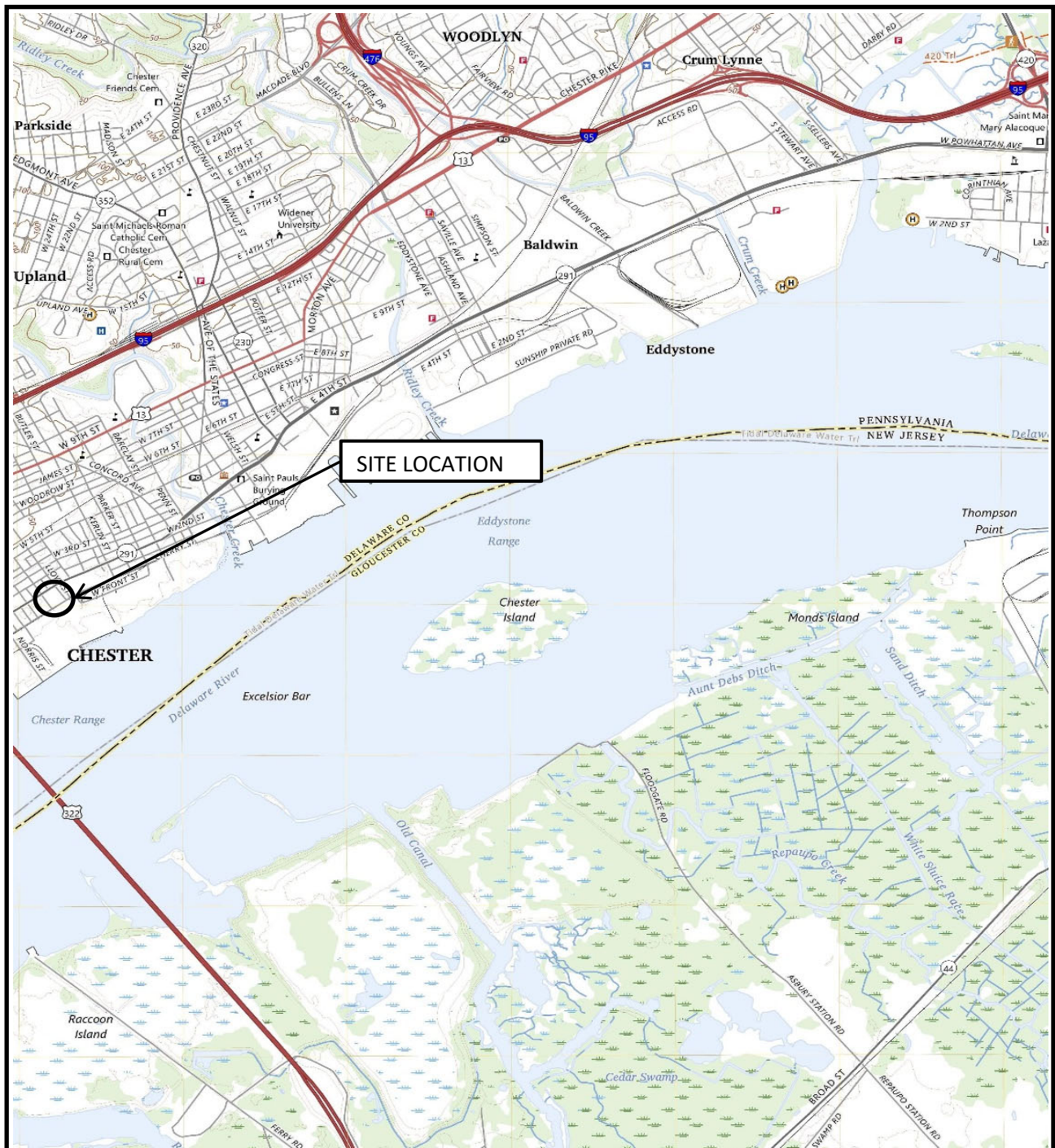
The conclusions and recommendations contained in this report are based upon the subsurface data obtained during this investigation and on details stated in this report. The validity of the projections, conclusions, and recommendations contained in this report is necessarily limited by the scope of field investigation and by the number of borings that were made. It is understood that the number of borings made are consistent with good engineering practice but, given the nature of subsurface conditions, there is a possibility that actual conditions encountered may differ from those projected in this report. Should conditions arise which differ from those described in this report, CED should be notified immediately and provided with all relevant information when available regarding subsurface conditions.

Our recommendations are based upon the assumption that the services of a qualified Geotechnical Engineer will be retained for the observation of excavation operations, proofrolling, load-bearing fill placement, foundation installation, and all critical earthwork operations. CED has the capability of providing these services and would be pleased to present a proposal to perform the on-site quality assurance observation and materials testing.

The scope of this evaluation was limited to the evaluation of the load-carrying capabilities and load stability of the soils. Oil, hazardous waste, radioactivity, irritants, pollutants, radon or other dangerous substances and conditions were not the subject of this exploration.

Appendices

Figures



NOTES:

- 1.) *SITE MAP OBTAINED FROM USGS TOPOGRAPHIC MAP, BRIDGEPORT, NJ, PA QUADRANGLE, DATED 2023.



**Engineering
& Design**

Title:

SITE LOCATION MAP

Project:

***Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA***

Drawn By:

*

Checked By:

MJK

Project No.:

COCD0004

Scale:

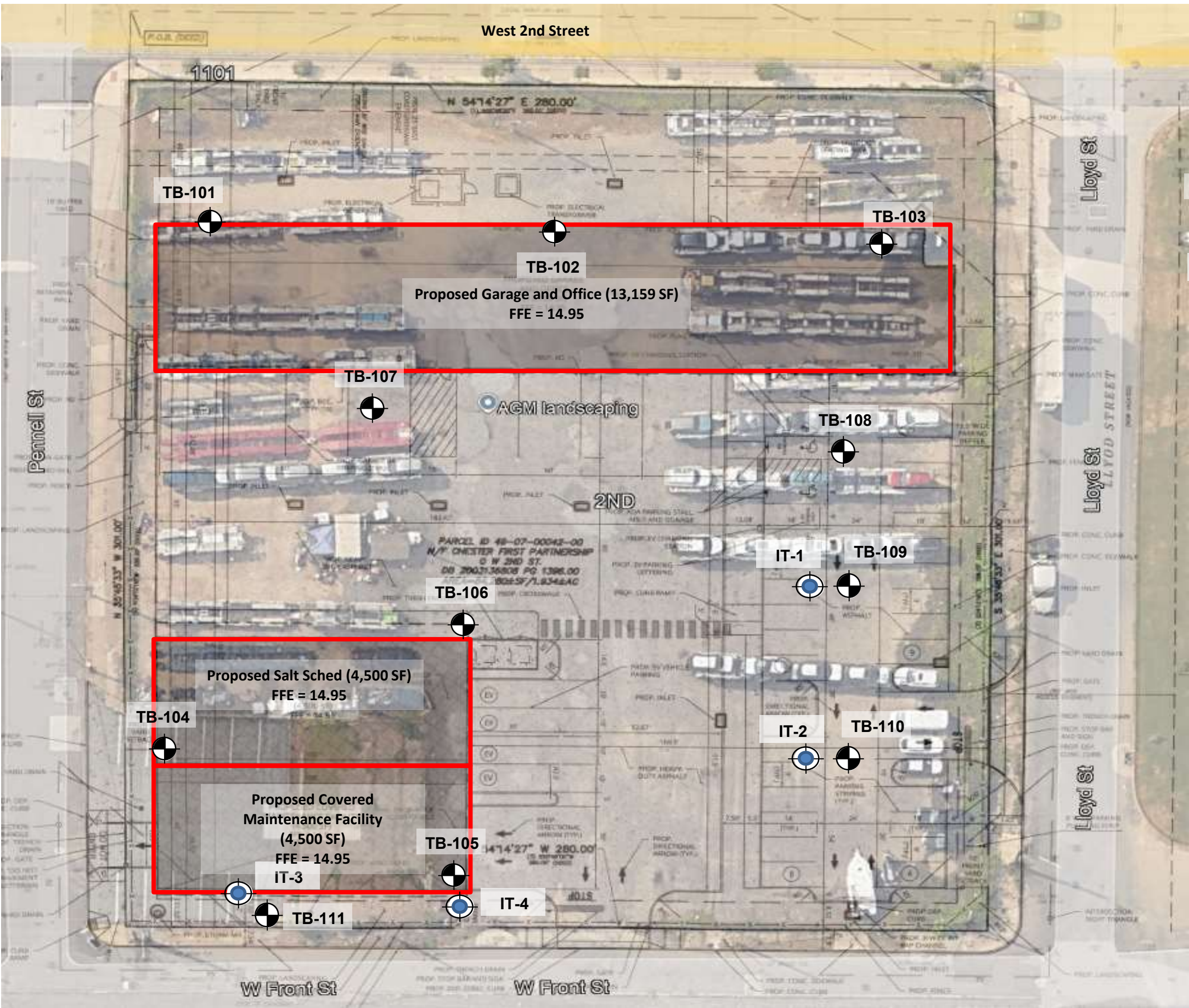
N.T.S.

Date:

10/22/2024

Figure No.:

1



LEGEND:

- TB-101** TEST BORING LOCATION (APPROXIMATE)
- IT-101** INFILTRATION TEST LOCATION (APPROXIMATE)
- PROPOSED BUILDING FOOTPRINT (APPROXIMATE)**

NOTES:

- 1.) BASE PLAN PREPARED FROM A GOOGLE EARTH AERIAL IMAGE WITH A SITE PLAN (DATED OCTOBER 11, 2024) OVERLAY.
- 2.) THIS DRAWING IS PART OF THE COLLIERS ENGINEERING & DESIGN, INC. GEOTECHNICAL REPORT (PROJECT NO. COCD0004) DATED NOVEMBER 2024.

Colliers

Engineering & Design

TITLE:

EXPLORATION LOCATION PLAN

PROJECT:

Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA

DRAWN BY:

*

CHECKED BY:

MJK

PROJECT NO.:

COCD0004

SCALE:

N.T.S.

DATE:

11/6/2024

FIGURE NO.:

2

Appendix A

Test Boring Logs



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-101

PAGE 1 OF 1

GROUND ELEVATION (ft): 16
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 7.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/14/2024

END OF DRILLING (0 hrs.) 14.3 10/14/2024

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|---|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | 18 | 21 | 23 | 50/4" | 7 | 1.5 | | | Existing Fill | S-1: Brown, Gray, Tan, cmf SAND and mf Gravel, little (+) Silt, (Fill) (Moist) |
| | 0.0'-1.8' | | | | | 2 | | | | | S-2: Tan, Gray, mf SAND and c Gravel (concrete), trace Silt, (Fill) (Moist) |
| | S-2 | 50/3" | - | - | - | 18 | | | | | S-3: (Top 8") Same as S-2, (Fill) (Moist) (Bottom 10") Brown, Yellowish Brown, SILT, some cmf Sand, trace mf Gravel, (Moist) |
| | 2.0'-2.3' | | | | | 19 | | | | | S-4: Yellowish Brown, Orange-Brown, cmf SAND, little (-) Silt, trace f Gravel, (Moist) |
| | S-3 | 3 | 5 | 5 | 8 | 16 | | | | Stratum A | S-5: Gray, Tan, m(+)f GRAVEL and Clay & Silt, little (-) cmf Sand, (Very Moist to Wet) |
| 10 | 4.0'-6.0' | | | | | 14 | | | | | S-6: Orange-Brown, Tan, Gray, SILT & CLAY, little (+) cmf Sand, trace f Gravel, (Very Moist) |
| | S-4 | 7 | 8 | 7 | 13 | 15 | | | | | S-7: Gray, White, Clayey SILT, some (+) cmf Sand, slightly micaceous, (Moist) |
| | 6.0'-8.0' | | | | | 22 | | | | | S-8: Greenish Gray, cmf SAND, little (+) Silt, trace f Gravel (friable RF), (Moist) |
| | S-5 | 2 | 1 | 5 | 16 | 23 | | | | | S-9: Greenish Gray, cmf(+) SAND, little Silt, trace (+) f Gravel (friable RF), (Moist) |
| | 8.0'-10.0' | | | | | 4 | | | | Stratum B | S-10: Gray, cmf SAND, little friable RF, trace (+) Silt, slightly micaceous, (Moist) |
| 15 | S-6 | 4 | 5 | 6 | 4 | 5 | | | | | S-11: Gray, cmf SAND, trace (+) friable RF, trace Silt, slightly micaceous, (Moist) |
| | 10.0'-12.0' | | | | | | | | | | END OF TEST BORING AT 34.5 FEET |
| | S-7 | 4 | 6 | 7 | 10 | | | | | | |
| | 13.0'-15.0' | | | | | | | | | | |
| 20 | S-8 | 6 | 9 | 12 | 15 | | | | | | |
| | 18.0'-20.0' | | | | | | | | | | |
| | S-9 | 5 | 9 | 14 | 17 | | | | | | |
| | 23.0'-25.0' | | | | | | | | | | |
| 25 | S-10 | 50/5" | - | - | - | | | | | | |
| | 28.0'-28.4' | | | | | | | | | | |
| 30 | S-11 | 50/5" | - | - | - | | | | | | |
| | 33.0'-33.4' | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
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NOTES: Hard Augering/Grinding through Fill (Concrete) 2 feet to 3.5 feet; Moderately Hard Augering 29 feet to 33 feet; Hard to Very Hard Augering/Grinding 33 feet to 34.5 feet; Auger Refusal at 34.5 feet.

End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.

Boring backfilled upon completion for safety considerations.

TEST BORING: TB-101

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-102

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.5

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED 9.0 10/14/2024
END OF DRILLING (0 hrs.) 26.4 10/14/2024

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | 15 | 13 | 8 | 9 | 19 | 3.5 | | | Existing Fill | S-1: Tan. mf SAND and Silt, trace (+) asphalt fragments, (Fill)) (Moist) |
| | 0.0'-2.0' | | | | | | | | | | |
| | S-2 | 10 | 8 | 11 | 11 | 19 | | | | | S-2: Tan, SILT, some (+) f Sand, (Moist) |
| | 2.0'-4.0' | | | | | | | | | | |
| 10 | S-3 | 10 | 22 | 21 | 17 | 22 | <0.25 | | | Stratum A | S-3: Orange-Brown, cmf SAND, some mf Gravel, trace (+) Silt, (Moist) |
| | 4.0'-6.0' | | | | | | | | | | |
| | S-4 | 8 | 5 | 3 | 3 | 15 | | | | | S-4: (Top 4") Same as S-3, (Moist) (Bottom 11") Tan, Gray, CLAY & SILT, little (-) mf(+) Sand, (Very Moist) |
| | 6.0'-8.0' | | | | | | | | | | |
| 15 | S-5 | 11 | 3 | 2 | 2 | 16 | 0.75 | | | Stratum B | S-5: Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (-) friable RF, (Very Moist) |
| | 8.0'-10.0' | | | | | | | | | | |
| | S-6 | 3 | 5 | 6 | 6 | 20 | | | | | S-6: Yellowish Brown, Gray, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 10.0'-12.0' | | | | | | | | | | |
| 20 | S-7 | 3 | 5 | 8 | 12 | 21 | | | | Stratum C | S-7: Gray, cmf SAND, little (+) Silt, slightly micaceous, (Moist) |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | S-8 | 18 | 16 | 13 | 47 | 23 | | | | Stratum C | S-8: Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Moist) |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | S-9 | 50 | 50/2" | - | - | 8 | | | | Stratum C | S-9: Gray, micaceous cmf SAND, trace (+) Silt, trace friable RF, (Moist) |
| | 23.0'-23.7' | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-10 | 50/3" | - | - | - | 3 | | | | Stratum C | S-10: Gray, micaceous cmf SAND, little (-) friable RF, little (-) Silt, (Very Moist to Wet) |
| | 27.0'-27.3' | | | | | | | | | | |
| | | | | | | | | | | | |
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| 40 | | | | | | | | | | Stratum C | |
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NOTES: Moderately Hard Augering 20 feet to 23 feet; Hard Augering and Light to Moderate Auger Grinding 24 feet to 27 feet; Auger and Spoon Refusal at 27.3 feet.

End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.

Boring backfilled upon completion for safety considerations.

TEST BORING: TB-102

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-103

PAGE 1 OF 1

GROUND ELEVATION (ft): 13
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 8.0 10/14/2024

END OF DRILLING (0 hrs.) 13.8 10/14/2024

ASTM D-1586

DATE STARTED 10/14/2024

DATE FINISHED 10/14/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|--------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 0.0'-2.0' | 9 | 6 | 6 | 6 | 19 | 4.0 | | | Existing Fill | S-1: Brown, cmf SAND, some Silt, trace mf Gravel, trace (-) brick fragments, (Fill) (Moist) |
| | S-2 2.0'-2.8' | 6 | 50/4" | - | - | 7 | | | | | S-2: Dark Brown, Clayey SILT, little (+) cmf Sand, little brick fragments, (Fill) (Moist) |
| | S-3 4.0'-6.0' | 3 | 12 | 15 | 9 | 19 | | | | | S-3: (Top 9") Same as S-2 (Fill) (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (-) cmf Sand, little mf Gravel, (Moist) |
| | S-4 6.0'-8.0' | 6 | 7 | 9 | 8 | 20 | | | | | S-4: Orange-Brown, cmf Sand, some (-) Silt, trace (+) mf(+) Gravel, (Moist) |
| 10 | S-5 8.0'-10.0' | 6 | 14 | 24 | 32 | 11 | | | | Stratum B | S-5: Orange-Brown, Tan, Gray, cmf SAND, little (+) mf Gravel, little Silt, (Very Moist) |
| | S-6 10.0'-10.8' | 22 | 50/4" | - | - | 10 | | | | | S-6: Yellowish Brown, Gray, Orange-Brown, cmf SAND, little Silt, trace (+) friable RF, slightly micaceous, (Moist) |
| | S-7 13.0'-13.3' | 50/3" | - | - | - | 3 | | | | Stratum C | S-7: Yellowish-Brown, Gray, cmf SAND, some Silt, little friable and non-friable RF, slightly micaceous, (Very Moist to Wet) |
| 20 | | | | | | | | | | -2.5 | END OF TEST BORING AT 15.5 FEET |
| | | | | | | | | | | | |
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NOTES: Moderate to Hard Augering through Fill 2.5 feet to 4 feet; Moderately Hard drilling 1.5 feet to 13 feet; Hard to Very Hard Augering/Grinding 13 feet to 15.5 feet; Auger Refusal at 15.5 feet.

End of drilling groundwater measurement not reflective of a stabilized condition prior to backfilling.

Boring backfilled upon completion for safety considerations.

TEST BORING: TB-103

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-104

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.0

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/17/2024

END OF DRILLING (0 hrs.) 9.5 10/17/2024


DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|---|------------------------------|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | |
| 5 | S-1 | - | - | 4 | 6 | 7 | 3.25 | |  | Existing Fill 2.0 12.5 | S-1: Asphalt +/- 2.5 inches; Concrete +/- 8.5 inches; Base +/- 3 inches Brown, Tan, mf SAND, some cmf Gravel, little Silt, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 23 | | | | | S-2: Yellowish Brown, Orange-Brown, SILT & CLAY, little (+) cmf Sand, trace (+) f Gravel, (Moist) |
| | S-2 | 10 | 7 | 13 | 10 | 15 | | | | | S-3: Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (+) f Gravel, (Moist) |
| | 2.0'-4.0' | | | | | 18 | | | | | S-4: Orange-Brown, cmf SAND, some Silt, trace mf Gravel, (Very Moist) |
| 10 | S-3 | 10 | 8 | 7 | 10 | 15 | 2.0 | | | Stratum A 11.5 3.0 | S-5: Orange-Brown, cmf SAND, some (-) mf Gravel, little (-) Silt, (Very Moist to Wet) |
| | 4.0'-6.0' | | | | | 18 | | | | | S-6: (Top 11") Same as S-5, (Wet) (Bottom 6") Gray, White, cmf SAND, some (+) Clayey Silt, slightly micaceous, (Very Moist to Wet) |
| | S-4 | 10 | 7 | 19 | 13 | 18 | | | | | S-7: Gray, White, micaceous cmf SAND, some (+) Silt, trace friable RF, (Very Moist) |
| | 6.0'-8.0' | | | | | 17 | | | | | S-8: Gray, White, cmf SAND, some Silt, trace friable RF, slightly micaceous, (Very Moist) |
| 15 | S-5 | 3 | 10 | 9 | 13 | 18 | | | | Stratum B | S-9: Gray, White, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 8.0'-10.0' | | | | | 20 | | | | | S-10: Gray, micaceous cmf SAND, little Silt, trace friable RF, (Moist) |
| | S-6 | 6 | 8 | 11 | 7 | 23 | | | | | |
| | 10.0'-12.0' | | | | | 22 | | | | | |
| 20 | S-7 | 3 | 8 | 7 | 8 | 20 | | | | | |
| | 13.0'-15.0' | | | | | 16 | | | | | |
| | | | | | | 23 | | | | | |
| | | | | | | 22 | | | | | |
| 25 | S-8 | 7 | 9 | 11 | 15 | 16 | | | | | |
| | 18.0'-20.0' | | | | | 23 | | | | | |
| | | | | | | 22 | | | | | |
| | | | | | | 22 | | | | | |
| 30 | S-9 | 9 | 11 | 15 | 22 | 23 | | | | | |
| | 23.0'-25.0' | | | | | 22 | | | | | |
| | | | | | | 22 | | | | | |
| | | | | | | 22 | | | | | |
| 35 | S-10 | 20 | 20 | 26 | 34 | 22 | | | | | |
| | 28.0'-30.0' | | | | | 22 | | | | | |
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| 40 | | | | | | 22 | | | | | |
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| | | | | | | 22 | | | | | |
| END OF TEST BORING AT 30.0 FEET | | | | | | | | | | | |

NOTES: Moderately Hard drilling 25 feet to 28 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-104

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 1 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/15/2024

END OF DRILLING (0 hrs.) 8.7 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|---|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | - | 2 | 1 | 10 | 0.25 | | Existing Fill | 2.0 | S-1: Asphalt +/- 1.5 inches; Concrete +/- 6.5 inches; Base +/- 4 inches Orange-Brown, Tan, Gray, Clayey SILT, some (+) cmd Sand, trace (+) mf Gravel, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 21 | >4.5 | | | 12.0 | S-2: Orange-Brown, SILT, some (+) mf Sand, (Moist) |
| | S-2 | 4 | 4 | 6 | 11 | 18 | 3.25 | | | | S-3: Orange-Brown, Gray, SILT, some mf Sand, trace mf Gravel, (Moist) |
| 10 | S-3 | 5 | 4 | 6 | 9 | | | | Stratum A | | S-4: (Top 11") Same as S-3, (Moist) (Bottom 11") Orange-Brown, Tan, cmf SAND, little (+) mf Gravel, trace (+) Silt, (Very Moist) |
| | 4.0'-6.0' | | | | | 22 | | | | | S-5: Orange-Brown, DARK Brown, c(+)mf SAND, little mf Gravel, trace (+) Silt, (Very Moist to Wet) |
| | S-4 | 8 | 8 | 13 | 13 | 13 | | | | | S-6: (Top 10") Same as S-5, (Wet) (Bottom 12") Gray SILT and mf Sand, slightly micaceous, (Very Moist to Wet) |
| 15 | 6.0'-8.0' | | | | | | | | | 11.0 | S-7: Gray, Orange-Brown, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) |
| | S-5 | 11 | 13 | 8 | 4 | | | | | 3.0 | S-8: (Top 8") Same as S-7, (Very Moist to Wet) (Bottom 8") White, Gray, Tan, cmf SAND, little Silt, trace (+) friable RF, trace phyllite, slightly micaceous, (Very Moist) |
| | 8.0'-10.0' | | | | | | | | | | S-9: Gray, cmf(+) SAND, some (+) Silt, trace friable RF, slightly micaceous, (Very Moist to Wet) |
| 20 | S-6 | 2 | 2 | 2 | 3 | 20 | | | Stratum B | | S-10: White, Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Very Moist) |
| | 10.0'-12.0' | | | | | | | | | | S-11: Gray, micaceous cmf SAND, some (-) Silt, trace friable RF, (Very Moist) |
| | S-7 | 3 | 3 | 4 | 5 | | | | | | S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) |
| 25 | 13.0'-15.0' | | | | | | | | | 38.0 | S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| | | | | | | | | | Stratum C | -24.0 | |
| | | | | | | | | | | | |
| 30 | S-8 | 3 | 7 | 10 | 20 | 16 | | | | | |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-9 | 4 | 4 | 7 | 8 | 19 | | | | | |
| | 23.0'-25.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 40 | S-10 | 8 | 12 | 9 | 13 | 23 | | | | | |
| | 28.0'-30.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 45 | S-11 | 9 | 13 | 21 | 28 | 22 | | | | | |
| | 33.0'-35.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 50 | S-12 | 50/5" | - | - | - | 5 | | | | | |
| | 38.0'-38.4' | | | | | | | | | | |
| | | | | | | | | | | | |
| 55 | S-13 | 50/5" | - | - | - | 5 | | | | | |
| | 43.0'-43.4' | | | | | | | | | | |
| | | | | | | | | | | | |

NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 1 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 2 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED
END OF DRILLING (0 hrs.)

ASTM D-1586

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|---------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|-------------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| | | | | | | | | | | Stratum C | |
| | | | | | | | | | | 48.3 | |
| 50 | S-14 48.0'-48.3' | 50/4" | - | - | - | 4 | | | | -34.3 | S-14: White, Light Gray, cmf SAND, little Silt, trace (+) friable RF, (Moist) END OF TEST BORING AT 48.3 FEET |
| | | | | | | | | | | | |
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| 55 | | | | | | | | | | | |
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| 60 | | | | | | | | | | | |
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| 65 | | | | | | | | | | | |
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| 70 | | | | | | | | | | | |
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| 75 | | | | | | | | | | | |
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| 80 | | | | | | | | | | | |
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| 85 | | | | | | | | | | | |
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NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 2 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-106

PAGE 1 OF 1

GROUND ELEVATION (ft): 14.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.



DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED  9.5 10/15/2024
END OF DRILLING (0 hrs.)  9.2 10/17/2024

ASTM D-1586

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 12 | 6 | 6 | 15 | >4.5 | | | | S-1: Asphalt +/- 5 inches; Base +/- 5 inches Brown, Clayey SILT, little cmf Sand, trace (-) f Gravel, (Moist) |
| | 0.0'-2.0' | | | | | 20 | 2.75 | | | | S-2: Orange-Brown, CLAY & SILT, some(-) cmf Sand, trace (-) f Gravel, (Moist) |
| | S-2 | 7 | 8 | 10 | 9 | 19 | | | | | S-3: (Top 10") Same as S-2, (Moist) (Bottom 9") Orange-Brown, cmf SAND, little (+) Silt, (Moist) |
| | S-3 | 16 | 14 | 12 | 10 | 19 | | | | | S-4: Orange-Brown, cmf Sand, some (-) Silt, trace (+) mf Gravel, (Moist) |
| | 4.0'-6.0' | | | | | 18 | | | | | S-5: (Top 12") Same as S-4, (Very Moist to Wet) (Bottom 6") Orange-Brown, Clayey SILT, little (+) cmf Sand, trace (+) cmf Gravel, (Wet) |
| 10 | S-4 | 7 | 8 | 8 | 7 | 20 | | | | | S-6: Orange-Brown, Tan, Gray, cmf SAND, some Silt, slightly micaceous, (Very Moist to Wet) |
| | 6.0'-8.0' | | | | | 22 | | | | | S-7: Gray, White, cmf SAND, some (-) Silt, trace (-) friable RF, (Very Moist) |
| | S-5 | 12 | 12 | 9 | 4 | 23 | | | | | S-8: Gray, White, cmf SAND, some Silt, trace friable RF, slightly micaceous, (Very Moist) |
| 15 | 8.0'-10.0' | | | | | 22 | | | | | S-9: Gray, Greenish Gray, cmf SAND, some Silt, trace (+) friable RF, Slightly micaceous, (Very Moist) |
| | S-6 | 5 | 8 | 11 | 8 | 23 | | | | | S-10: Gray, White, cmf SAND, little (+) Silt, trace friable RF, slightly micaceous, (Moist) |
| | 10.0'-12.0' | | | | | 1 | | | | | S-11: Gray, mf SAND and friable/non-friable RF, trace Silt, slightly micaceous, (Moist) |
| 20 | S-7 | 5 | 7 | 10 | 13 | | | | | | END OF TEST BORING AT 33.5 FEET |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 25 | S-8 | 4 | 5 | 7 | 10 | | | | | | |
| | 18.0'-20.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 30 | S-9 | 9 | 10 | 8 | 50/4" | | | | | | |
| | 23.0'-24.8' | | | | | | | | | | |
| | | | | | | | | | | | |
| 35 | S-10 | 9 | 5 | 5 | 21 | | | | | | |
| | 28.0'-30.0' | | | | | | | | | | |
| | | | | | | | | | | | |
| 40 | S-11 | 50/1" | - | - | - | | | | | | |
| | 33.0'-33.1' | | | | | | | | | | |
| | | | | | | | | | | | |

NOTES: Moderately Hard to Hard Augering 24.5 feet to 28 feet; Hard Augering 30 feet to 32 feet; Very Hard Augering/Grinding 32 feet to 33.5 feet; Auger Refusal at 33.5 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-106

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-107

PAGE 1 OF 1

GROUND ELEVATION (ft): 15.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 6.5

CONTRACTOR: Soil Borings, Inc.



DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED  9 10/18/2024
END OF DRILLING (0 hrs.)  * 10/18/2024

DATE STARTED 10/18/2024

DATE FINISHED 10/18/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 7 | 8 | 8 | 11 | 1.25 | | | | Existing Fill S-1: Asphalt +/- 4.5 inches; Base +/- 3 inches Gray, Brown, SILT, little (+) mf Sand, trace (+) f Gravel, (Fill) (Moist) S-2: (Top 7") Same as S-1, (Fill) (Moist) (Bottom 11") Gray, Orange-Brown, SILT, some (-) mf(+) Sand, (Moist) S-3: Orange-Brown, SILT & CLAY, little (+) cmf Sand, trace (-) f Gravel, (Moist) |
| | 0.0'-2.0' | | | | | 18 | 1.0 | | | 3.0 | |
| | S-2 | 7 | 7 | 8 | 9 | 19 | 1.75 | | | 12.5 | |
| | 2.0'-4.0' | | | | | 19 | 1.75 | | | 12.5 | |
| 10 | S-3 | 5 | 6 | 6 | 5 | 17 | 0.75 | | | | Stratum A S-4: Orange-Brown, Tan, Gray. Clayey SILT, some (-) mf Gravel, little (+) cmf Sand, (Moist) S-5: Orange-Brown, cmf SAND and cmf Gravel, trace (+) Silt, (Very Moist to Wet) S-6: (Top 7") Same as S-5, (Wet) (Bottom 8") Gray, White, cmf SAND, little (+) Silt, trace (-) friable RF, slightly micaceous, (Very Moist) |
| | 4.0'-6.0' | | | | | 19 | 0.75 | | | | |
| | S-4 | 7 | 19 | 8 | 4 | 15 | 0.75 | | | 11.0 | |
| | 6.0'-8.0' | | | | | 15 | 0.75 | | | 4.5 | |
| 15 | S-5 | 8 | 14 | 11 | 9 | 14 | 0.75 | | | | Stratum B S-7: Gray, White, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Very Moist) |
| | 8.0'-10.0' | | | | | 14 | 0.75 | | | | |
| | S-6 | 8 | 10 | 12 | 15 | 14 | 0.75 | | | 15.0 | |
| | 10.0'-12.0' | | | | | 14 | 0.75 | | | 15.0 | |
| 20 | S-7 | 5 | 5 | 7 | 9 | | | | | | END OF TEST BORING AT 15.0 FEET |
| | 13.0'-15.0' | | | | | | | | | | |
| | | | | | | | | | | | |
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| 25 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
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| 30 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
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| 35 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
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| 40 | | | | | | | | | | | END OF TEST BORING AT 15.0 FEET |
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NOTES: Moderately Hard Augering/Grinding through gravel layer 6.5 feet to 8 feet.
* Caved dry at 7.8 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-107

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-108

PAGE 1 OF 1

GROUND ELEVATION (ft): 13
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.6

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi


DRILLING EQUIPMENT: Mobile B-57 Truck Rig


METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED  10 10/15/2024

END OF DRILLING (0 hrs.)  8.4 10/17/2024

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

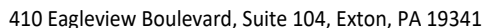
ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| 5 | S-1 | - | 5 | 6 | 13 | 10 | | | | | Existing Fill S-1: Asphalt +/- 2 inches, Base +/- 4 inches Reddish Brown, Brown, Tan, cmf SAND, little mf Gravel, trace brick fragments, (Fill) (Moist) S-2: Dark Brown, Reddish Brown, cmf SAND, Some (-) cmf Gravel, trace (+) Silt, trace brick fragments, (Fill) (Moist) S-3: Orange-Brown, White, Tan, mf SAND, Some Clayey Silt, little mf Gravel (possible concrete fragments), (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 13 | | | | | |
| | S-2 | 8 | 8 | 4 | 3 | | | | | | |
| | 2.0'-4.0' | | | | | 17 | | | | | |
| 10 | S-3 | 3 | 5 | 18 | 25 | | | | | | Stratum A S-4: Orange-Brown, Dark Brown, Tan, cmf SAND, some mf Gravel, little Silt, (Moist) S-5: Reddish-Brown, cmf SAND, some (+) Silt, some mf Gravel, (Moist) S-6: (Top 11") Same as S-5, (Moist to Wet) (Bottom 9") Brownish Gray, Orange-Brown, mf SAND, little (+) Silt, slightly micaceous, (Very Moist) S-7: Brownish Gray, Orange-Brown, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Moist) |
| | 4.0'-6.0' | | | | | 9 | | | | | |
| | S-4 | 7 | 9 | 12 | 9 | | | | | | |
| | 6.0'-8.0' | | | | | 18 | | | | | |
| 15 | S-5 | 3 | 8 | 12 | 33 | | | | | | Stratum B S-6: (Top 11") Same as S-5, (Moist to Wet) (Bottom 9") Brownish Gray, Orange-Brown, mf SAND, little (+) Silt, slightly micaceous, (Very Moist) S-7: Brownish Gray, Orange-Brown, cmf SAND, some Silt, trace (-) friable RF, slightly micaceous, (Moist) |
| | 8.0'-10.0' | | | | | 20 | | | | | |
| | S-6 | 31 | 49 | 43 | 43 | | | | | | |
| | 10.0'-12.0' | | | | | 10 | | | | | |
| 20 | S-7 | 16 | 50/4" | - | - | | | | | | Stratum C END OF TEST BORING AT 13.8 FEET |
| | 13.0'-13.8' | | | | | | | | | | |
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NOTES: Moderately Hard Augering 11 feet to 13 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-108

PAGE 1 OF 1



PROJECT NO. COCD0004

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.0

RODS: AW X NW Other

ASTM D-1586

CHECKED BY: M. Kwiatkowski

[illegible]

NOTES: Boring backfilled and patched upon completion for safety considerations.

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-110

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 8.0 10/17/2024

END OF DRILLING (0 hrs.) 7.7 10/18/2024











DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|---|----------------|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | |
| 5 | S-1 | - | 2 | 4 | 4 | 15 | 2.0 | |  | Existing Fill | S-1: Asphalt +/- 1.5 inches; Base +/- 4.5 inches Dark Brown, Black, cmf SAND, some Silt, little mf Gravel, trace (-) brick fragments, (Fill) (Moist) |
| | 0.0'-2.0' | | | | | 13 | | | | | S-2: (Top 5") Same as S-1, (Fill) (Moist) |
| | S-2 | 2 | 2 | 1 | 2 | 15 | | | | | (Bottom 8") Grayish Brown, SILT & CLAY, little mf Sand, (Very Moist) |
| | 2.0'-4.0' | | | | | 20 | | | | | S-3: Yellowish Brown, SILT, trace mf Sand, trace (-) f Gravel, (Moist) |
| | S-3 | 2 | 3 | 4 | 8 | 15 | | | | | |
| 10 | 4.0'-6.0' | | | | | 20 | 1.0 | |  | Stratum A | S-4: (Top 10") Same as S-3, (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (+) cmf Sand, little (-) f Gravel, (Very Moist) |
| | S-4 | 12 | 13 | 8 | 7 | 12 | | | | | S-5: Orange-Brown, Tan, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) |
| | 6.0'-8.0' | | | | | 21 | | | | | S-6: Orange-Brown, Yellowish Brown, cmf SAND, trace (+) friable RF, Slightly micaceous, (Moist to Very Moist) |
| | S-5 | 2 | 2 | 3 | 4 | 7 | | | | | S-7: Gray, Orange-Brown, micaceous cmf SAND, little friable RF, trace (+) Silt, (Moist) |
| | 8.0'-10.0' | | | | | 7 | | | | | |
| 15 | S-6 | 4 | 6 | 20 | 50/4" | 21 | | |  | Stratum B | |
| | 10.0'-11.8' | | | | | 7 | | | | | |
| | S-7 | 48 | 50/2" | - | - | | | | | | |
| | 12.0'-12.7' | | | | | | | | | | |
| | | | | | | | | | | | |
| 20 | | | | | | | | |  | Stratum C | |
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| END OF TEST BORING AT 12.7 FEET | | | | | | | | | | | |

NOTES: Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-110

PAGE 1 OF 1



PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

PAGE 1 OF 1

GROUNDWATER ELEV. (ft): 5.1

RODS: AW X NW Other

ASTM D-1586

CHECKED BY: M. Kwiatkowski

NOTES: Boring backfilled and patched upon completion for safety considerations.

PAGE 1 OF 1

Appendix B

Laboratory Test Results



CLIENT: City of Chester Public Works
1 Fourth Street
Chester, PA 19013

PROJECT: West 2nd Street and Lloyd Street Garage/Shed

Project # COCD0004 **DATE:** October 30, 2024
PAGE: 1 of 1

CHECKED BY: Jason Veach
TITLE: Assistant Laboratory Manager

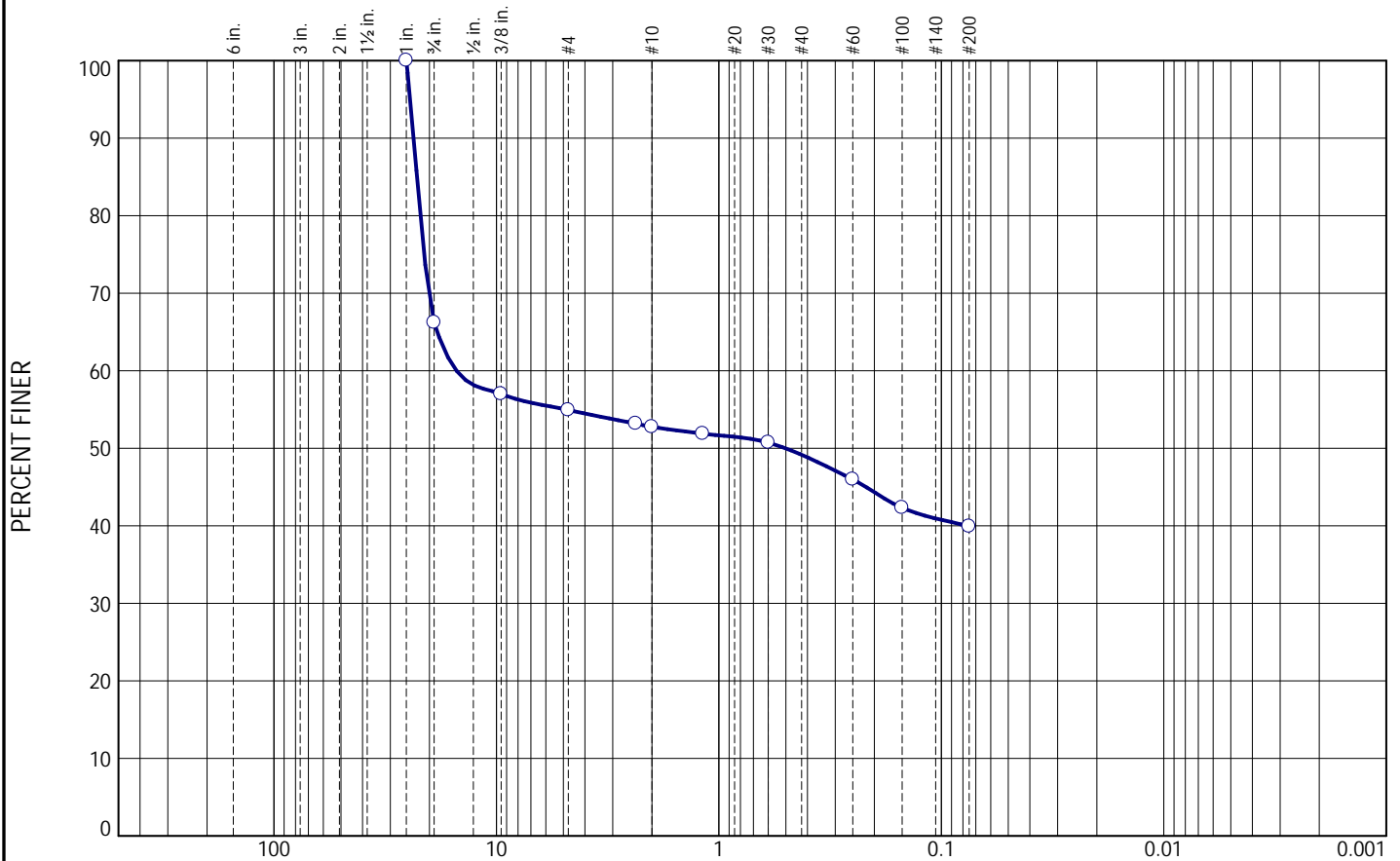
SAMPLES RECEIVED: October 22, 2024

SAMPLES TESTED: 10/22/24 - 10/30/24

LAB TECHNICIAN(S): K. Perry

Comments/Remarks: * See attached Plate(s)

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 43.0 | 4.2 | 2.1 | 4.7 | 6.1 | 39.9 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|--------------------|-----------------|
| 1 | 100.0 | | |
| .75 | 66.2 | | |
| .375 | 57.0 | | |
| #4 | 54.9 | | |
| #8 | 53.2 | | |
| #10 | 51.9 | | |
| #16 | 50.7 | | |
| #30 | 46.0 | | |
| #60 | 42.3 | | |
| #100 | 39.9 | | |
| #200 | | | |

* (no specification provided)

| Material Description | | |
|---|--|--|
| Light tan medium Gravel, and Clay & Silt, little coarse to fine Sand | | |
| <div> <div> Atterberg Limits </div> <div> LL= 30 </div> <div> PL= 19 </div> <div> PI= 11 </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 22.7448 </div> <div> D₆₀= 15.1019 </div> <div> D₃₀= </div> <div> D₁₅= </div> <div> D₁₀= </div> <div> C_u= </div> <div> C_c= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= GC </div> </div> | | |
| <div> <div> Remarks </div> <div> Water Content (WC): 32.8% </div> </div> | | |

Source of Sample: TB-101
Sample Number: S-5

Depth: 8'-10'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

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Laboratory



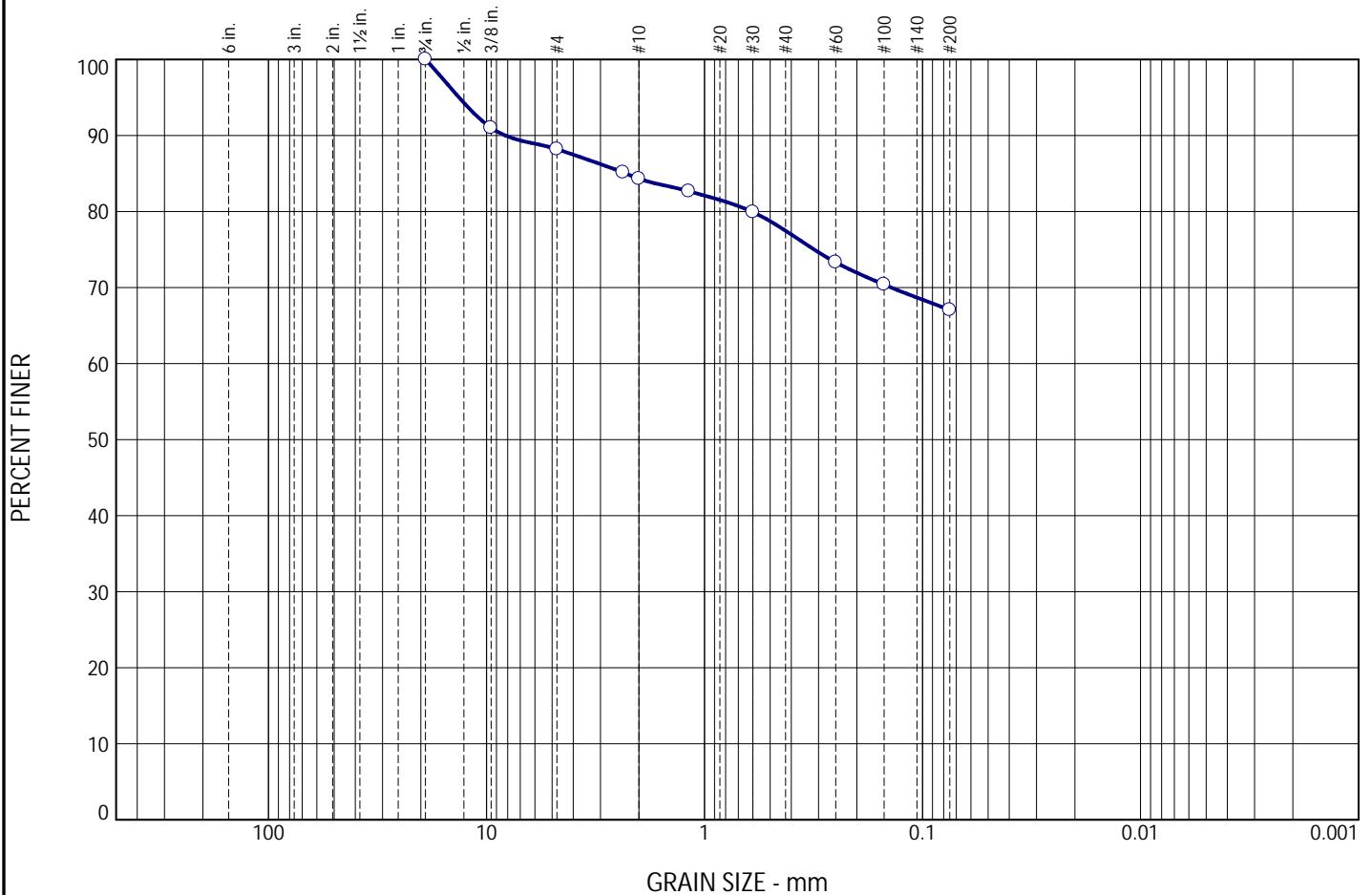
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-1

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 9.0 | 6.7 | 4.4 | 6.6 | 6.2 | 67.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 91.0 | | |
| #4 | 88.2 | | |
| #8 | 85.1 | | |
| #10 | 84.3 | | |
| #16 | 82.7 | | |
| #30 | 79.9 | | |
| #60 | 73.3 | | |
| #100 | 70.4 | | |
| #200 | 67.1 | | |

* (no specification provided)

Material Description
Dark gray [Fines: (SILT/CLAY)], some coarse to fine Sand, little medium to fine Gravel

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= 2.2938 D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 21.1%

Source of Sample: TB-103
Sample Number: S-2

Depth: 2'-2.8'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



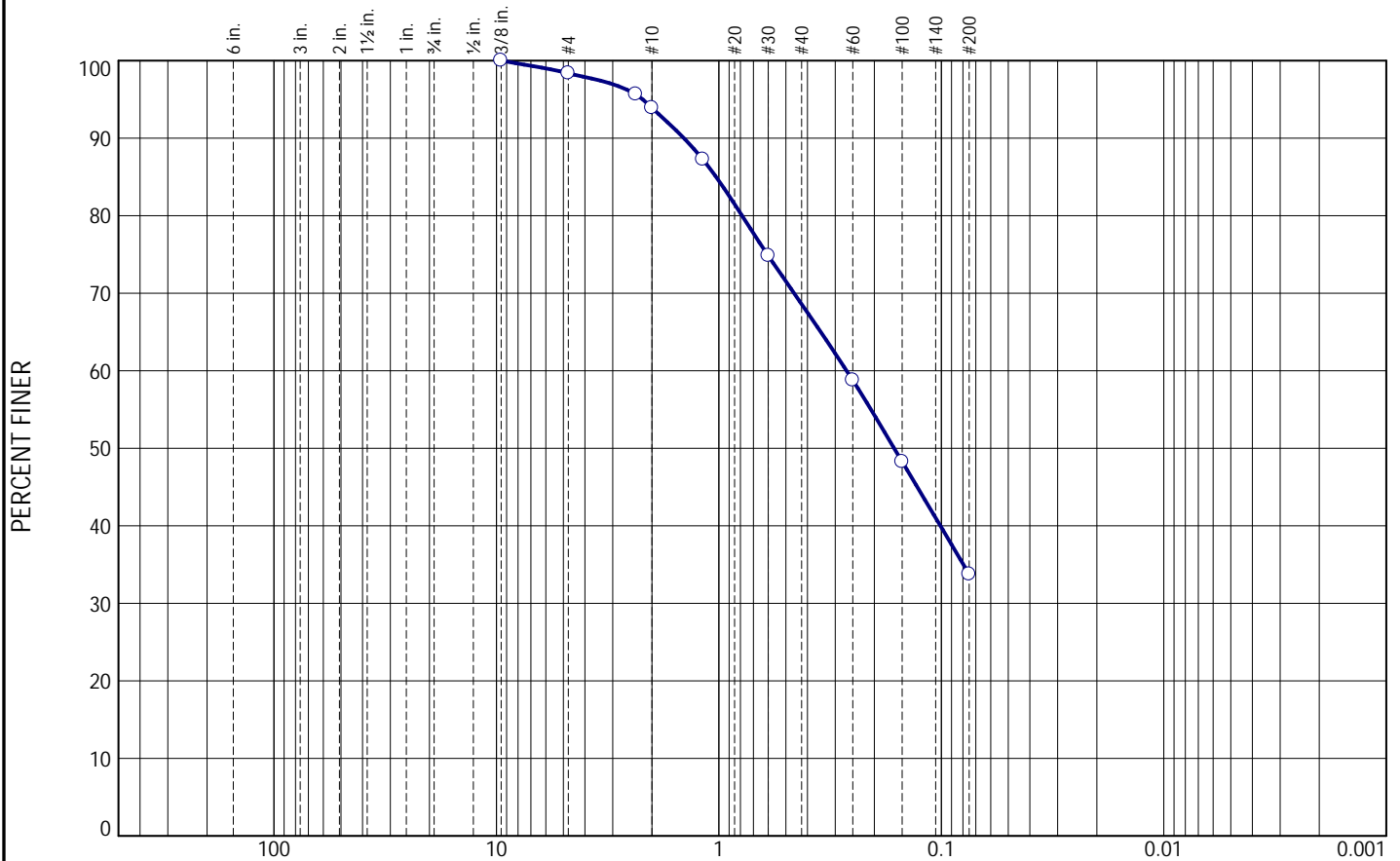
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-2**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 6.1 | 19.1 | 16.0 | 25.1 | 33.7 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 98.4 | | |
| #8 | 95.6 | | |
| #10 | 93.9 | | |
| #16 | 87.2 | | |
| #30 | 74.8 | | |
| #60 | 58.8 | | |
| #100 | 48.3 | | |
| #200 | 33.7 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some [Fines: (Silt/Clay)], trace fine Gravel | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 1.0298 | D ₆₀ = 0.2665 | D ₅₀ = 0.1630 |
| D ₃₀ = | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 20.1% | | |
| Trace Mica | | |

Source of Sample: TB-104
Sample Number: S-7

Depth: 13'-15'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



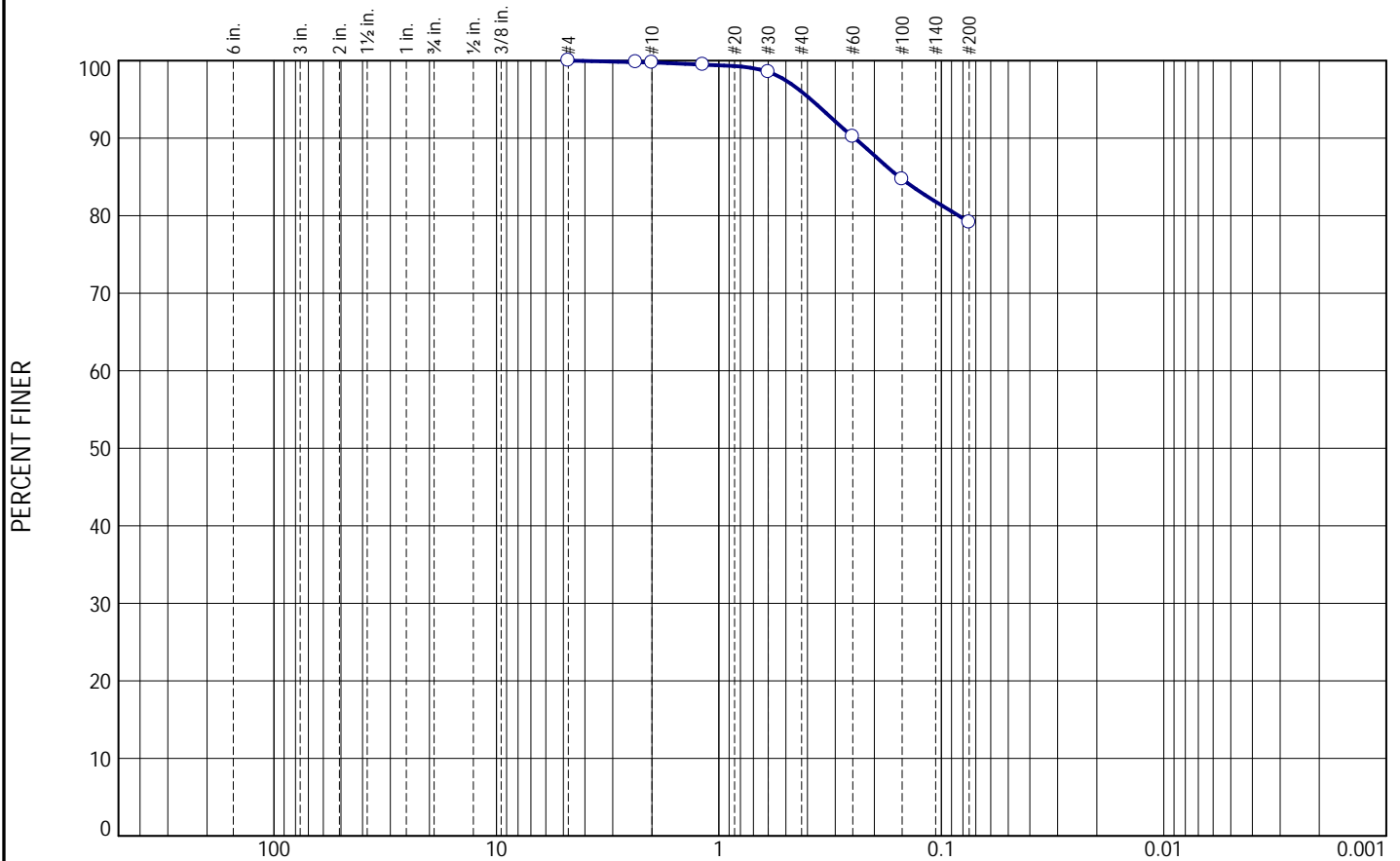
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-3

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.2 | 1.3 | 8.3 | 11.1 | 79.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 99.8 | | |
| #10 | 99.8 | | |
| #16 | 99.5 | | |
| #30 | 98.5 | | |
| #60 | 90.2 | | |
| #100 | 84.7 | | |
| #200 | 79.1 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|-------------------|-------------------|
| Brown CLAY & SILT, some medium to fine Sand | | |
| <u>Atterberg Limits</u> | | |
| LL= 30 | PL= 20 | PI= 10 |
| <u>Coefficients</u> | | |
| D ₈₅ = 0.1546 | D ₆₀ = | D ₅₀ = |
| D ₃₀ = | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= CL | | |
| <u>Remarks</u> | | |
| WC: 19.6% | | |

Source of Sample: TB-106
Sample Number: S-2

Depth: 2'-4'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



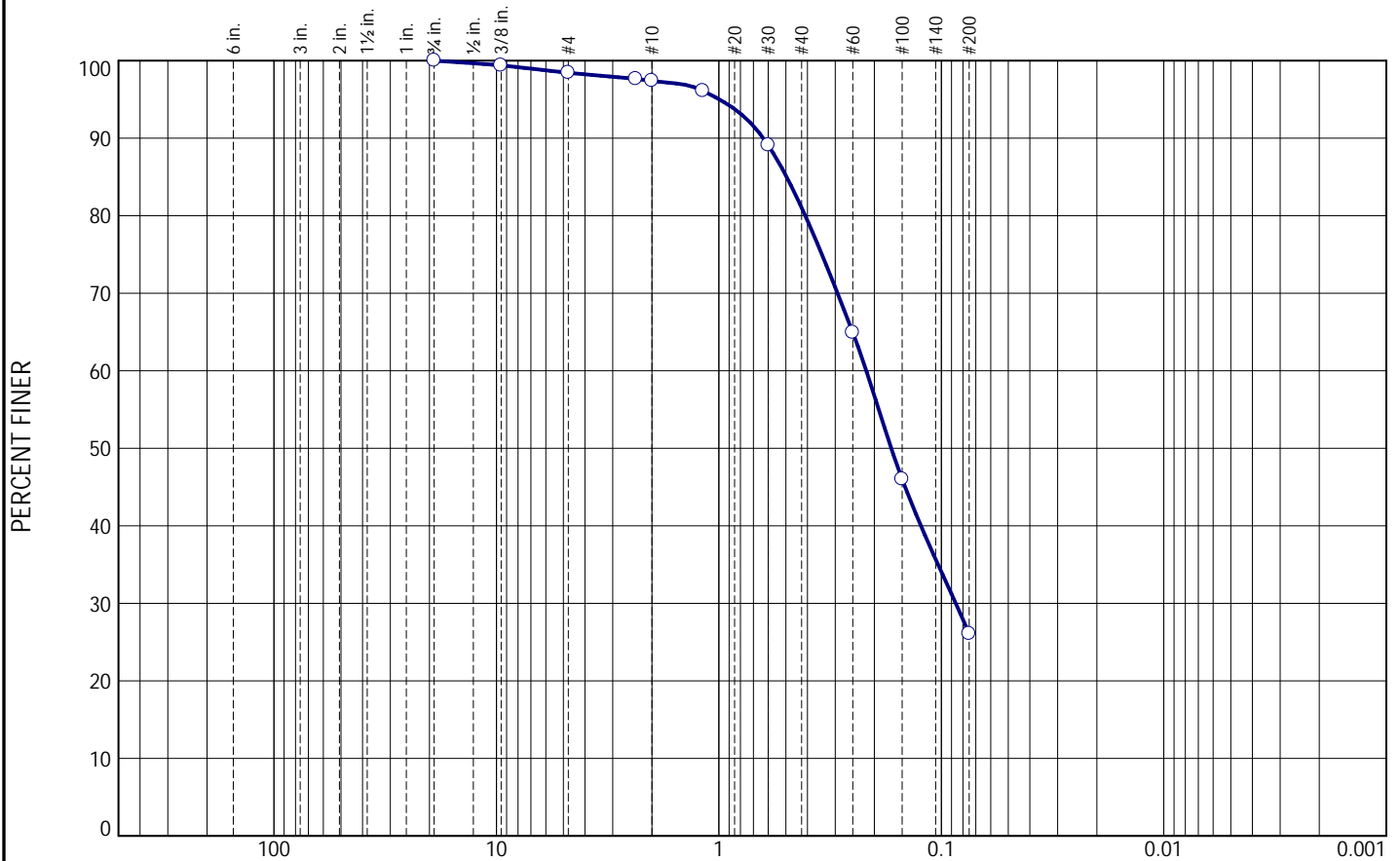
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-4

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.6 | 2.0 | 8.3 | 24.2 | 38.8 | 26.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 99.4 | | |
| #4 | 98.4 | | |
| #8 | 97.6 | | |
| #10 | 97.4 | | |
| #16 | 96.1 | | |
| #30 | 89.1 | | |
| #60 | 64.9 | | |
| #100 | 46.0 | | |
| #200 | 26.1 | | |

* (no specification provided)

| Material Description | | |
|--|--|--|
| Brown tan medium to fine SAND, some [Fines: (Silt/Clay)], trace medium to fine Gravel | | |
| <div> <div> Atterberg Limits </div> <div> LL= </div> <div> PL= </div> <div> PI= </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 0.4962 </div> <div> D₃₀= 0.0862 </div> <div> C_u= </div> <div> D₆₀= 0.2175 </div> <div> D₁₅= </div> <div> C_c= </div> <div> D₅₀= 0.1679 </div> <div> D₁₀= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= SM\SC </div> </div> | | |
| <div> <div> Remarks </div> <div> WC: 10.3% </div> <div> Trace Mica </div> </div> | | |

Source of Sample: TB-108
Sample Number: S-7

Depth: 13'-13.8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



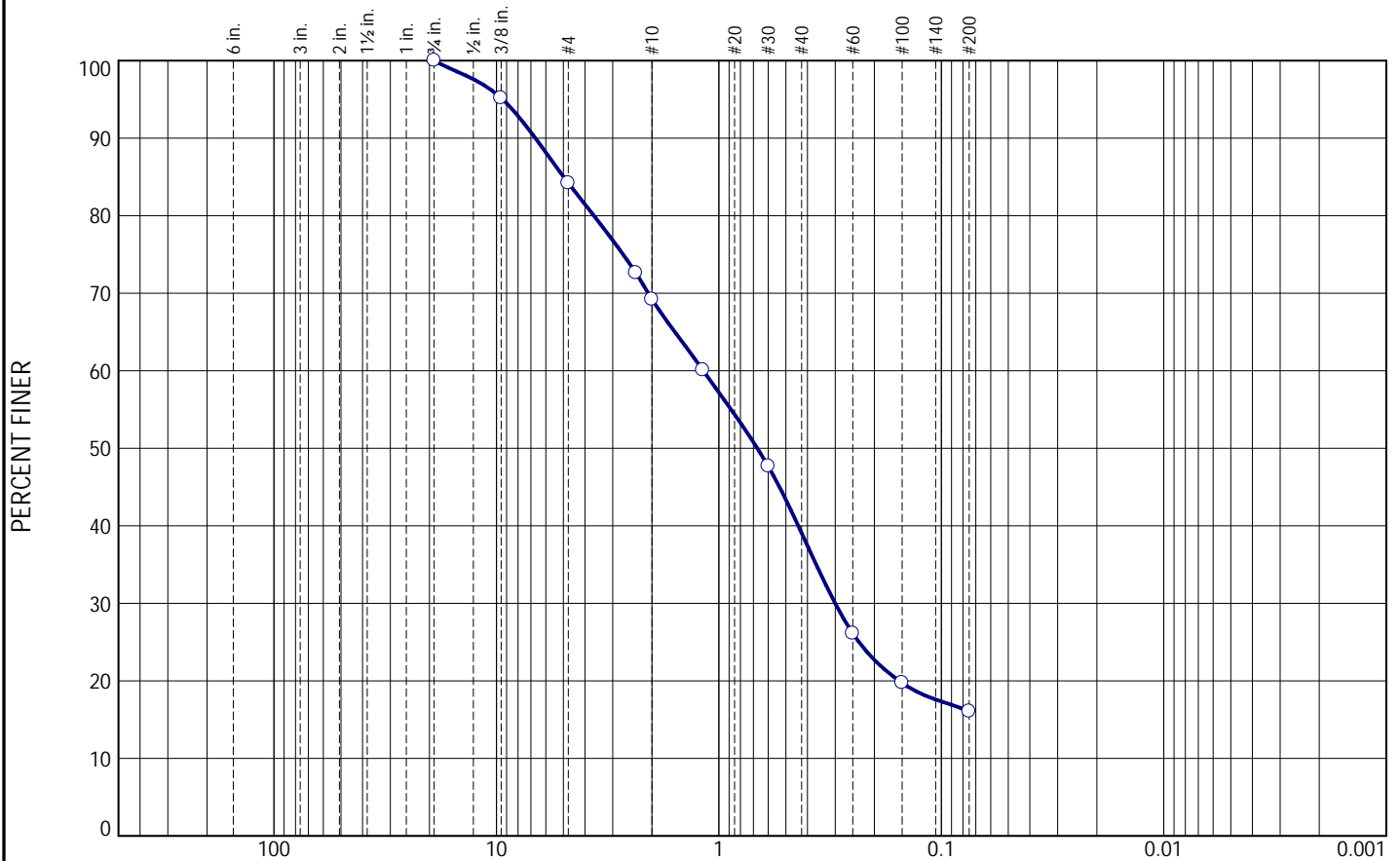
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-5

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 4.8 | 26.0 | 21.5 | 21.6 | 10.0 | 16.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 95.2 | | |
| #4 | 84.2 | | |
| #8 | 72.6 | | |
| #10 | 69.2 | | |
| #16 | 60.1 | | |
| #30 | 47.7 | | |
| #60 | 26.1 | | |
| #100 | 19.7 | | |
| #200 | 16.1 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some medium to fine Gravel, little [Fines: (Silt/Clay)] | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 4.9830 | D ₆₀ = 1.1751 | D ₅₀ = 0.6716 |
| D ₃₀ = 0.3000 | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 14.2% | | |
| Trace Mica | | |

Source of Sample: TB-109
Sample Number: S-4

Depth: 6'-8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory

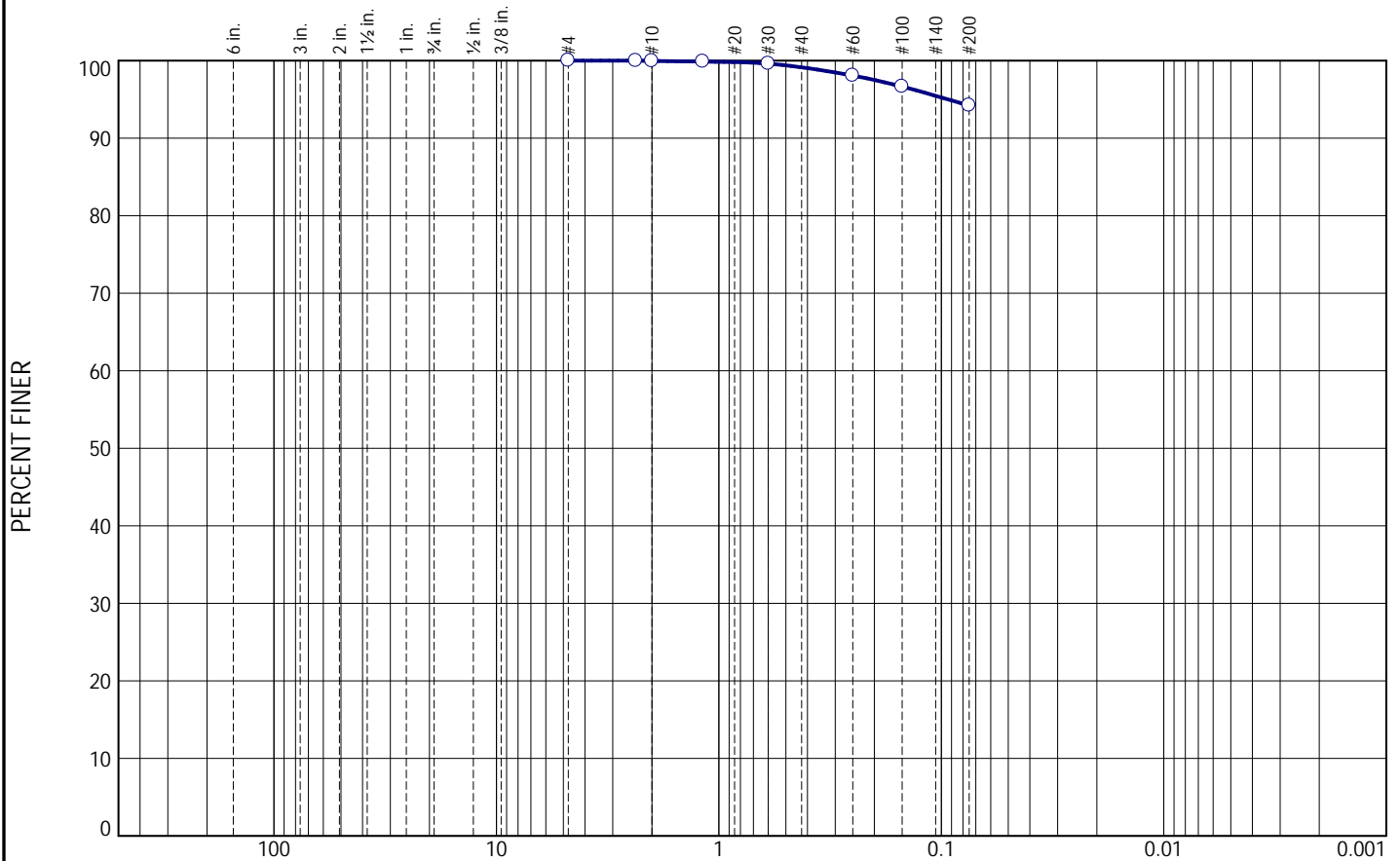


Client: City of Chester Public Works
Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-6

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 3.9 | 94.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 100.0 | | |
| #10 | 100.0 | | |
| #16 | 99.9 | | |
| #30 | 99.6 | | |
| #60 | 98.1 | | |
| #100 | 96.6 | | |
| #200 | 94.2 | | |

* (no specification provided)

Material Description
Brown [Fines: (SILT/CLAY)], trace medium to fine Sand

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 20.3%

Source of Sample: TB-110
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



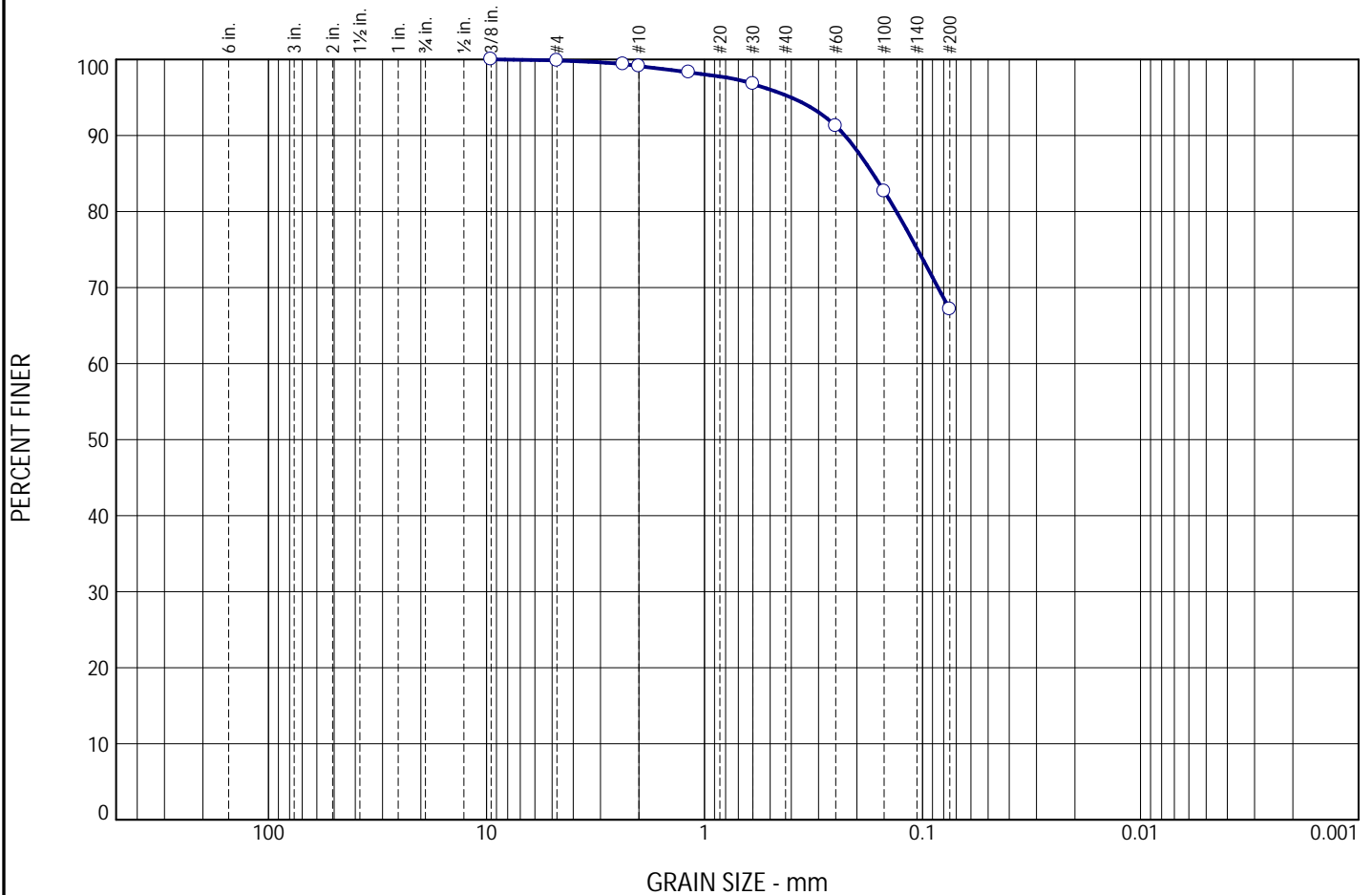
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-7**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.9 | 2.3 | 5.5 | 24.1 | 67.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 99.9 | | |
| #8 | 99.4 | | |
| #10 | 99.1 | | |
| #16 | 98.3 | | |
| #30 | 96.8 | | |
| #60 | 91.3 | | |
| #100 | 82.7 | | |
| #200 | 67.2 | | |

* (no specification provided)

Material Description

Brown [Fines: (SILT/CLAY)], some medium to fine Sand

Atterberg Limits

LL= PL= PI=

Coefficients

D₈₅= 0.1692 D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification

USCS= CL:H\ML:H

Remarks

WC: 21.3%

Source of Sample: TB-111
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-8**



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Report of Stormwater Infiltration Exploration

November 14, 2024

Proposed Public Works Garage and Shed

West 2nd Street and Lloyd Street

City of Chester, Delaware County, Pennsylvania



Prepared for:

Mr. Leonard Lightner
Chief of Staff
City of Chester Public Works
1 4th Street
City of Chester, PA 19013

Prepared by:

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Michael J. Kwiatkowski, PE
PA Professional Engineer
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Project No. COCD0004

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Introduction

This report presents the results of the stormwater infiltration exploration performed in support of the proposed stormwater management system associated with the proposed public works garage and shed to be constructed at W. 2nd Street and Lloyd Street in the City of Chester, Pennsylvania. Specifically, this report presents a summary of observations related to the subsurface soil and groundwater conditions, as well as the results of infiltration testing completed within the footprint of the proposed stormwater management features. This exploration was conducted in accordance with our proposal COCD0004 (work order issued June 26, 2024) and the subsequent work requisition (approved July 15, 2024).

Site and Project Description

The subject site is located on the south side of West 2nd Street between Pennel Street and Lloyd Street in the City of Chester, Pennsylvania, as shown on the Site Location Map (Figure 1). The site is otherwise bordered by commercial developments to the north, south, east, and west. The Delaware River is located less than 0.25 miles to the south of the site.

The existing lot serves as a vehicle storage/parking for various commercial tracker trailer rigs and accompanying vehicle transport trailers. There is a small wood shack located in the western-central portion of the site. There is a relatively small loading dock platform (suspected remanence of a former structure) located in the southern-central portion of the subject property. The site is otherwise predominantly covered with asphalt pavement (existing parking lot), which is in poor condition with abundant cracking and potholes. The pavements in the northern portion of the site are completely dilapidated. There are partially vegetated landscape areas along the northern and eastern property boundaries. There are several small piles of scrap automotive parts (e.g. tires truck body parts, etc.) in the existing parking lot area, just north of the former loading dock area.

The overall site is relatively flat to gently sloping with elevations ranging from ± 16 to ± 12 , grading downward slightly from the northwest side of the site to the southeast. Utility mark-outs, including water, storm sewer, electric, and communications, were observed within and around the perimeter of the site. Other un-marked below-grade utilities may also exist at the site.

The overall project includes construction of a new office / garage structure and a separate new maintenance facility / salt shed. A below-grade stormwater management feature is proposed on the southeast side of the site, adjacent to Lloyd Street, in the vicinity of TB-109 and TB-110, as shown on the attached Exploration Location Plan (Figure 2). The proposed bottom elevation of the proposed stormwater management feature was not available at the time of our exploration program, however an estimated basin invert of about 5.5 feet to 6.5 feet below existing grades was assumed for the purposes of stormwater testing.

We note that a separate stormwater feature (potential stormwater drainage swale) was previously being considered along the southwest side of the site. However, this feature was subsequently eliminated from consideration after completion of our field exploration. The subsurface exploration

and infiltration testing performed as part of our field exploration and the results summarized in this report include both areas.

Scope of Services

CED performed the following scope of services to evaluate the subsurface conditions within the footprint of the proposed stormwater management area and to provide consultation regarding anticipated subsurface infiltration rates and estimated seasonal high-water levels (ESHWL):

- a) Engaged the services of a drilling contractor to advance three test borings for exploration of subsurface soil and groundwater conditions;
- b) Provided full-time technical observation of the test boring services;
- c) Obtained representative continuous soil samples from the test borings for classification purposes to a depth of 16 feet below existing grades;
- d) Evaluated the field data and prepared test boring logs showing the types of soils observed, depths to groundwater;
- e) Performed in-situ field infiltration testing using the cased borehole test method to evaluate groundwater infiltration rates for the subgrade soils; and
- f) Prepared this *Report of Stormwater Infiltration Exploration* that reviews potential soil infiltration rates for design and groundwater considerations for the proposed basin design.

Subsurface Exploration

Subsurface conditions for this infiltration evaluation were explored through the completion of four test borings, identified herein as TB-105 and TB-109 through TB-111. Test borings TB-109 and TB-110 were completed in the footprint of the planned below-grade basin on the southwest side of the site. Test borings TB-105 and TB-111 were performed in the area being considered for possible use as a drainage swale (which has since been eliminated from consideration). We note that test borings TB-101 through TB-104 and TB-106 through TB-108 were located in the footprints of either the proposed buildings or parking areas (outside of the footprint of the proposed stormwater management features), and are therefore excluded from this report.

The test borings were performed by Soil Borings Inc. of Haddonfield, New Jersey, at the locations shown on the Exploration Location Plan, Figure 2. The test locations were field located by Colliers Engineering & Design, Inc. (CED) and cleared for below-grade utilities by Level A Underground Solutions. The drilling was performed under the full-time technical supervision of CED. Elevations of the test locations were estimated using the Overall Grading, Drainage & Utility Plan (Sheet 3), by Colliers Engineering & Design, Inc., dated October 11, 2024.

The test borings were advanced using hollow-stem drilling techniques. Soil samples for strata identification and analyses were obtained from each of the test borings by means of a 2-inch OD split barrel sampler. This spoon is typically driven 18 inches or 24 inches by blows from a 140-pound hammer which free falls 30 inches (the Standard Penetration Test, ASTM D 1586). The boring logs are presented in the Appendix with descriptions of the soil horizons encountered and depth to encountered groundwater. The penetration resistance of the drive sampler has been

recorded on the test boring log adjacent to the sample locations as the number of hammer blows required for each 6 inches of sampler penetration or fraction thereof. The Standard Penetration Test values (N) are determined by totaling the blow counts required for the middle 12 inches of sampler penetration and are expressed as blows per foot. Upon completion, the test borings were backfilled with the cuttings, and the asphalt pavement was patched with asphalt cold patch.

The test borings were performed under the full-time technical observation of CED. Representative soil samples were collected and visually identified in accordance with the Burmister Soil Classification System. Details pertaining to the subsurface conditions encountered are presented on the test boring logs in Appendix A.

Soil samples obtained during this investigation will be retained by CED for 60 days from issuance of this report. At the end of this time, they will be discarded unless we receive other instructions from the City of Chester Public Works.

Subsurface Conditions

Regional Geology

The site for the proposed development is located within the Lowland and Intermediate Upland Section of the Atlantic Coastal Plain physiographic province. Locally, the site is underlain by existing fill material, followed by fine- and coarse-grained alluvial deposits of the Trenton Gravel formation, followed by the decomposed and weathered remains of the Wissahickon Formation. These materials were encountered in the test borings, as described in the following paragraphs.

Subsurface Description

Based on the results of the test borings, the generalized subsurface conditions within the footprint of the proposed stormwater features may be described below, in order of depth. Please refer to the corresponding Report of Geotechnical Exploration for a summary of subsurface conditions elsewhere throughout the proposed development (i.e. the proposed building and parking lot areas).

- **Existing Pavements:** Asphalt pavement was encountered in each of the test borings ranging from about 1.5 to 4 inches, averaging about 2.25 inches thick. A concrete pavement/slab was encountered below the asphalt layer in test borings TB-105 and TB-111, measuring 6.5 inches and 6 inches thick, respectively. The asphalt and concrete layers are underlain by aggregate base materials, ranging from 3 to 4.5 inches, and averaging 3.8 inches in thickness.

Existing Fill Materials: Existing fill material was encountered beneath the surficial pavement layer at each test boring location within the stormwater management area, extending to depths ranging from approximately 2 to 4.5 feet, averaging about 2.5 feet below the existing grades. The existing fill layer generally consists of a sand with moderate to high percentages of silt/clay and lesser amounts of gravel. Occasional demolition debris was intermixed within the existing fill materials (i.e. brick and concrete fragments).

The Standard Penetration Test (SPT) 'N'-values for the existing fill layer range from 3 blows per foot (bpf) to 10 bpf, averaging about 5 bpf. The upper 2 feet of the existing fill layer is generally relatively dense immediately below the asphalt and concrete layer, but typically becomes loose thereafter nearing the transition with the underlying Stratum A soil layer. The existing fill does not appear to have been placed in a controlled/compacted manner.

- **Stratum A – Coarse-Grained and Fine-Grained Alluvial Soils:** Coarse-grained and fine-grained alluvial soils (intermixed layers) were encountered beneath the existing fill layer in each of the test borings performed within the proposed stormwater management areas, extending to depths ranging from 10 feet to 11.5 feet, averaging about 10.5 feet.

The predominantly coarse-grained Stratum A soils are generally comprised of a sand with moderate amounts of medium to fine gravel and lesser percentages of silt. Overall, the SPT N-values of the coarse-grained Stratum A soils range widely from 4 bpf to 44 bpf, averaging 17 bpf. However, they are typically loose to medium dense, with infrequent, isolated very loose and very dense layers.

The predominantly fine-grained Stratum A soils consist of clay and silt mixtures with moderate amounts of coarse to fine sand and lesser percentages of fine gravel. Overall, the SPT N-values range from 3 bpf to 24 bpf, averaging 11 bpf. However, they are typically medium to stiff, with less frequent soft or very stiff layers. Based on the results of field pocket penetrometer testing, the fine-grained Stratum A soils have unconfined compression values ranging from less than 1 ton per square foot (tsf) to 4.5 tsf, averaging about 2.75 tsf.

- **Stratum B – Decomposed Rock:** Decomposed rock was encountered beneath the Stratum A soils in each of the test borings. For purposes of this report, decomposed rock is defined as the completely weathered remains of the underlying bedrock (i.e. a soil-like material), which retains some of the relic rock structure. The decomposed rock at this site generally consists of loose to medium dense micaceous sand with moderate amounts of silt and trace amounts of friable rock fragments.

The test borings were either terminated in the Stratum B layer at a depth of 16 feet (TB-109 and TB-111) or the layer extended to the transition with the underlying Stratum C – Altered Rock materials (TB-105 and TB-110) at depths of 38 feet and 12 feet, respectively. In general, the decomposed rock layer appears to trend deeper from east to west.

Stratum B soils are generally loose to medium dense, with SPT 'N'-values ranging from 7 bpf to 26 bpf, averaging 15 bpf. We note that the loose conditions were only observed in TB-105 near the transition from Stratum A to B. The density generally increases with depth approaching the underlying Stratum C - Altered Rock layer.

- **Stratum C – Altered Rock:** Altered rock (a.k.a. saprolite) was encountered beneath the Stratum B – Decomposed Rock layer in test borings TB-105 and TB-110 extending to the maximum depths explored. For purposes of this report, altered rock is defined as the partially weathered remains of the parent bedrock. It is differentiated from the Stratum B – Decomposed Rock layer based on the increased resistance to split spoon sampling (typically resulting in split spoon refusal) and augering

(penetrable with some difficulty). The altered rock at this site generally consists of dense to very dense micaceous sand with moderate amounts of silt and lesser amounts of both friable and non-friable rock fragments.

The SPT “N” values for Stratum C are typically in excess of 100 blows for less than 1 foot of penetration.

Groundwater Conditions

Groundwater was encountered in each of the test borings. Groundwater readings were recorded at the depths first encountered during drilling, at the completion of the test borings, and (in some instances) at extended periods (e.g. 48 hours). Based on the groundwater readings obtained during the field exploration, the depth to groundwater at the site generally ranges from about 7.7 feet to 8.9 feet, averaging about 8.5 feet below existing grades (elevations ranging from 4.0 to 5.3, and averaging elevation 4.7).

CED did not observe evidence of staining or redox (i.e. oxidation / reduction due to varying states of saturation or water seepage through a soil stratum) in the soil samples that might otherwise indicate a fluctuating or seasonal high groundwater condition. However, fluctuations in groundwater levels can occur due to several factors, including variations in precipitation, seasonal changes, tidal fluctuations (i.e. of the Delaware River), and site development activities, which can alter surface water drainage paths.

| TABLE 1 DEPTH TO GROUNDWATER AND ESHWL SUMMARY | | | | | | |
|---|----------------------|--------------|-------------------|------------|---------------------|---------------|
| Basin Type | Test Boring Location | GS EL (ft) * | Depth to GWT (ft) | GW EL (ft) | Depth to ESHWL (ft) | ESHWL EL (ft) |
| Infiltration Basin | TB-109 | 12.5 | 8.5 | 4.0 | NE | NA |
| | TB-110 | 12.0 | 7.7 | 4.3 | NE | NA |
| Drainage Swale** | TB-111 | 14.0 | 8.9 | 5.1 | NE | NA |
| | TB-105 | 14.0 | 8.7 | 5.3 | NE | NA |

*Ground surface elevations are interpolated from the project plans and should be considered approximate.

**Eliminated from consideration after completion of the field exploration.

Soil Infiltration Evaluation

Four infiltration tests (IT-1 through IT-4) were performed at the locations shown on the attached Figure 2 – Exploration Location Plan. The tests were performed using the Borehole Infiltration Test method. The results of the infiltration testing are summarized below in Table 2. Please refer to the attached Infiltration Testing Logs (Appendix B), as well as the laboratory test results on select soil samples at the infiltration test depth (Appendix C) for additional information.

| TABLE 2 SUMMARY OF INFILTRATION TEST RESULTS | | | | | | | |
|---|-----------------------------|--------------------|--------------------|----------------------|--------------------------|---------------------------|---------------------|
| Basin Type | Infiltration Test ID | GS EL (ft)* | GW EL (ft)* | ESHWL EL (ft) | Inf. Test EL (ft) | Inf Rate (in/hr)** | Soil Stratum |
| Infiltration Basin | IT-1 | 12.5 | 4.0 | NE | 6.2 | 1.0 | Stratum A |
| | IT-2 | 12.0 | 4.3 | NE | 6.5 | 0.5 | Stratum A |
| Drainage Swale*** | IT-3 | 14.0 | 5.1 | NE | 7.7 | 0.0 | Stratum A |
| | IT-4 | 14.0 | 5.3 | NE | 7.4 | 0.0 | Stratum A |

*Ground surface and corresponding groundwater elevations are interpolated from the project plans and should be considered approximate.

**Infiltration rates do not include a factor of safety.

***Eliminated from consideration after completion of the field exploration.

Discussion

In general, infiltration practices appear feasible for the proposed infiltration basin located in the southeast region of the site. The soils encountered at the test depths (planned bottom of basin elevation) contained appreciable coarse-grained materials, which was reflected in the observed infiltration rates. We note that the possibility exists for finer-grained (e.g. lower permeability) Stratum A soils to also be present elsewhere at the basin bottom in areas not explored. We that this be accounted for in the design infiltration rate (e.g. increased factor of safety) and/or managed during construction through over-excavation and replacement of fine-grained seams, construction-phase infiltration testing to confirm the design infiltration rates, etc.

We recognize that the drainage swale previously being considered in the southwestern area of the site has been eliminated from consideration; however, it's worth mentioning that the soils in this area appear less favorable for infiltration practices. The soils encountered at the test depth were relatively fine-grained in this area, resulting in negligible infiltration.

We recommend that the proposed stormwater infiltration basin located in the southeast corner of the site be designed based on the more conservative rates measured, and that the design rate include an appropriate factor of safety to account for possible variability of the subsurface conditions and other factors such as clogging. If the area located in the southwest is to be considered for stormwater management, alternate design strategies will likely be required for the such as bio-retention feature planned on the southwest portion of the site.

Closing

We emphasize that the conclusions summarized in this report are based on the results of the test boring explorations and field infiltration testing. Additional infiltration testing may be required once final design and basin size is prepared to meet local code requirements.

Successful construction of the project will require competent field observation of the construction operations. Earthwork, including clearing and grubbing, subgrade identification, grading, and fill placement, should be observed by a competent individual familiar with the recommendations contained in this report, to confirm that the underlying soils are not artificially disturbed or compacted. We are available to perform construction observation services, if requested. Furthermore, we recommend a pre-construction meeting be attended by the construction team, stormwater design professionals, and field observation team to review construction procedures and outline requirements to be implemented and/or avoided during construction of the stormwater facilities and subgrade preparation.

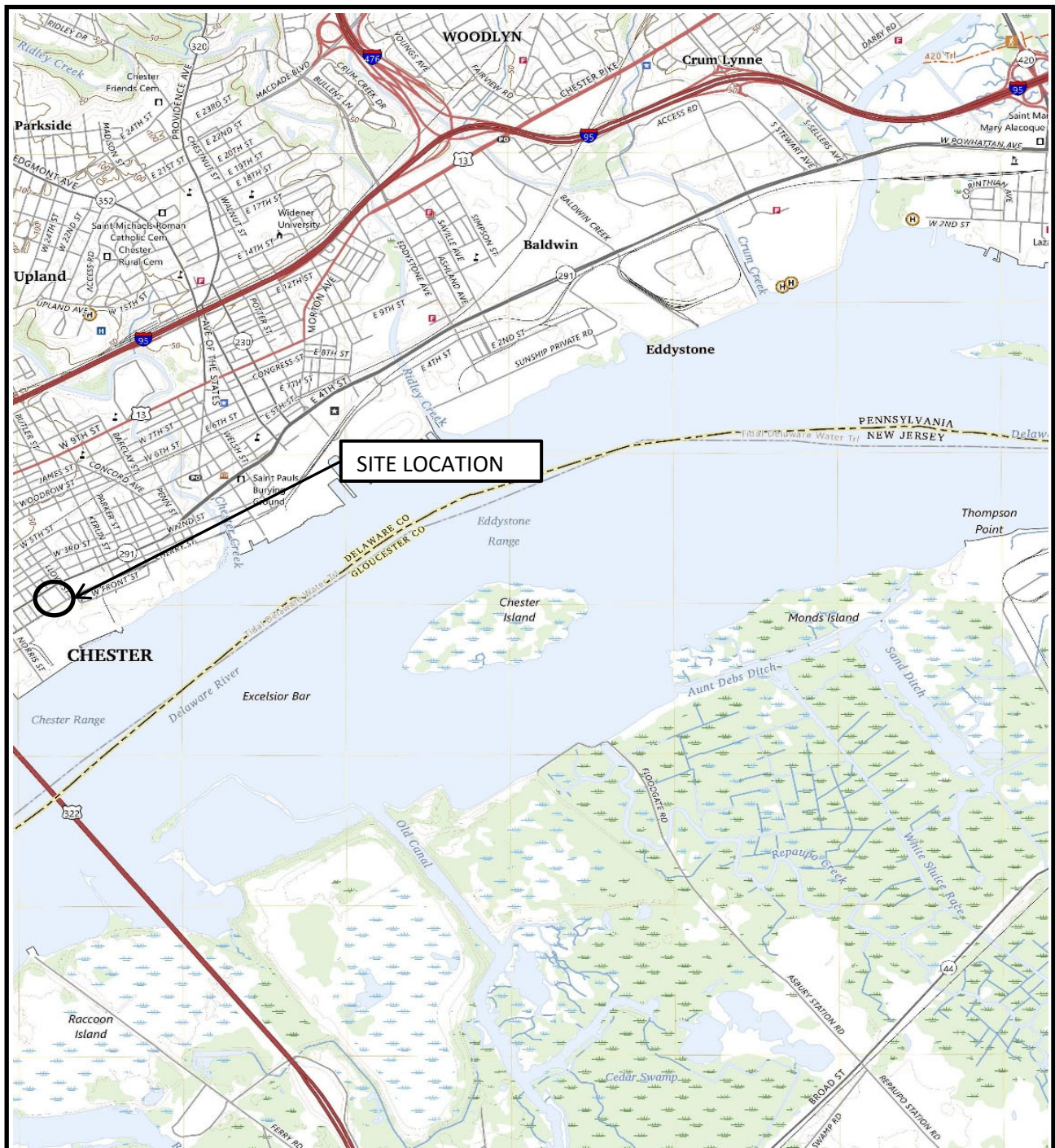
The recommendations contained in this report are contingent upon the actual field conditions being consistent with those encountered during our field exploration. Should any variation in the anticipated conditions be encountered, or should site regrading be proposed, CED should be notified to determine what impact the changed conditions may have upon the presented recommendations.

Limitations

Services performed by CED during this project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended in the services provided.

Figures

Figure 1 Site Location Map



NOTES:

- 1.) *SITE MAP OBTAINED FROM USGS TOPOGRAPHIC MAP, BRIDGEPORT, NJ, PA QUADRANGLE, DATED 2023.



**Engineering
& Design**

Title:

SITE LOCATION MAP

Project:

***Proposed Development
West 2nd Street and Lloyd Street
Chester, Delaware County, PA***

Drawn By:

*

Checked By:

MJK

Project No.:

COCD0004

Scale:

N.T.S.

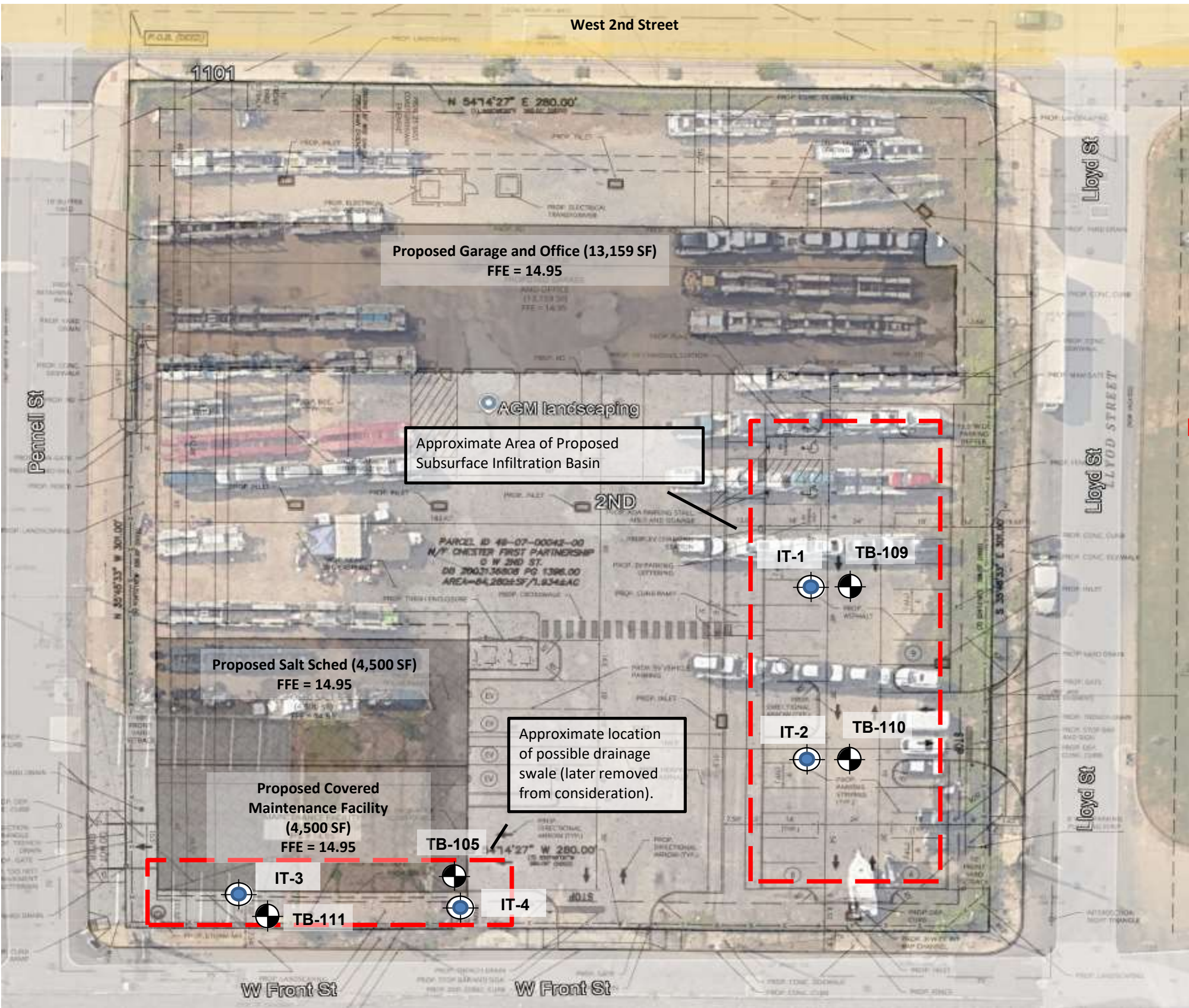
Date:

10/22/2024

Figure No.:

1

Figure 2 Exploration Location Plan



LEGEND:

- TB-101** TEST BORING LOCATION (APPROXIMATE)
- IT-101** INFILTRATION TEST LOCATION (APPROXIMATE)
- APPROXIMATE FOOTPRINT OF PROPOSED STORMWATER INFILTRATION BASIN
- APPROXIMATE FOOTPRINT OF PROPOSED DRAINAGE SWALE AREA (LATER REMOVED FROM CONSIDERATION)

NOTES:

- 1.) BASE PLAN PREPARED FROM A GOOGLE EARTH AERIAL IMAGE WITH A SITE PLAN (DATED OCTOBER 11, 2024) OVERLAY.
- 2.) THIS DRAWING IS PART OF THE COLLIER'S ENGINEERING & DESIGN, INC. REPORT OF STORMWATER INFILTRATION EXPLORATION (PROJECT NO. COCD0004) DATED NOVEMBER 2024.

| | | | |
|--|-----------------|--------------|----------|
| TITLE: EXPLORATION LOCATION PLAN | | | |
| PROJECT: Proposed Development West 2nd Street and Lloyd Street Chester, Delaware County, PA | | | |
| DRAWN BY: * | CHECKED BY: MJK | PROJECT NO.: | COCD0004 |
| SCALE: N.T.S. | DATE: 11/6/2024 | FIGURE NO.: | 2 |

Appendix

Appendix A Test Boring Logs



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 1 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 9.0 10/15/2024

END OF DRILLING (0 hrs.) 8.7 10/17/2024



DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | | |
|---------------------------|---------------|--------------------|-------|--------|--------|---------------|------------------------|---|---|---------------|--|--|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | | | |
| 5 | S-1 | - | - | 2 | 1 | 10 | 0.25 |  |  | Existing Fill | S-1: Asphalt +/- 1.5 inches; Concrete +/- 6.5 inches; Base +/- 4 inches Orange-Brown, Tan, Gray, Clayey SILT, some (+) cmd Sand, trace (+) mf Gravel, (Fill) (Moist) | | |
| | 0.0'-2.0' | | | | | 21 | >4.5 | | | | 2.0 | S-2: Orange-Brown, SILT, some (+) mf Sand, (Moist) | |
| | S-2 | 4 | 4 | 6 | 11 | 18 | 3.25 | | | 12.0 | S-3: Orange-Brown, Gray, SILT, some mf Sand, trace mf Gravel, (Moist) | | |
| | 2.0'-4.0' | | | | | 22 | 1.75 | | | Stratum A | S-4: (Top 11") Same as S-3, (Moist) (Bottom 11") Orange-Brown, Tan, cmf SAND, little (+) mf Gravel, trace (+) Silt, (Very Moist) | | |
| S-3 | 5 | 4 | 6 | 9 | 13 | | | | | | S-5: Orange-Brown, DArk Brown, c(+)mf SAND, little mf Gravel, trace (+) Silt, (Very Moist to Wet) | | |
| 4.0'-6.0' | | | | | 20 | | | | | | 1.75 | Stratum B | S-6: (Top 10") Same as S-5, (Wet) (Bottom 12") Gray SILT and mf Sand, slightly micaceous, (Very Moist to Wet) |
| S-4 | 8 | 8 | 13 | 13 | | | | | | | | | S-7: Gray, Orange-Brown, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) |
| 6.0'-8.0' | | | | | | 16 | 1.75 | | | Stratum C | | | S-8: (Top 8") Same as S-7, (Very Moist to Wet) (Bottom 8") White, Gray, Tan, cmf SAND, little Silt, trace (+) friable RF, trace phyllite, slightly micaceous, (Very Moist) |
| S-5 | 11 | 13 | 8 | 4 | | | | | | | | | S-9: Gray, cmf(+) SAND, some (+) Silt, trace friable RF, slightly micaceous, (Very Moist to Wet) |
| 8.0'-10.0' | | | | | 23 | | | | | | 1.75 | Stratum C | S-10: White, Gray, micaceous cmf SAND, little Silt, trace (+) friable RF, (Very Moist) |
| S-6 | 2 | 2 | 2 | 3 | | | | | | | | | S-11: Gray, micaceous cmf SAND, some (-) Silt, trace friable RF, (Very Moist) |
| 10.0'-12.0' | | | | | | 5 | 1.75 | | | Stratum C | | | S-12: Light Gray, White, micaceous cmf SAND, little Silt, trace friable RF, (Moist) |
| S-7 | 3 | 3 | 4 | 5 | | | | | | | | | S-13: White, Gray, micaceous cmf SAND, little (+) Silt, trace (+) friable RF, (Moist) |
| 13.0'-15.0' | | | | | 5 | | | | | | 1.75 | Stratum C | |
| S-8 | | | | | | | | | | | | | |
| 18.0'-20.0' | | | | | | | | | | | | | |
| S-9 | 4 | 4 | 7 | 8 | | | | | | | | | |
| 25 | 23.0'-25.0' | | | | | 22 | 1.75 | | | Stratum C | | | |
| | S-10 | 8 | 12 | 9 | 13 | | | | | | | | |
| | 28.0'-30.0' | | | | | | | | | | | | |
| | S-11 | 9 | 13 | 21 | 28 | | | | | | | | |
| 35 | 33.0'-35.0' | | | | | 5 | 1.75 | | | Stratum C | | | |
| | S-12 | 50/5" | - | - | - | | | | | | | | |
| | 38.0'-38.4' | | | | | | | | | | | | |
| | S-13 | 50/5" | - | - | - | | | | | | | | |
| 40 | 43.0'-43.4' | | | | | 5 | 1.75 | | | Stratum C | | | |
| | S-13 | 50/5" | - | - | - | | | | | | | | |
| | 43.0'-43.4' | | | | | | | | | | | | |
| | S-13 | 50/5" | - | - | - | | | | | | | | |

NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 1 OF 2



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed
LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania
PROJECT NO. COCD0004

TEST BORING: TB-105

PAGE 2 OF 2

GROUND ELEVATION (ft): 14.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 5.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE
FIRST ENCOUNTERED ∇ 9.0 10/15/2024
END OF DRILLING (0 hrs.) ∇ 8.7 10/17/2024

ASTM D-1586

DATE STARTED 10/15/2024

DATE FINISHED 10/15/2024

FIELD OBSERVER: T. Hill

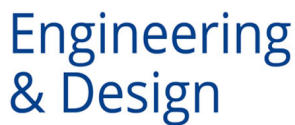
CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (lbf) | MOISTURE (%) | WATER SYMBOL | PROFILE DEPTH ELEV. | IDENTIFICATION OF SOILS / REMARKS |
|------------------------------------|---------------------|--------------------|-------|--------|--------|------------------|------------------------------|-----------------|-----------------|---------------------------|--|
| | | 0-6" | 6-12" | 12-18" | 18-24" | | | | | | |
| | | | | | | | | | | Stratum C | |
| | | | | | | | | | | 48.3 | |
| 50 | S-14 48.0'-48.3' | 50/4" | - | - | - | 4 | | | | -34.3 | S-14: White, Light Gray, cmf SAND, little Silt, trace (+) friable RF, (Moist) END OF TEST BORING AT 48.3 FEET |
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NOTES: Moderately Hard Augering/Grinding through gravel layer 7 feet to 8 feet; Hard Augering 36 feet to 38 feet; Hard Augering 40 feet to 48 feet.
Boring backfilled and patched upon completion for safety considerations.

TEST BORING: TB-105

PAGE 2 OF 2



PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania



PROJECT NO. COCD0004

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.5
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.0

| RODS: AW | X | NW | Other |
|----------|---|----|-------|
|----------|---|----|-------|

| GROUNDWATER: | DEPTH (ft) | DATE |
|--------------------------|---|-------------------|
| FIRST ENCOUNTERED |  <u>NE</u> | <u>10/17/2024</u> |
| END OF DRILLING (0 hrs.) |  8.5 | 10/18/2024 |

ASTM D-1586

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (tsf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | | | |
|---------------------------|-------------------|--------------------|-------|--------|--------|---------------|------------------------|--------------|--------------|---------------|--|------|-----------|---|
| | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | 18-24" | | | | | DEPTH ELEV. | | | | |
| 5 | S-1 0.0'-2.0' | - | 4 | 6 | 7 | 15 | | | | Existing Fill | S-1: Asphalt +/- 4 inches; Base +/- 3 inches Brown Gray, cmf SAND, some (+) Silt, trace cmf Gravel, (Fill) (Moist) S-2: NO RECOVERY * Likely push of large gravel in Fill. | | | |
| | S-2 2.0'-4.0' | 4 | 2 | 2 | 2 | 0 | | | | | | | | |
| | S-3 4.0'-6.0' | 3 | 8 | 10 | 11 | 14 | | | | | | 4.5 | Stratum A | S-3: (Top 5") Same as S-1, (Fill) (Moist) (Bottom 9") Orange-Brown, Tan, White, cmf SAND, some Silt, little (+) cmf Gravel, (Very Moist) S-4: Orange-Brown, Dark Brown, cmf SAND, some (+) mf Gravel, little Silt, (Moist) S-5: Brown, Tan, cmf SAND, some (-) mf Gravel, little (-) Silt, (Moist) |
| | S-4 6.0'-8.0' | 10 | 7 | 11 | 8 | 12 | | | | | | 8.0 | | |
| | S-5 8.0'-10.0' | 2 | 2 | 2 | 4 | 5 | | | | | | 10.5 | | |
| S-6 10.0'-12.0' | 4 | 6 | 6 | 7 | 22 | 2.0 | | | | | | | | |
| S-7 12.0'-14.0' | 4 | 5 | 9 | 11 | 21 | | | | | | | | | |
| S-8 14.0'-16.0' | 7 | 9 | 10 | 13 | 20 | | | | | | | | | |
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NOTES: Boring backfilled and patched upon completion for safety considerations.

PAGE 1 OF 1



Engineering & Design

410 Eagleview Boulevard, Suite 104, Exton, PA 19341

PROJECT: City of Chester Public Works
Garage and Shed

LOCATION: West 2nd Street and Lloyd Street
Chester, Pennsylvania

PROJECT NO. COCD0004

TEST BORING: TB-110

PAGE 1 OF 1

GROUND ELEVATION (ft): 12.0
ELEV. FROM: Interpolated

GROUNDWATER ELEV. (ft): 4.3

CONTRACTOR: Soil Borings, Inc.

DRILLER: Anthony Scafidi

DRILLING EQUIPMENT: Mobile B-57 Truck Rig

METHOD: HSA ☒ Mud Rotary ☐ Other ☐

HAMMER: CH ☐ Safety ☐ Automatic ☒

RODS: AW ☒ NW ☐ Other ☐

GROUNDWATER: DEPTH (ft) DATE

FIRST ENCOUNTERED 8.0 10/17/2024

END OF DRILLING (0 hrs.) 7.7 10/18/2024


DATE STARTED 10/17/2024

DATE FINISHED 10/17/2024

FIELD OBSERVER: T. Hill

CHECKED BY: M. Kwiatkowski

ASTM D-1586

| DEPTH BELOW SURFACE (ft.) | SAMPLE NUMBER | BLOWS PER 6 INCHES | | | | RECOVERY (in) | POCKET PENETROM. (tsf) | MOISTURE (%) | WATER SYMBOL | PROFILE | IDENTIFICATION OF SOILS / REMARKS | |
|------------------------------------|------------------|--------------------|-------|-------|--------|------------------|------------------------------|-----------------|---|---------------|---|---|
| | | DEPTH (ft.) | 0-6" | 6-12" | 12-18" | | | | | 18-24" | | DEPTH ELEV. |
| 5 | S-1 | - | 2 | 4 | 4 | 15 | 2.0 | |  | Existing Fill | S-1: Asphalt +/- 1.5 inches; Base +/- 4.5 inches Dark Brown, Black, cmf SAND, some Silt, little mf Gravel, trace (-) brick fragments, (Fill) (Moist) | |
| | 0.0'-2.0' | | | | | 13 | | | | | 3.0 | S-2: (Top 5") Same as S-1, (Fill) (Moist) |
| | S-2 | 2 | 2 | 1 | 2 | 15 | | | | | 9.0 | (Bottom 8") Grayish Brown, SILT & CLAY, little mf Sand, (Very Moist) |
| | 2.0'-4.0' | | | | | 20 | | | | | S-3: Yellowish Brown, SILT, trace mf Sand, trace (-) f Gravel, (Moist) | |
| | S-3 | 2 | 3 | 4 | 8 | 12 | | | | | Stratum A | S-4: (Top 10") Same as S-3, (Moist) (Bottom 10") Orange-Brown, Clayey SILT, some (+) cmf Sand, little (-) f Gravel, (Very Moist) |
| 10 | 4.0'-6.0' | | | | | 21 | 1.0 | | | Stratum B | S-5: Orange-Brown, Tan, cmf SAND, little (+) Silt, slightly micaceous, (Very Moist to Wet) | |
| | S-4 | 12 | 13 | 8 | 7 | 10.0 | | | | | S-6: Orange-Brown, Yellowish Brown, cmf SAND, trace (+) friable RF, Slightly micaceous, (Moist to Very Moist) | |
| | 6.0'-8.0' | | | | | 12.0 | | | | | Stratum C | S-7: Gray, Orange-Brown, micaceous cmf SAND, little friable RF, trace (+) Silt, (Moist) |
| | S-5 | 2 | 2 | 3 | 4 | 7 | | | | | | |
| | 8.0'-10.0' | | | | | | | | | | | |
| 15 | S-6 | 4 | 6 | 20 | 50/4" | 7 | | | | | END OF TEST BORING AT 12.7 FEET | |
| | 10.0'-11.8' | | | | | | | | | | | |
| | S-7 | 48 | 50/2" | - | - | | | | | | | |
| | 12.0'-12.7' | | | | | | | | | | | |
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Appendix B Infiltration Testing Logs

Infiltration Testing Log

Project Name: City of Chester Public Works Garage & Shed SWM **Date:** 10/18/2024
Project Address: West 2nd Street and Lloyd Street Chester, PA **Weather:** Sunny / 60's
Testing Company: Colliers Engineering & Design **Tester's Name:** T. Hill
Phone Number: 267.318.0664 **Email Address:** tim.hill@collierseng.com
Test Number: IT-1 **Test Pit/Boring Hole Number:** TB-109 **Test Method:** Cased Borehole
Test Depth (feet): 6.3 **Surface Elevation (feet):** 12.5 **Instrument Diameter (inches):** 4"

Soil Characterization

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|---|
| 0 to 0.5 | Asphalt and Base Materials | |
| 0.5 to 4.5 | Loamy Sand, 0 to 5% cmf Gravel (Fill) | |
| 4.5 to 10.5 | Loamy Sand, 10% to 25% mf Gravel (Alluvial Soils) | Groundwater at 8.5 feet |
| 10.5 to 16.0 | Loamy Sand, 5% to 15% friable RF (Residual Soils) | |
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Presoak

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 12:06 | 0 | 98.375 | --- |
| 12:36 | 30 | 100 | 1.625 |
| 13:06 | 30 | 100.5 | 0.5 |
| | | | |

Infiltration Testing

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|---------------------------------|---------------------------------|-----------------------------------|--|----------|
| 13:08 | 0 | 99.25 | --- | | |
| 13:38 | 30 | 99.75 | 0.5 | 1.0 | |
| 14:08 | 30 | 100.25 | 0.5 | 1.0 | |
| 14:38 | 30 | 100.75 | 0.5 | 1.0 | |
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| Stabilized Infiltration Testing Rate (inches per hour): | | | | 1.0 | |

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|---------------------------|--|--------------------------------------|--|
| Project Name: | City of Chester Public Works Garage & Shed SWM | Date: | 10/18/2024 |
| Project Address: | West 2nd Street and Lloyd Street Chester, PA | Weather: | Sunny / 60's |
| Testing Company: | Colliers Engineering & Design | Tester's Name: | T. Hill |
| Phone Number: | 267.318.0664 | Email Address: | tim.hill@collierseng.com |
| Test Number: | IT-2 | Test Pit/Boring Hole Number: | TB-110 |
| Test Depth (feet): | 5.5 | Surface Elevation (feet): | 12 |
| | | Test Method: | Cased Borehole |
| | | Instrument Diameter (inches): | 4" |

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|--|
| 0 to 0.5 | Asphalt and Base Materials | |
| 0.5 to 3.0 | oamy Sand, 10% to 15% mf Gravel & brick frag (Fill) | |
| 3.0 to 8.0 | Silt Loam, 0% to 10% f Gravel (Alluvial Soils) | Groundwater at 7.7 feet |
| 8.0 to 10.0 | Loamy Sand, 0% to 5% f Gravel (Alluvial Soils) | |
| 10.0 to 12.0 | Loamy Sand, 0% to 5% friable RF (Residual Soils) | |
| 12.0 to 12.7 | micaceous Loamy Sand, 5% to 10% friable RF (WR) | Very Dense Weathered Rock at 12.5 feet |
| | | |

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|--------------|-----------------------|---|---|
| 12:11 | 0 | 95.125 | --- |
| 12:41 | 30 | 95.5 | 0.375 |
| 13:11 | 30 | 95.875 | 0.375 |

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|------------------------------|------------------------------|--------------------------------|--------------------------------------|----------|
| 13:13 | 0 | 94.125 | --- | | |
| 13:43 | 30 | 94.5 | 0.375 | 0.75 | |
| 14:13 | 30 | 94.75 | 0.25 | 0.5 | |
| 14:43 | 30 | 95 | 0.25 | 0.5 | |
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| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0.5 | |

Infiltration Testing Log

Project Name: City of Chester Public Works Garage & Shed SWM **Date:** 10/18/2024
Project Address: West 2nd Street and Lloyd Street Chester, PA **Weather:** Sunny / 60's
Testing Company: Colliers Engineering & Design **Tester's Name:** T. Hill
Phone Number: 267.318.0664 **Email Address:** tim.hill@collierseng.com
Test Number: IT-3 **Test Pit/Boring Hole Number:** TB-111 **Test Method:** Cased Borehole
Test Depth (feet): 6.3 **Surface Elevation (feet):** 14 **Instrument Diameter (inches):** 4"

Soil Characterization

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|---|
| 0 to 1.0 | Asphalt, Concrete, and Base Materials | |
| 1.0 to 2.0 | Loamy Sand, 5% to 10% mf Gravel (Fill) | |
| 2.0 to 7.5 | andy Clay Loam, 5% to 10% f Gravel (Alluvial Soils) | |
| 7.5 to 11.5 | Loamy Sand, 10% to 25% mf Gravel (Alluvial Soils) | Groundwater at 8.9 feet |
| 11.5 to 16.0 | Loamy Sand, <5% friable RF (Residual Soils) | |
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Presoak

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 9:55 | 0 | 69.5 | --- |
| 10:25 | 30 | 70 | 0.5 |
| 10:55 | 30 | 70.125 | 0.125 |

Infiltration Testing

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|---------------------------------|---------------------------------|-----------------------------------|--|---|
| 10:57 | 0 | 68.5 | --- | | |
| 11:27 | 30 | 68.5 | 0 | 0 | |
| 11:57 | 30 | 68.5 | 0 | 0 | *Test stopped due to lack of infiltration. |
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| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0 | |

Infiltration Testing Log

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|-------------------------|--|-----------------------|--|
| Project Name: | City of Chester Public Works Garage & Shed SWM | Date: | 10/18/2024 |
| Project Address: | West 2nd Street and Lloyd Street Chester, PA | Weather: | Sunny / 60's |
| Testing Company: | Colliers Engineering & Design | Tester's Name: | T. Hill |
| Phone Number: | 267.318.0664 | Email Address: | tim.hill@collierseng.com |

Test Number: IT-4 **Test Pit/Boring Hole Number:** TB-105 **Test Method:** Cased Borehole
Test Depth (feet): 6.6 **Surface Elevation (feet):** 14 **Instrument Diameter (inches):** 4"

Soil Characterization

| Depth (feet): | Soil Texture: | Limiting Layers Type and Depth (feet): |
|---------------|---|--|
| 0 to 1.0 | Asphalt, Concrete, and Base Materials | |
| 1.0 to 2.0 | Sandy Loam, 5% to 10% mf Gravel (Fill) | |
| 2.0 to 7.0 | Silt Loam, 0% to 5% mf Gravel (Alluvial Soils) | |
| 7.0 to 11.0 | Loamy Sand, 10% to 15% mf Gravel (Alluvial Soils) | Groundwater at 8.7 feet |
| 11.0 to 18.0 | Loamy Sand, <5% friable RF (Residual Soils) | |
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Presoak

| Time: | Time Interval: | Measurement (TOC), (inches): | Drop in water level, (inches): |
|-------|----------------|---------------------------------|-----------------------------------|
| 9:59 | 0 | 77.5 | --- |
| 10:29 | 30 | 79.5 | 2 |
| 10:59 | 30 | 79.75 | 0.25 |

Infiltration Testing

| Time: | Time Interval (Minute/Hour): | Measurement (TOC), (inches): | Drop in water level, (inches): | Infiltration rate (inches per hour): | Remarks: |
|---|------------------------------|------------------------------|--------------------------------|--------------------------------------|--|
| 11:02 | 0 | 77.5 | --- | | |
| 11:32 | 30 | 77.5 | 0 | 0 | |
| 12:02 | 30 | 77.5 | 0 | 0 | *Test stopped due to lack of infiltration. |
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| Stabilized Infiltration Testing Rate (inches per hour): | | | | 0 | |

Appendix C Laboratory Test Results



CLIENT: City of Chester Public Works
1 Fourth Street
Chester, PA 19013

PROJECT: West 2nd Street and Lloyd Street Garage/Shed

Project # COCD0004 **DATE:** October 30, 2024
PAGE: 1 of 1

CHECKED BY: Jason Veach
TITLE: Assistant Laboratory Manager

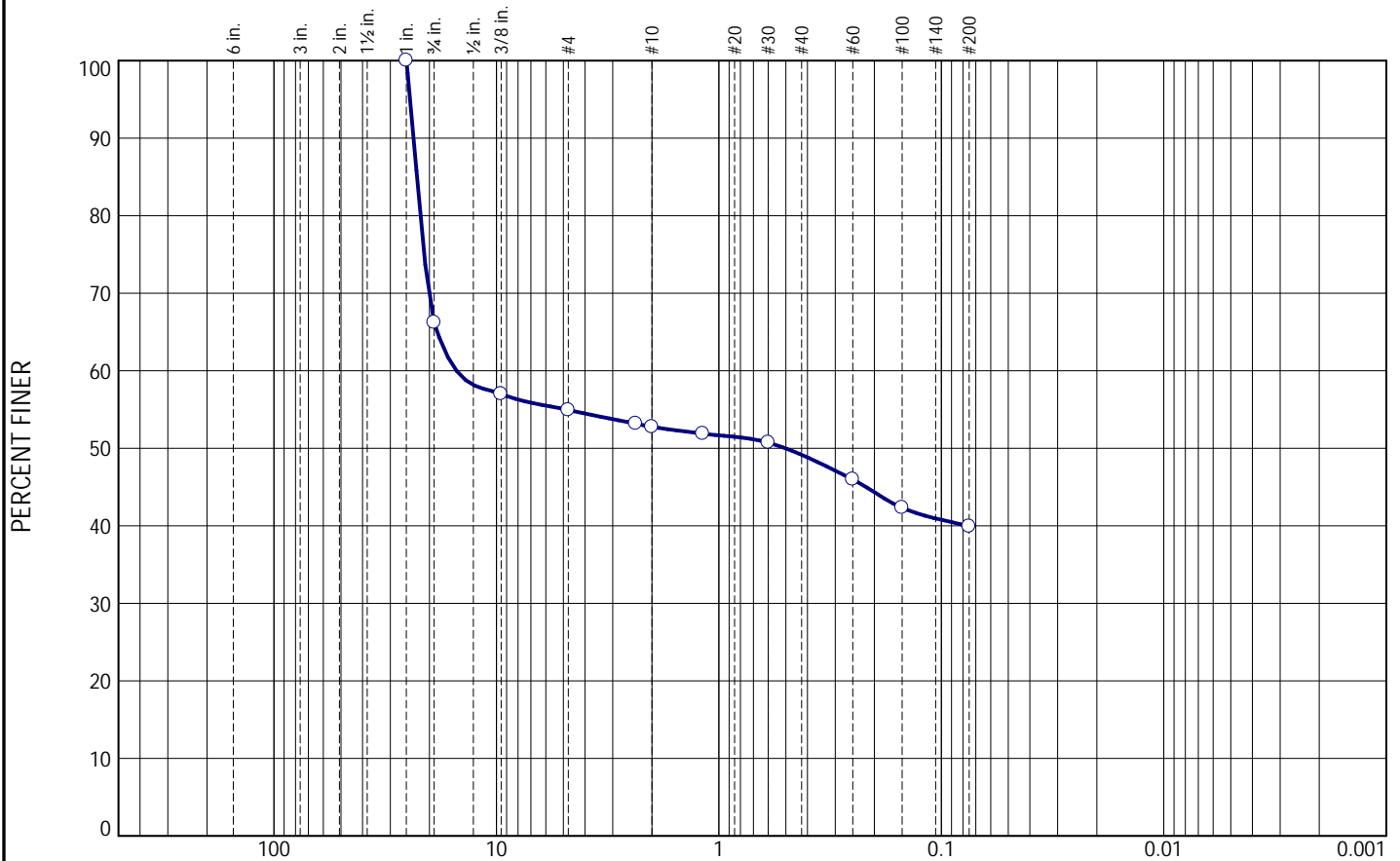
SAMPLES RECEIVED: October 22, 2024

SAMPLES TESTED: 10/22/24 - 10/30/24

LAB TECHNICIAN(S): K. Perry

Comments/Remarks: * See attached Plate(s)

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 43.0 | 4.2 | 2.1 | 4.7 | 6.1 | 39.9 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|--------------------|-----------------|
| 1 | 100.0 | | |
| .75 | 66.2 | | |
| .375 | 57.0 | | |
| #4 | 54.9 | | |
| #8 | 53.2 | | |
| #10 | 51.9 | | |
| #16 | 50.7 | | |
| #30 | 46.0 | | |
| #60 | 42.3 | | |
| #100 | 39.9 | | |
| #200 | | | |

* (no specification provided)

| Material Description | | |
|---|--|--|
| Light tan medium Gravel, and Clay & Silt, little coarse to fine Sand | | |
| <div> <div> Atterberg Limits </div> <div> LL= 30 </div> <div> PL= 19 </div> <div> PI= 11 </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 22.7448 </div> <div> D₆₀= 15.1019 </div> <div> D₃₀= </div> <div> D₁₅= </div> <div> C_u= </div> <div> D₅₀= 0.5026 </div> <div> D₁₀= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= GC </div> </div> | | |
| <div> <div> Remarks </div> <div> Water Content (WC): 32.8% </div> </div> | | |

Source of Sample: TB-101
Sample Number: S-5

Depth: 8'-10'

Date: 10/29/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



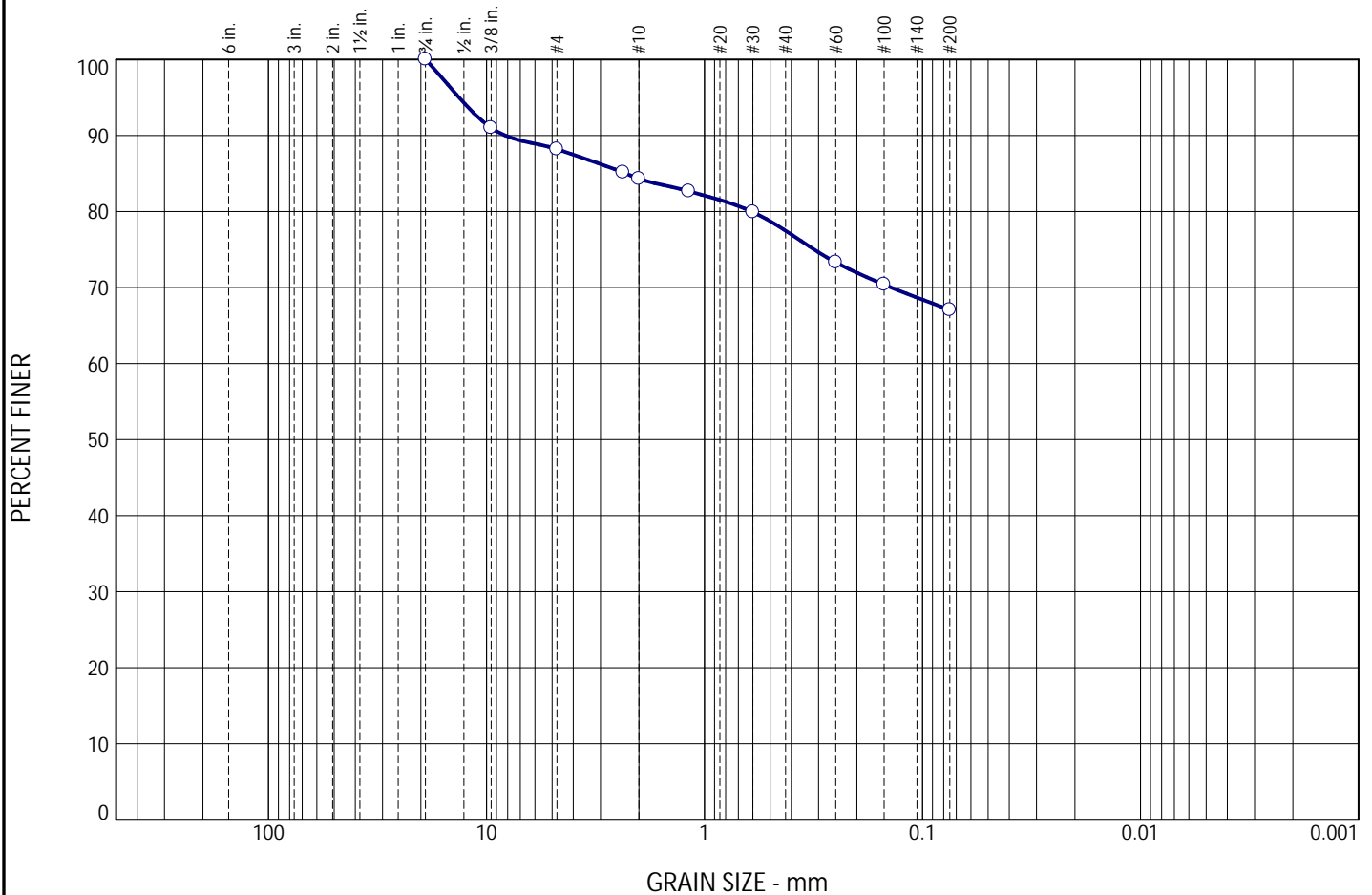
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-1

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 9.0 | 6.7 | 4.4 | 6.6 | 6.2 | 67.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 91.0 | | |
| #4 | 88.2 | | |
| #8 | 85.1 | | |
| #10 | 84.3 | | |
| #16 | 82.7 | | |
| #30 | 79.9 | | |
| #60 | 73.3 | | |
| #100 | 70.4 | | |
| #200 | 67.1 | | |

* (no specification provided)

Material Description
 Dark gray [Fines: (SILT/CLAY)], some coarse to fine Sand, little medium to fine Gravel

Atterberg Limits
 LL= PL= PI=

Coefficients
 D₈₅= 2.2938 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= CL:H\ML:H

Remarks
 WC: 21.1%

Source of Sample: TB-103
 Sample Number: S-2

Depth: 2'-2.8'

Date: 10/29/24

5439 Harding Highway
 Mays Landing New Jersey 08330
 Main: 877 627 3772

Geotechnical Laboratory



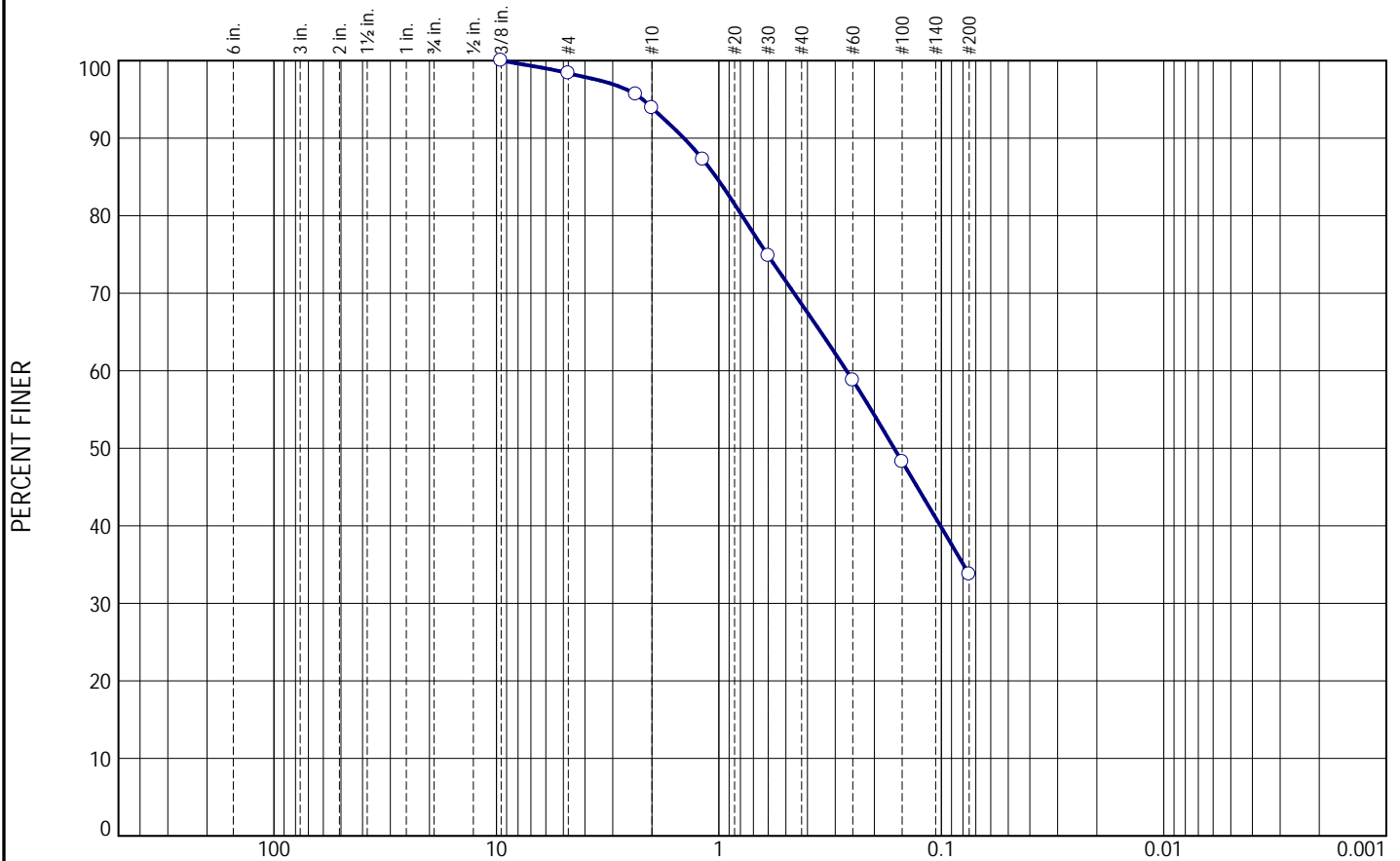
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-2**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 6.1 | 19.1 | 16.0 | 25.1 | 33.7 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 98.4 | | |
| #8 | 95.6 | | |
| #10 | 93.9 | | |
| #16 | 87.2 | | |
| #30 | 74.8 | | |
| #60 | 58.8 | | |
| #100 | 48.3 | | |
| #200 | 33.7 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown coarse to fine SAND, some [Fines: (Silt/Clay)], trace fine Gravel | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| <u>Coefficients</u> | | |
| D ₈₅ = 1.0298 | D ₆₀ = 0.2665 | D ₅₀ = 0.1630 |
| D ₃₀ = | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| <u>Remarks</u> | | |
| WC: 20.1% | | |
| Trace Mica | | |

Source of Sample: TB-104
Sample Number: S-7

Depth: 13'-15'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



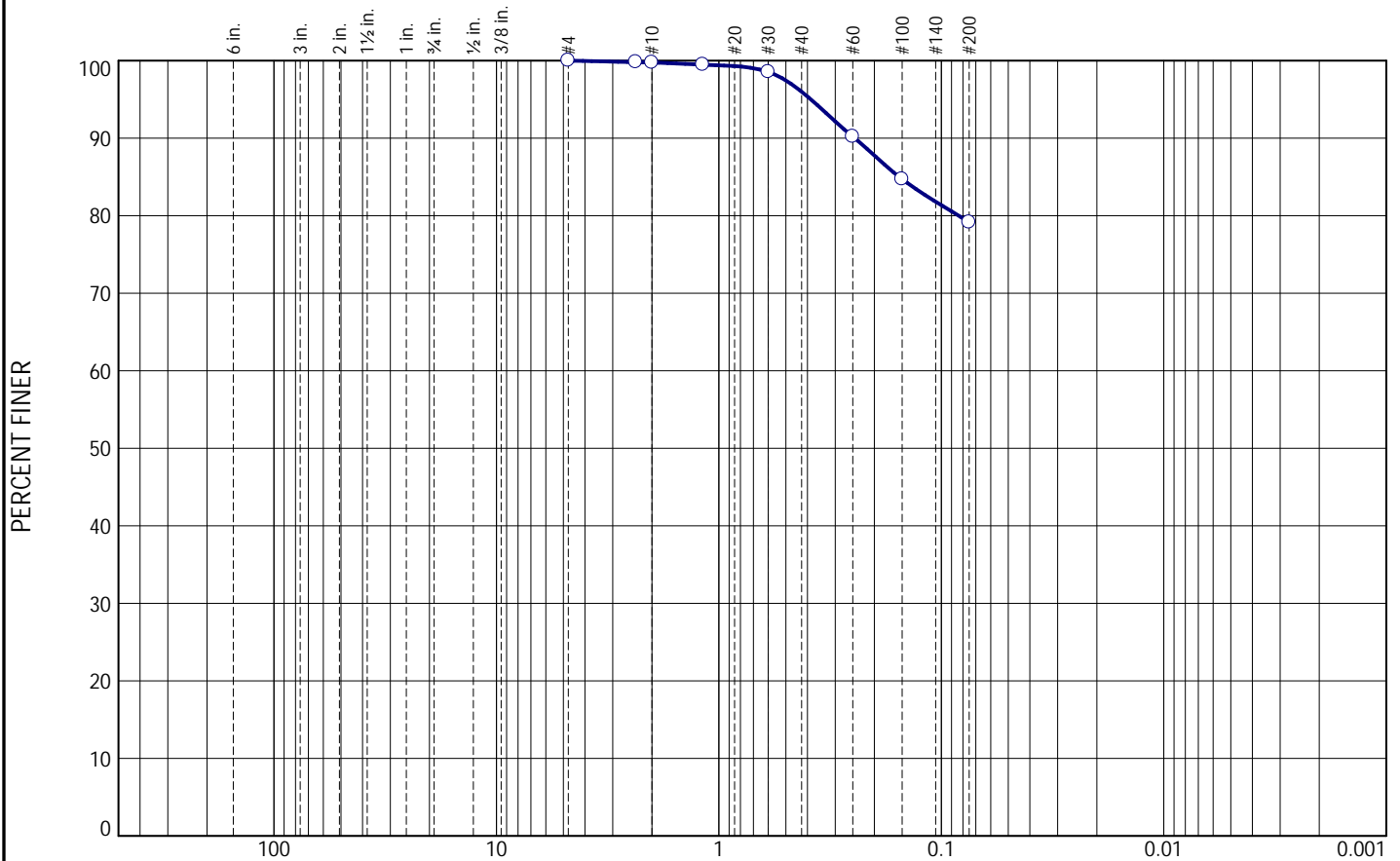
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-3

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.2 | 1.3 | 8.3 | 11.1 | 79.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 99.8 | | |
| #10 | 99.8 | | |
| #16 | 99.5 | | |
| #30 | 98.5 | | |
| #60 | 90.2 | | |
| #100 | 84.7 | | |
| #200 | 79.1 | | |

* (no specification provided)

Material Description
 Brown CLAY & SILT, some medium to fine Sand

Atterberg Limits
 LL= 30 PL= 20 PI= 10

Coefficients
 D₈₅= 0.1546 D₆₀= D₅₀=
 D₃₀= D₁₅= D₁₀=
 C_u= C_c=

Classification
 USCS= CL

Remarks
 WC: 19.6%

Source of Sample: TB-106
Sample Number: S-2

Depth: 2'-4'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



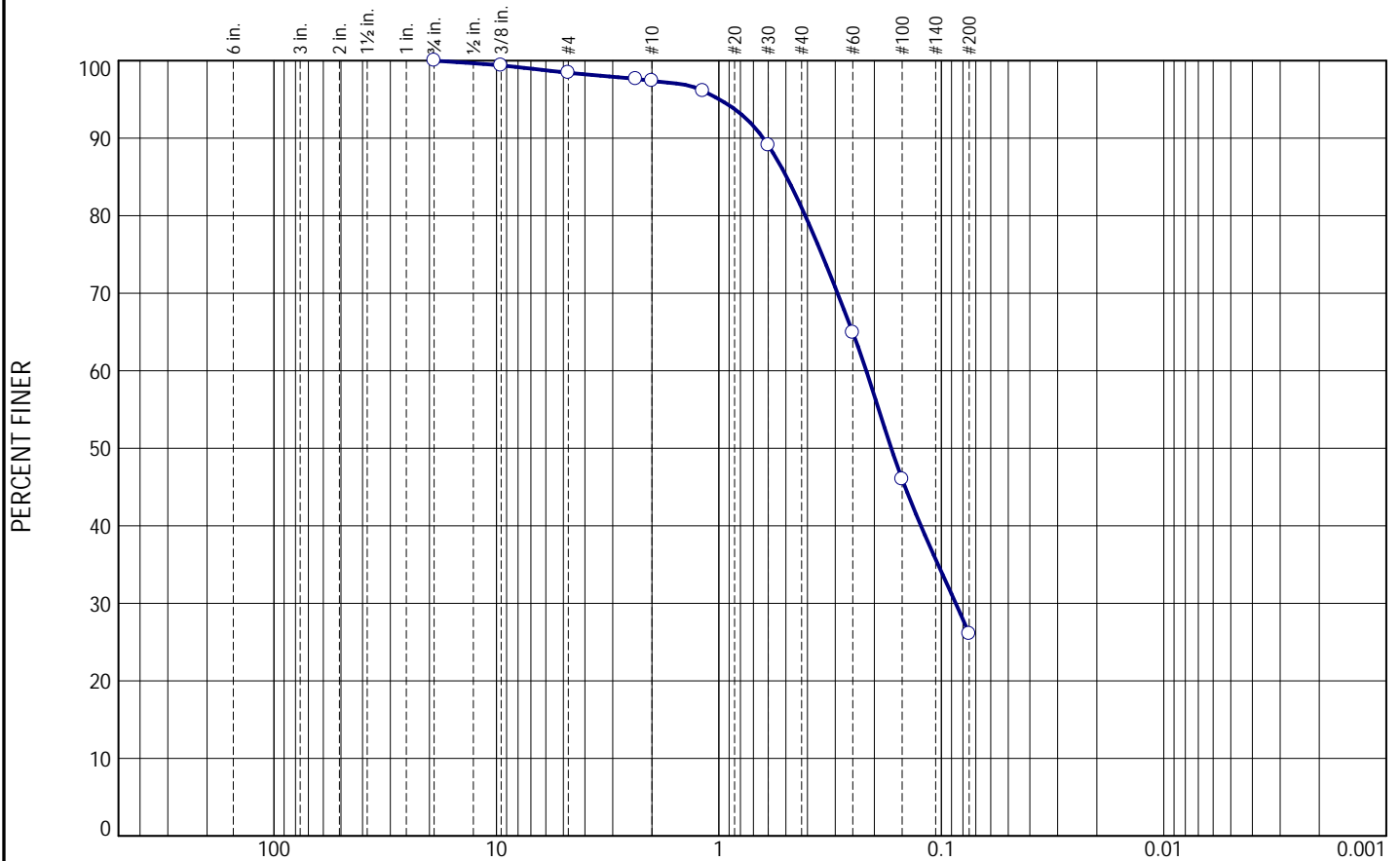
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-4

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.6 | 2.0 | 8.3 | 24.2 | 38.8 | 26.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 99.4 | | |
| #4 | 98.4 | | |
| #8 | 97.6 | | |
| #10 | 97.4 | | |
| #16 | 96.1 | | |
| #30 | 89.1 | | |
| #60 | 64.9 | | |
| #100 | 46.0 | | |
| #200 | 26.1 | | |

* (no specification provided)

| <u>Material Description</u> | | |
|---|--------------------------|--------------------------|
| Brown tan medium to fine SAND, some [Fines: (Silt/Clay)], trace medium to fine Gravel | | |
| | | |
| <u>Atterberg Limits</u> | | |
| LL= | PL= | PI= |
| | | |
| <u>Coefficients</u> | | |
| D ₈₅ = 0.4962 | D ₆₀ = 0.2175 | D ₅₀ = 0.1679 |
| D ₃₀ = 0.0862 | D ₁₅ = | D ₁₀ = |
| C _u = | C _c = | |
| <u>Classification</u> | | |
| USCS= | SM\SC | |
| | | |
| <u>Remarks</u> | | |
| WC: 10.3% | | |
| Trace Mica | | |

Source of Sample: TB-108
Sample Number: S-7

Depth: 13'-13.8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



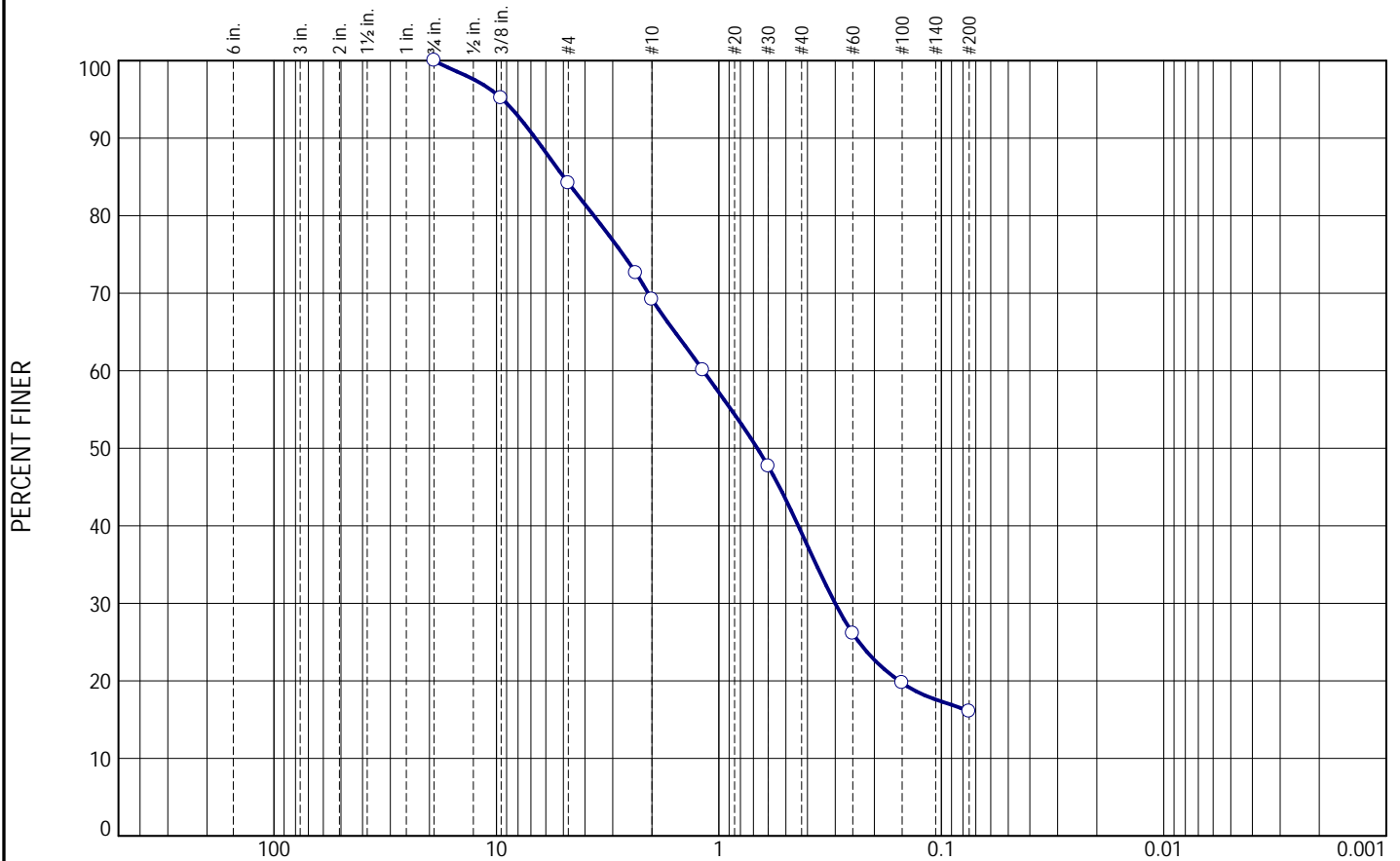
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-5

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 4.8 | 26.0 | 21.5 | 21.6 | 10.0 | 16.1 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .75 | 100.0 | | |
| .375 | 95.2 | | |
| #4 | 84.2 | | |
| #8 | 72.6 | | |
| #10 | 69.2 | | |
| #16 | 60.1 | | |
| #30 | 47.7 | | |
| #60 | 26.1 | | |
| #100 | 19.7 | | |
| #200 | 16.1 | | |

* (no specification provided)

| Material Description | | |
|--|--|--|
| Brown coarse to fine SAND, some medium to fine Gravel, little [Fines: (Silt/Clay)] | | |
| <div> <div> Atterberg Limits </div> <div> LL= </div> <div> PL= </div> <div> PI= </div> </div> | | |
| <div> <div> Coefficients </div> <div> D₈₅= 4.9830 </div> <div> D₃₀= 0.3000 </div> <div> C_u= </div> <div> D₆₀= 1.1751 </div> <div> D₁₅= </div> <div> C_c= </div> <div> D₅₀= 0.6716 </div> <div> D₁₀= </div> </div> | | |
| <div> <div> Classification </div> <div> USCS= SM\SC </div> </div> | | |
| <div> <div> Remarks </div> <div> WC: 14.2% </div> <div> Trace Mica </div> </div> | | |

Source of Sample: TB-109
Sample Number: S-4

Depth: 6'-8'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

Geotechnical
Laboratory



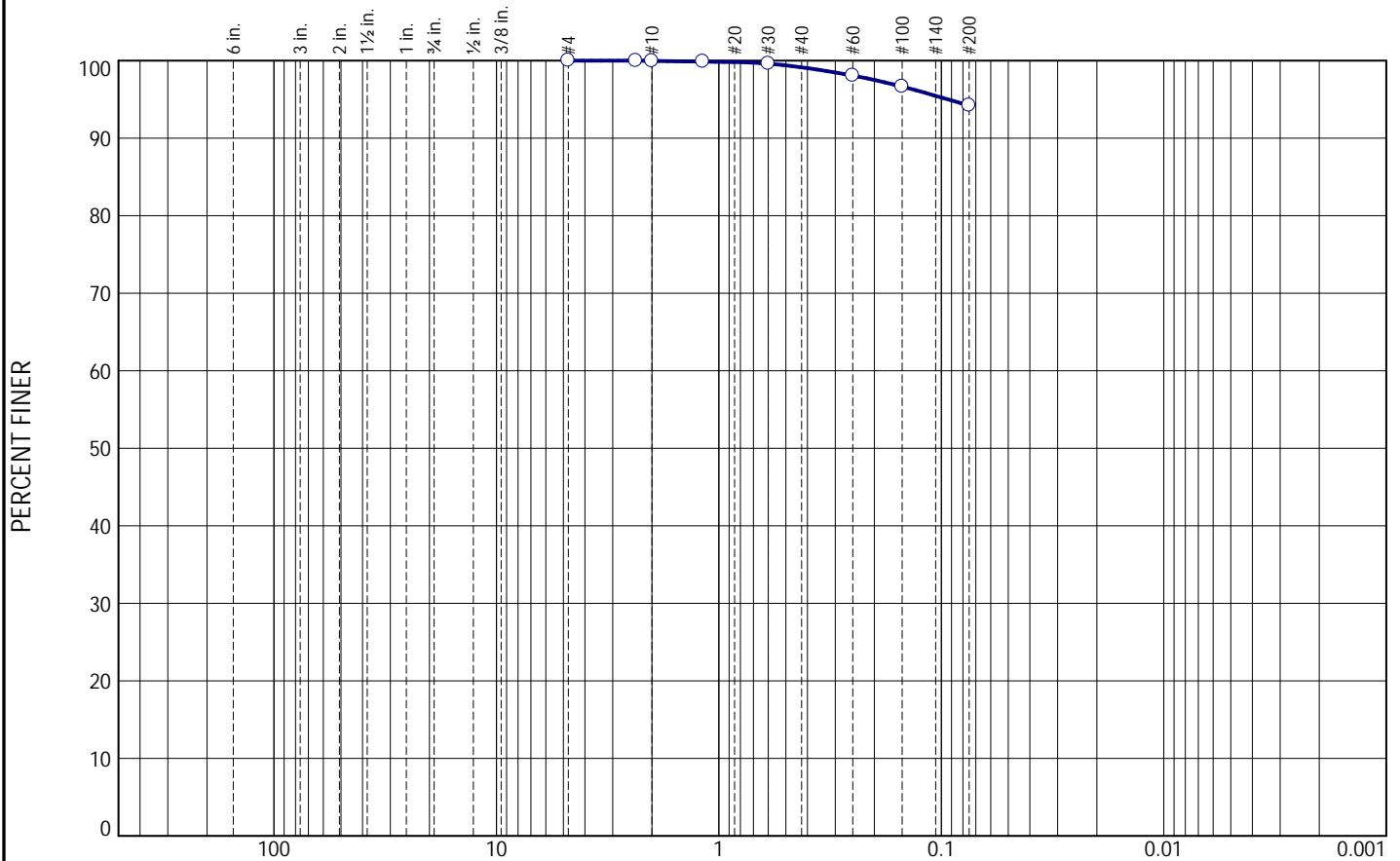
Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate PSA-6

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 1.5 | 3.9 | 94.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| #4 | 100.0 | | |
| #8 | 100.0 | | |
| #10 | 100.0 | | |
| #16 | 99.9 | | |
| #30 | 99.6 | | |
| #60 | 98.1 | | |
| #100 | 96.6 | | |
| #200 | 94.2 | | |

* (no specification provided)

Material Description
Brown [Fines: (SILT/CLAY)], trace medium to fine Sand

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 20.3%

Source of Sample: TB-110
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**

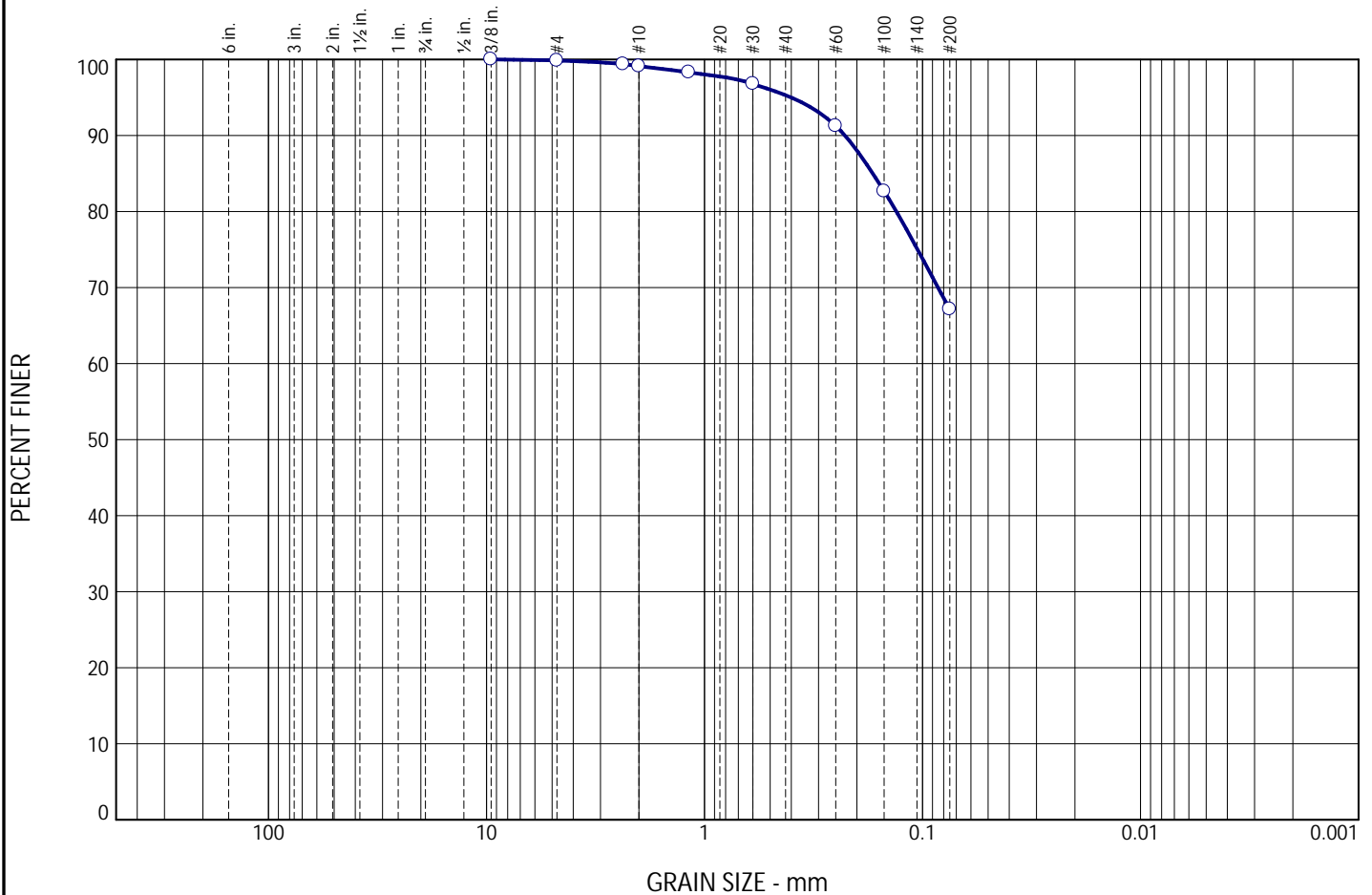


Client: City of Chester Public Works
Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-7**

Particle Size Distribution Report



| % Cobbles | % Gravel | | | % Sand | | | % Fines |
|-----------|----------|--------|------|--------|--------|------|---------|
| | Coarse | Medium | Fine | Coarse | Medium | Fine | |
| 0.0 | 0.0 | 0.0 | 0.9 | 2.3 | 5.5 | 24.1 | 67.2 |

| SIEVE SIZE | PERCENT FINER | SPEC. * PERCENT | PASS? (X=NO) |
|------------|---------------|-----------------|--------------|
| .375 | 100.0 | | |
| #4 | 99.9 | | |
| #8 | 99.4 | | |
| #10 | 99.1 | | |
| #16 | 98.3 | | |
| #30 | 96.8 | | |
| #60 | 91.3 | | |
| #100 | 82.7 | | |
| #200 | 67.2 | | |

* (no specification provided)

Material Description
Brown [Fines: (SILT/CLAY)], some medium to fine Sand

Atterberg Limits
LL= PL= PI=

Coefficients
D₈₅= 0.1692 D₆₀= D₅₀=
D₃₀= D₁₅= D₁₀=
C_u= C_c=

Classification
USCS= CL:H\ML:H

Remarks
WC: 21.3%

Source of Sample: TB-111
Sample Number: S-3

Depth: 4'-6'

Date: 10/30/24

5439 Harding Highway
Mays Landing New Jersey 08330
Main: 877 627 3772

**Geotechnical
Laboratory**



Client: City of Chester Public Works

Project: West 2nd Street and Lloyd Street Garage/Shed

Project No: COCD004

Plate **PSA-8**



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SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected site elements.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for restrictions on use of the premises and Owner-occupancy requirements.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 4. Review areas where existing construction is to remain and requires protection.

1.5 ACTION SUBMITTALS

- A. Shoring Design: Provide shoring designs, including plans, details, and calculations, prepared and sealed by a professional engineer licensed in the Commonwealth of Pennsylvania.

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.

1.7 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
- C. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

- D. Remove temporary barricades and protections where hazards no longer exist.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 2. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: As indicated on the Drawings, including but not limited to:
 1. Vegetation, planters, soils, gravel, asphalt and concrete pavement, pavers, curbs, storm piping, site furnishings.

END OF SECTION 024119

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Shoring, bracing, and anchoring.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **[Project site]** <Insert location>.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.
3. Form ties.
4. Waterstops.
5. Form-release agent.

- B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.

1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with **ACI 301 (ACI 301M)**.
 - a. Location of construction joints is subject to approval of the Architect.
3. Indicate location of waterstops.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Minutes of preinstallation conference.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with **ACI 301 (ACI 301M)**, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
 - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
 - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
 - a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).

2.2 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
 - 1. Provide continuous, true, and smooth concrete surfaces.
 - 2. Furnish in largest practicable sizes to minimize number of joints.
 - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
 - a. Plywood, metal, or other approved panel materials.
 - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - 1) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
 - 1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 RELATED MATERIALS

- A. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than **0.034 inch (0.85 mm)** thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, **3/4 by 3/4 inch (19 by 19 mm)**, minimum.

- C. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
 - 2. Form release agent for form liners shall be acceptable to form liner manufacturer.
- E. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than **1 inch (25 mm)** to the plane of exposed concrete surface.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with **ACI 301 (ACI 301M)**.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of **ACI 117 (ACI 117M)** and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes [**and**] [**Section 033300 "Architectural Concrete"**].
- C. Limit concrete surface irregularities as follows:
 - 1. Surface Finish-2.0: ACI 117 Class B, **1/4 inch (6 mm)**.
- D. Construct forms tight enough to prevent loss of concrete mortar.
 - 1. Minimize joints.
 - 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 - 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 - 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.

1. Provide and secure units to support screed strips.
 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 2. Locate temporary openings in forms at inconspicuous locations.
- I. **Chamfer** exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than **12 inches (305 mm)**.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
1. Determine sizes and locations from trades providing such items.
 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:
1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 3. Place joints perpendicular to main reinforcement.
 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls **as indicated on Drawings**.
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
 - 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
 - 5. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.
 - 1. Install in longest lengths practicable.
 - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 - 3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."
 - 4. Secure waterstops in correct position at 12 inches (305 mm) on center.
 - 5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.
 - a. Miter corners, intersections, and directional changes in waterstops.
 - b. Align center bulbs.
 - 6. Clean waterstops immediately prior to placement of concrete.
 - 7. Support and protect exposed waterstops during progress of the Work.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
 - 1. Install in longest lengths practicable.
 - 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 - 3. Protect exposed waterstops during progress of the Work.

3.4 SHORING AND RESHORING INSTALLATION

- A. Comply with **ACI 318 (ACI 318M)** and **ACI 301 (ACI 301M)** for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete..
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a **special inspector and qualified testing and inspecting agency]**to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
 - 2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.
3. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1. Reinforcement to Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."
- C. Material Test Reports: For the following, from a qualified testing agency:
 1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
 2. Mechanical splice couplers.
- D. Field quality-control reports.
- E. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, **Grade 60 (Grade 420)**, deformed.
- B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.
- C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.
- D. Galvanized Reinforcing Bars:
 1. Steel Bars: **ASTM A615/A615M, Grade 60 (Grade 420)**, deformed bars.
 2. Zinc Coating: ASTM A767/A767M, **Class I or Class II**] zinc coated after fabrication and bending.
- E. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.
- G. Galvanized-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from galvanized-steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
 - b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.
 - d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
 - e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
- C. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than 0.0508 inch (1.2908 mm) in diameter.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than **1 inch (25 mm)**, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with **ACI 318 (ACI 318M)**.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or **24 inches (610 mm)**, whichever is greater.
 - 2. Stagger splices in accordance with **ACI 318 (ACI 318M)**.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed **12 inches (305 mm)**.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus **2 inches (50 mm)** for plain wire and **8 inches (200 mm)** for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.

3.4 INSTALLATION TOLERANCES

- A. Comply with **ACI 117 (ACI 117M)**.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a **special inspector** and **qualified testing and inspecting agency** to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel-reinforcement placement.
 - 2. Steel-reinforcement mechanical splice couplers.
 - 3. Steel-reinforcement welding.

END OF SECTION

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at **Project site**

1.4 ACTION SUBMITTALS

- A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Aggregates.
6. Admixtures:

- a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at

time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

7. Vapor retarders.
8. Liquid floor treatments.
9. Curing materials.
10. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.

4. Vapor retarders.
5. Joint-filler strips.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Aggregates.
6. Admixtures:

C. Research Reports: For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.

D. Preconstruction Test Reports: For each mix design.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and **ACI 301** (ACI 301M).

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with **ACI 301 (ACI 301M)** and ACI 306.1.
- B. Hot-Weather Placement: Comply with **ACI 301 (ACI 301M)** and **ACI 305.1 (ACI 305.1M)**.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with **ACI 301 (ACI 301M)** unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C150/C150M, **Type I/II, white**.
 - 2. Fly Ash: ASTM C618, Class C or F.
 - 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C33/C33M, **Class 3M** coarse aggregate or better, graded. Provide aggregates from a single source.
- C. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride **in steel-reinforced concrete**.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- D. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A[, **except with maximum water-vapor permeance of not less than 10 mils (0.25 mm)** thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.4 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately **9 oz./sq. yd. (305 g/sq. m)** when dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below **50 deg F (10 deg C)**: Black.
 - b. Ambient Temperature between **50 deg F (10 deg C)** and **85 deg F (29 deg C)**: Any color.
 - c. Ambient Temperature Above **85 deg F (29 deg C)**: White.
- C. Water: Potable or complying with ASTM C1602/C1602M.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: **ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.**

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with **ACI 301 (ACI 301M)**.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.

2.7 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: Per Drawings
 - 2. Minimum Compressive Strength: Per Drawings
 - 3. Maximum w/cm: Per Drawings
 - 4. Air Content: Per Drawings

5. Limit water-soluble, chloride-ion content in hardened concrete to **1.00** percent by weight of cement.
- B. Class B: Normal-weight concrete used for foundation walls.
1. Exposure Class: Per Drawings
 2. Minimum Compressive Strength: Per Drawings
 3. Maximum w/cm: Per Drawings
 4. Air Content: Per Drawings
5. Limit water-soluble, chloride-ion content in hardened concrete to **1.00** percent by weight of cement.
- C. Class C: Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: Per Drawings
 2. Minimum Compressive Strength: Per Drawings
 3. Maximum w/cm: Per Drawings
 4. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
5. Limit water-soluble, chloride-ion content in hardened concrete to **1.00** percent by weight of cement.

PART 3 - EXECUTION

3.1 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.
 3. Lap vapor retarder over footings and grade beams not less than **6 inches (150 mm)**, sealing vapor retarder to concrete.

4. Lap joints **6 inches (150 mm)** and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by **6 inches (150 mm)** on all sides, and sealing to vapor retarder.

3.3 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Space vertical joints in walls **as indicated on Drawings**. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated on drawings:
 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of **1/8 inch (3.2 mm)**. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut **1/8-inch- (3.2-mm-)** wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 2. Terminate full-width joint-filler strips not less than **1/2 inch (13 mm)** or more than **1 inch (25 mm)** below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.
2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with **ACI 301 (ACI 301M)**.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least **6 inches (150 mm)** into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.

5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.5 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. **ACI 301 (ACI 301M)** Surface Finish SF-3.0:
 - a. Patch voids larger than **3/4 inch (19 mm)** wide or **1/2 inch (13 mm)** deep.
 - b. Remove projections larger than **1/8 inch (3 mm)**.
 - c. Patch tie holes.
 - d. Surface Tolerance: **ACI 117 (ACI 117M)** Class A.
 - e. Locations: Apply to concrete surfaces **exposed to public view..**

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces [**indicated on Drawings**] [**where ceramic or quarry tile is to be installed by either thickset or thinset method**]. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

C. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Architect before application.

3.7 TOLERANCES

- A. Conform to **ACI 117** (**ACI 117M**).

3.8 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than **[three]** **[seven]** **[14]** **[28]** days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
 - 4. Rinse with water; remove excess material until surface is dry.
 - 5. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: **[Owner will engage]** **[Engage]** a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.

- 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Measure floor and slab flatness and levelness in accordance with **ASTM E1155** (**ASTM E1155M**) within **24** hours of completion of floor finishing and promptly report test results to Architect.

3.10 PROTECTION

- A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.
 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Decorative concrete masonry units.
3. Pre-faced concrete masonry units.
4. Steel reinforcing bars.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For reinforcing steel. Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
- C. Samples: For each type and color of the following:
1. Smooth face CMUs.
 2. Split Face CMUs.
 3. **Colored** mortar.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type and size of product. For masonry units, include **data on material properties and material test reports substantiating compliance with requirements**.
- B. Mix Designs: For each type of mortar **and grout**. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test in accordance with ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.

2. Include test reports, in accordance with ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

- A. Sample Panels: Build sample panels to verify selections made under Sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.
 1. Build sample panels for **[each type of exposed unit masonry construction]** **[typical exterior wall]** **[typical interior wall]** **[typical exterior and interior walls]** in sizes approximately **[48 inches (1200 mm)]** **[60 inches (1500 mm)]** **<Insert dimension>** long by **[36 inches (900 mm)]** **[48 inches (1200 mm)]** **<Insert dimension>** high **[by full thickness]**.

1.6 FIELD CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 1. Where fire-resistance-rated construction is indicated, units are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. Insulated CMUs: Where indicated, units contain rigid, specially shaped, molded-polystyrene insulation units complying with ASTM C578, Type I, designed for installing in cores of masonry units.
- C. CMUs: ASTM C90.
 - 1. Unit Compressive Strength: Per drawings
 - 2. Density Classification: **Normal weight unless otherwise indicated.**
- D. Decorative CMUs: ASTM C90.
 - 1. Unit Compressive Strength: Per drawings
 - 2. Density Classification: **Normal weight.**
 - 3. Basis of Design -- Pattern and Texture:
 - a. Smooth face: York Building Products, Slate color.
 - b. Split face: York Building Products, Slate color.

2.3 CONCRETE LINTELS

- A. Concrete Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. **Provide lintels with net-area compressive strength not less than that of CMUs.**

2.4 MORTAR AND GROUT MATERIALS

- A. Basis of Design – York Building Products, WR2521 Slate in color.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.

- F. Colored Cement Products: Packaged blend made from [**portland cement and hydrated lime** and mortar pigments, all complying with specified requirements, and containing no other ingredients.
- G. Aggregate for Mortar: ASTM C144.
 - 1. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Aggregate for Grout: ASTM C404.
- I. Water: Potable.

2.5 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, **Grade 60 (Grade 420)**.
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from **0.148-inch (3.77-mm)** steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.

2.6 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 - 1. Fabricate continuous flashings in sections **96 inches (2400 mm)** long minimum, but not exceeding **12 feet (3.7 m)**. Provide splice plates at joints of formed, smooth metal flashing.
 - 2. Fabricate metal drip edges from stainless steel. Extend at least **3 inches (76 mm)** into wall and **1/2 inch (13 mm)** out from wall, with outer edge bent down 30 degrees **and hemmed**.
 - 3. Fabricate metal sealant stops from stainless steel. Extend at least **3 inches (76 mm)** into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for **3/4 inch (19 mm)** and down into joint **1/4 inch (6 mm)** to form a stop for retaining sealant backer rod.
 - 4. Fabricate metal expansion-joint strips from [**stainless steel**] to shapes indicated.
- B. Flexible Flashing: Use **one of** the following unless otherwise indicated:
 - 1. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than **0.040 inch (1.02 mm)**.
 - 2. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or

spunbonded polyolefin to produce an overall thickness of not less than **0.040 inch (1.02 mm)**.

3. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymers alloy.
 4. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene terpolymer, complying with ASTM D4637/D4637M, **0.040 inch (1.0 mm)** thick.
- C. Single-Wythe CMU Flashing System: System of CMU cell flashing pans and interlocking CMU web covers made from UV-resistant, high-density polyethylene. Cell flashing pans have integral weep spouts designed to be built into mortar bed joints and that extend into the cell to prevent clogging with mortar.
- D. Solder and Sealants for Sheet Metal Flashings: As specified in Section 076200 "Sheet Metal Flashing and Trim."
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from **neoprene**.
- B. Preformed Control-Joint Gaskets: Made from **styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406** and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.8 MASONRY-CELL FILL

- A. Loose-Fill Insulation: Perlite complying with ASTM C549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).
- B. Lightweight-Aggregate Fill: ASTM C331/C331M.

2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
 2. Use **portland cement-lime** mortar unless otherwise indicated.
 3. For exterior masonry, use **portland cement-lime** mortar.
 4. For reinforced masonry, use **portland cement-lime** mortar.
 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent..
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Provide mortar types as indicated on drawings
- D. Pigmented Mortar: Use colored cement product[**or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products**].
1. Pigments do not exceed 10 percent of portland cement by weight.
 2. Pigments do not exceed 5 percent of masonry cement by weight.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Application: Use colored-aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
- F. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C476
 3. Provide grout with a slump of **8 to 11 inches (200 to 280 mm)** as measured in accordance with ASTM C143/C143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped

edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus **1/2 inch (12 mm)** or minus **1/4 inch (6 mm)**.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus **1/2 inch (12 mm)**.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus **1/4 inch (6 mm)** in a story height or **1/2 inch (12 mm)** total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than **1/4 inch in 10 feet (6 mm in 3 m)**, or **1/2-inch (12-mm)** maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 feet (3 mm in 3 m)**, **1/4 inch in 20 feet (6 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.
5. For lines and surfaces, do not vary from straight by more than **1/4 inch in 10 feet (6 mm in 3 m)**, **3/8 inch in 20 feet (9 mm in 6 m)**, or **1/2-inch (12-mm)** maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**, with a maximum thickness limited to **1/2 inch (12 mm)**.
2. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch (9 mm)** or minus **1/4 inch (6 mm)**.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch (3 mm)**.

3.3 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal **4-inch (100-mm)** horizontal face dimensions at corners or jambs.

- C. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- D. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- E. Fill cores in hollow CMUs with grout **24 inches (600 mm)** under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.4 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.5 MASONRY-CELL FILL

- A. Pour **loose-fill insulation** into cavities to fill void spaces. Maintain inspection ports to show presence of fill at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of fill to one story high, but not more than **20 feet (6 m)**.
- B. Install molded-polystyrene insulation units into masonry unit cells before laying units.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch (16 mm)** on exterior side of walls, **1/2 inch (13 mm)** elsewhere. Lap reinforcement a minimum of **6 inches (150 mm)**.
 - 1. Space reinforcement not more than **16 inches (406 mm)** o.c.
 - 2. Space reinforcement not more than **8 inches (203 mm)** o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than **8 inches (203 mm)** above and below wall openings and extending **12 inches (305 mm)** beyond openings **in addition to continuous reinforcement.**

- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following:
 1. Provide an open space not less than [**1/2 inch (13 mm)**] [**1 inch (25 mm)**] [**2 inches (50 mm)**] wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 3. Space anchors as indicated, but not more than **24 inches (610 mm)** o.c. vertically and **36 inches (915 mm)** o.c. horizontally.

3.8 FLASHING

- A. General: Install embedded flashing at ledges and other obstructions to downward flow of water in wall where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape[**as recommended by flashing manufacturer**].
 2. At lintels, extend flashing a minimum of **6 inches (150 mm)** into masonry at each end. At heads and sills, extend flashing **6 inches (150 mm)** at ends and turn up not less than **2 inches (50 mm)** to form end dams.
 3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall, and adhere flexible flashing to top of metal drip edge.
 4. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing **1/2 inch (13 mm)** back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

3.9 REINFORCED UNIT MASONRY

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than **60 inches (1520 mm)**.

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements is done at Contractor's expense.
- B. Inspections: Special inspections in accordance with Level **B** in TMS 402/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.
- E. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.
- F. Mortar Test (Property Specification): For each mix provided, in accordance with ASTM C780. Test mortar for **[mortar air content] [and] [compressive strength]**.
- G. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

3.11 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in two uniform coats to a total thickness of **3/4 inch (19 mm)**. Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of **1/8 inch per foot (3 mm per 300 mm)**. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.12 REPAIRING, POINTING, AND CLEANING

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 2. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.13 MASONRY WASTE DISPOSAL

- 1. Do not dispose of masonry waste as fill within **18 inches (450 mm)** of finished grade.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior non-load-bearing wall framing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Cold-formed steel framing materials.
 - 2. Interior non-load-bearing wall framing.
 - 3. Vertical deflection clips.
 - 4. Single deflection track.
 - 5. Double deflection track.
 - 6. Drift clips.
 - 7. Post-installed anchors.
 - 8. Power-actuated anchors.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product certificates.
- C. Product test reports.
- D. Research Reports:
 - 1. For post-installed anchors and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Product Tests: Mill certificates or data from a qualified independent testing agency.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel".
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel".
- D. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One- and Two-Family Dwellings".

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:
 - 1. Wall Studs: AISI S211.
 - 2. Headers: AISI S212.
 - 3. Lateral Design: AISI S213.
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60 (Z180), A60 (ZF180), AZ50 (AZM150), or GF30 (ZGF90).
- B. Steel Sheet for Vertical Deflection/Drift Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60 (Z180).

2.3 INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0329 inch (0.84 mm).
 - 2. Flange Width: 1-5/8 inches (41 mm).

- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.
- C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.
- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC193 ICC-ES AC58 or ICC-ES AC308 as appropriate for the substrate.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Type: Torque-controlled expansion anchor or adhesive anchor.
 - 3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A780/A780M MIL-P-21035B or SSPC-Paint 20.
- B. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.
- E. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- G. Install insulation, specified in Section 072100 "Thermal Insulation", in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.3 INSTALLATION OF INTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: As indicated on Drawings.

- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to studs and anchor to building structure.
 - 4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.
 - 1. Install solid blocking at centers indicated on Shop Drawings.
- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:
 - 1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.5 REPAIRS

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 054000

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Steel framing and supports for overhead doors.
2. Steel framing and supports for countertops.
3. Steel framing and supports for mechanical and electrical equipment.
4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
5. Shelf angles.
6. Structural-steel door frames.
7. Loose bearing and leveling plates for applications where they are not specified in other Sections.
8. Metal gratings.
9. Ladder.
10. Floor Anchors

- B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 042200 "Concrete Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Steel framing and supports for overhead doors.
 - 2. Steel framing and supports for countertops.
 - 3. Steel framing and supports for mechanical and electrical equipment.
 - 4. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 5. Shelf angles.
 - 6. Structural-steel door frames.
 - 7. Loose steel lintels.
 - 8. Metal gratings.
 - 9. Ladder.
 - 10. Floor Anchors.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
1. Size of Channels: 1-5/8 by 1-5/8 inches.
 2. Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.108-inch nominal thickness.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

- E. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- F. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- G. Post-Installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- H. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting," Section 099123 Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

- H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- I. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with primer specified in Section 099600 "High-Performance Coatings" where indicated.

2.7 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 STRUCTURAL-STEEL DOOR FRAMES

- A. Fabricate structural-steel door frames from steel shapes, plates, and bars of size and to dimensions indicated, fully welded together, with 5/8-by-1-1/2-inch steel channel stops, unless otherwise indicated. Plug-weld built-up members and continuously weld exposed joints. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than 10 inches o.c. Reinforce frames and drill and tap as necessary to accept finish hardware.
 - 1. Provide with integrally welded steel strap anchors for securing door frames into adjoining concrete or masonry.

- B. Extend bottom of frames to floor elevation indicated with steel angle clips welded to frames for anchoring frame to floor with expansion shields and bolts.
- C. Galvanize and prime exterior steel frames.
- D. Prime exterior steel frames with primer specified in Section 099600 "High-Performance Coatings."

2.9 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.
- C. Prime plates with primer specified in Section 099600 "High-Performance Coatings."

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1" per foot of span, but not less than 8 inches unless otherwise indicated.
- C. Galvanize and prime loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with primer specified in Section 099600 "High-Performance Coatings."

2.11 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.12 METAL GRATINGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. EJ Company; 655-04 Reticuline Grate.

- B. Provide metal gratings in material, finish, style, size, thickness, weight, and type indicated or, if not indicated, as recommended by manufacturer for indicated applications and as needed to support indicated loads.

1. Material: Steel.
2. Steel Finish: Galvanized.
3. Style Designation: 1-1/2 number 9.
4. Strength: 16 Kip wheel load.
5. Longitudinal Bars: ASTM A529 Grade 50.
6. Reticuline Bars: ASTM A1011 Grade 36.

2.13 FLOOR ANCHORS

- A. Basis-of-design product: BL-10 Tydown by Bodyloc Collision Repair Equipment, 5738 Newt Patterson Road, Mansfield, TX 76063. Provide the indicated product or an approved comparable product.

2.14 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
1. Shop prime with universal shop primer unless primers specified in Section 099600 "High-Performance Coatings" are indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for overhead doors securely to, and rigidly brace from, building structure.

- C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with nonshrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 055000

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes pipe and tube handrails and railings, including removable sections, made of the following:

1. Steel.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Handrails and Railings:

1. Capable of withstanding the following structural loads without exceeding the allowable design working stress of materials involved:
 - a. Top Rail of Guards: Concentrated load of 200 lbs. applied at any point and in any direction, and a uniform load of 50 plf. applied horizontally and concurrently with uniform load of 100 plf. applied vertically downward. Concentrated and uniform loads need not be assumed to act concurrently.
 - b. Handrails Not Serving as Top Rails: Concentrated load of 200 lbs. applied at any point and in any direction, and a uniform load of 50 plf. applied in any direction. Concentrated and uniform loads need not be assumed to act concurrently.
 - c. Infill Area of Guards: Horizontal concentrated load of 50 lbs. applied to 1 sq. ft. at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area. Load on infill area need not be assumed to act concurrently with loads on top rails.

1.3 SUBMITTALS

- A. Product Data: For mechanically connected handrails and railings, grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details of installation, attachments to other Work.
1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1 METALS

A. Steel and Iron:

1. Steel Pipe: ASTM A 53, Type F or Type S, Grade A, standard weight (Schedule 40), unless another grade and weight are required by structural loads.
2. Steel Plates, Shapes, and Bars: ASTM A 36.

2.2 MISCELLANEOUS MATERIALS

- A. Welding Electrodes and Filler Metal: Provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Fasteners: Same basic metal as fastened metal; concealed, unless otherwise indicated or unavoidable, and standard with systems indicated.
- C. Anchors: Fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined per ASTM E 488.
- D. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; with good resistance to corrosion; and compatible with finish paint systems indicated.
- E. Grout and Anchoring Cement: Premixed, nonshrink, nonmetallic grout complying with ASTM C 1107 or erosion-resistant, nonshrink, anchoring cement; recommended by manufacturer for use indicated.

2.3 FABRICATION

- A. General: Fabricate to design, dimensions, and details indicated, but not less than that required to support structural loads.
 - 1. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- B. Form changes in direction of railing members by bending or inserting prefabricated flush-elbow fittings welded in place.
- C. Form curves by bending in jigs to produce uniform curvature without buckling, twisting, cracking, or otherwise deforming exposed surfaces.
- D. Welded Connections: Connect handrail and railing members by welding. Use welded-in fittings. Weld connections continuously.

- E. Brackets, Flanges, Fittings, and Anchors: Fabricate wall brackets, flanges, miscellaneous fittings, and anchors to connect handrails and railings to other work.
 - 1. Cast or form metal of same material and finish as rails.
- F. Close exposed ends of handrail and railing members.
- G. Provide wall returns at ends of wall-mounted handrails.

2.4 FINISHES

- A. Steel:
 - 1. Shop-Primed Steel Finish: Prepare to comply with SSPC-SP 7, "Brush-off Blast Cleaning" and apply primer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Perform cutting, drilling, and fitting required to install handrails and railings. Set units accurately in location, alignment, and elevation.
 - 1. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- B. Anchor posts in concrete by inserting into formed or core-drilled holes and grouting annular space.
- C. Anchor posts to metal surfaces with oval flanges.
- D. Anchor railing ends into concrete and masonry with round flanges connected with post-installed anchors and bolts.
- E. Attach handrails to wall with wall brackets.
 - 1. For steel-framed gypsum board assemblies, use hanger or lag bolts set into wood backing between studs or fasten to steel framing or concealed reinforcements using self-tapping screws of size and type required to support structural loads.
- F. Touch up surfaces and finishes after erection.
 - 1. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.

END OF SECTION 055213

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Framing with dimension lumber.
 - 2. Framing with engineered wood products.
 - 3. Shear wall panels.
 - 4. Wood blocking and nailers.
 - 5. Wood furring.
 - 6. Wood sleepers.
 - 7. Plywood backing panels.

1.2 REFERENCE STANDARDS

- A. American Plywood Association (APA)
 - 1. Performance Standards and Qualification Policy for Structural-Use Panels, Form No. E445.
 - 2. Voluntary Product Standard, PS 1-09, Structural Plywood.
- B. American Wood Protection Association (AWPA)
 - 1. Standard U1.
- C. ASTM
 - 1. ASTM D3498, Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
- D. National Institute for Standards and Technology (NIST), U.S. Department of Commerce (DOC)
 - 1. American Softwood Lumber Standard (Voluntary Product Standard PS 20).

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- C. Wood Treatment Data:
 - 1. Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.

2. Submit written statement indicating that all field-cut treated lumber has received field treating.
- D. Compatibility of Roofing with Treated Wood: Submit evidence from roofing manufacturer indicating that all wood materials which come into contact with roofing and roofing accessories are compatible and will not affect the roofing warranties.
 1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.
 2. For water-borne treatment, include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.
- E. Evaluation Reports: For the following, from ICC-ES:
 1. Wood-preservative-treated wood.
 2. Fire-retardant-treated wood.
 3. Engineered wood products.
 4. Shear panels.
 5. Power-driven fasteners.
 6. Post-installed anchors.
 7. Metal framing anchors.

1.4 QUALITY ASSURANCE

- A. All wood materials in this Section must be new and free from warps, cracks, bends, bows and knots. Any wood material installed under this Section which does not meet the requirements shall be removed and replaced at no cost to the Owner.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with two heavy brush coats of same chemical used for treatment and to comply with AWP A M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.
- E. Application: Treat items indicated on Drawings, and the following:
 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
 5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction, No. 3, Stud, or Standard grade.
 1. Application: Interior partitions not indicated as load bearing.
 2. Species:
 - a. Southern pine or mixed southern pine; SPIB.
 - b. Northern species; NLGA.

- c. Eastern softwoods; NeLMA.
 - d. Western woods; WCLIB or WWP.
- B. Load-Bearing Interior and Exterior Wall Studs: Construction, No. 3, or Stud grade.
 - 1. Application: Walls and partitions indicated as load bearing.
 - 2. Species:
 - a. Southern pine or mixed southern pine; SPIB.
 - b. Northern species; NLGA.
 - c. Eastern softwoods; NeLMA.
 - d. Western woods; WCLIB or WWP.
- C. Framing Other Than Wall and Partition Studs (Load Bearing Members including Joists, Rafters, Headers, etc.) : No. 2 grade.
 - 1. Application: Load bearing framing other than studs.
 - 2. Species (Allowable extreme bending stress greater than 850 psi):
 - a. Hem-fir (north); NLGA.
 - b. Southern pine (non-dense); SPIB.
 - c. Douglas fir-larch; WCLIB or WWP.
 - d. Spruce-pine-fir; NLGA.
 - e. Douglas fir-south; WWP.
 - f. Hem-fir; WCLIB or WWP.
 - g. Douglas fir-larch (north); NLGA.
 - h. Spruce-pine-fir (south); NeLMA, WCLIB, or WWP.
- D. Exposed Framing: Hand-select material for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.
 - 1. Species and Grade: As indicated above for load-bearing construction of same type.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Furring.
 - 6. Grounds.
- B. Dimension Lumber Items: No. 2 or Construction grade lumber of any species.

C. Concealed Boards: Any of the following species and grades:

1. Mixed southern pine or southern pine; SPIB.
2. Eastern softwoods; NeLMA.
3. Northern species; NLGA.
4. Western woods; WCLIB or WWPA.

2.5 PLYWOOD SHEATHING

- A. General: Unless indicated otherwise, all plywood shall comply with American Plywood Association (APA) Form No. E445 and Voluntary Product Standard, PS 1-09, Structural Plywood.
1. Factory mark each plywood panel with APA mark indicating compliance.
 2. Exposure Durability Classification: Exterior
 3. Thickness and Span Rating: If not indicated, as required to suit joist or stud spacing and loading.
 4. Edge Detail: Square
 5. Exposure Durability Classification: EXTERIOR
- B. Roof Sheathing: APA RATED SHEATHING, minimum 5/8" thickness.
- C. Wall Sheathing: APA RATED SHEATHING, minimum 1/2" thickness
- D. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated not less than 3/4-inch nominal thickness.

2.6 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel. Fasteners shall be compatible with the pressure-preservative.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Post-Installed Anchors: Fastener systems as indicated, or if not indicated with an evaluation report acceptable to Engineer as appropriate for the substrate.

2.7 METAL FRAMING ANCHORS

- A. Manufacturers and Products:

1. Simpson Strong Tie
 2. MiTek USA, USP Structural Connectors
 3. ITW BCG Hardware, ITW Building Components Group
 4. Or Approved Equal.
- B. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spun-bonded polyolefin to produce an overall thickness of not less than 0.025 inch.
- C. Adhesives for gluing wood-to-wood, concrete or masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
1. Liquid Nails
 2. Titebond
 3. Loctite
 4. Or Approved Equal.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- D. Install shear wall panels to comply with manufacturer's written instructions.
- E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- H. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood blocking and nailers.
 - 2. Utility shelving.
 - 3. Plywood backing panels.
- B. Related Requirements:
 - 1. Section 061600 "Sheathing" for sheathing and underlayment.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Sustainable Design Submittals:

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Power-driven fasteners.
3. Post-installed anchors.
4. Metal framing anchors.

1.6 QUALITY ASSURANCE

- ### A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

- ### A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- #### A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Dress lumber, S4S, unless otherwise indicated.
- #### B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- #### A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Grounds.
 - 4. Utility shelving.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:
 - 1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WHPA.
 - 2. Mixed southern pine or southern pine No. 1 grade; SPIB.
 - 3. Hem-fir or hem-fir (north), Select Merchantable or No. 1 Common grade; NLGA, WCLIB, or WHPA.
 - 4. Spruce-pine-fir (south) or spruce-pine-fir, Select Merchantable or No. 1 Common grade; NeLMA, NLGA, WCLIB, or WHPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193, or ICC-ES **AC308** as appropriate for the substrate.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

2.6 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- E. Do not splice structural members between supports unless otherwise indicated.

- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
 - 2. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.
- G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWP A M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILER

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Sheathing joint and penetration treatment.
- B. Related Requirements:
 - 1. Section 061053 "Miscellaneous Rough Carpentry" for plywood backing panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier and water-resistant glass-mat gypsum sheathing assemblies.
 - 1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
 - 2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, including list of ABAA-certified installers and supervisors employed by Installer, who work on Project and testing and inspecting agency.
- B. Product Certificates: From air-barrier and water-resistant glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.

- C. Product Test Reports: For each air-barrier and water-resistant glass-mat gypsum sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Air-barrier and water-resistant glass-mat gypsum sheathing.
- E. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
 - a. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing Performance: Air-barrier and water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, tie-ins to other installed air barriers, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 WALL SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. CertainTeed; SAINT-GOBAIN.
- b. Georgia-Pacific Gypsum LLC.
- c. Gold Bond Building Products, LLC provided by National Gypsum Company.
- d. USG Corporation.
2. Type and Thickness: Type X, 5/8 inch thick.
3. Size: 48 by 96 inches for vertical installation.
4. Fire Propagation Characteristics: Complies with NFPA 285 testing as part of an approved assembly.
5. UV Resistance: Can be exposed to sunlight for **30** days according to manufacturer's written instructions.
6. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by sheathing manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. For parapet and wall sheathing, provide fasteners of Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
- F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 1. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C954.

2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall and parapet sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
 2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
 3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Interior trim, including non-fire-rated interior door frames.
 - 2. Interior **plywood** paneling.
 - 3. Shelving.

- B. Related Requirements:

- 1. Section 061000 "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Section 099123 "Interior Painting" for priming and backpriming of interior finish carpentry.

1.3 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.
- C. PVC: Polyvinyl chloride.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

- B. Samples: For each exposed product and for each color and texture specified.
- C. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.
- D. Samples for Verification:
 - 1. For each species and cut of lumber and panel products with nonfactory-applied finish, with half of exposed surface finished; 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.
 - 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.
 - 1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
 - 2. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American

Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
- B. Softwood Plywood: DOC PS 1.
- C. Hardboard: ANSI A135.4.
- D. MDF: ANSI A208.2, **Grade 130**.
- E. Particleboard: ANSI A208.1, **Grade M-2**.
- F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper and complying with NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

1. Color: **As selected by Architect from manufacturer's full range.**

2.2 INTERIOR TRIM

- A. Lumber Trim for Opaque Finish (Painted Finish):
 1. Species and Grade:
 - a. Eastern white pine; NeLMA or NLGA **Premium or 2 Common**.
 2. Maximum Moisture Content for Softwoods: **15** percent.
 3. Maximum Moisture Content for Hardwoods: **10** percent.
 4. Finger Jointing: **Allowed**.
 5. Face Surface: **Surfaced (smooth)**.
 6. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.
- B. Moldings for Opaque Finish (Painted Finish): Made to patterns included in MMPA's "WM/Series Softwood Moulding Patterns."
 1. Softwood Moldings: MMPA WM 4, P grade.
 - a. Species: **Eastern white, Idaho white, lodgepole, ponderosa, radiata, or sugar pine.**
 - b. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
 2. Hardwood Moldings: MMPA WM 4, P-grade.
 - a. Species: **Aspen, basswood, cottonwood, gum, magnolia, soft maple, tupelo, or yellow poplar.**
 - b. Maximum Moisture Content: 9 percent.

3. Finger Jointing: **Allowed**.

2.3 SHELVING AND CLOTHES RODS

- A. **Closet Shelving:** Made from **the following material**, **3/4 inch (19 mm)** thick:
1. Melamine-faced particleboard with **radiused and filled** front edge.
- B. Shelf Cleats: **3/4-by-5-1/2-inch (19-by-140-mm)** boards with hole and notch to receive clothes rods], as specified above for shelving.
- C. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.
- D. Metal Clothes Rods: **1-5/16-inch- (33-mm-)** diameter, **chrome-plated-steel tubes**.
- E. Metal Rod Flanges: **Chrome-plated steel**.

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.5 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
1. Interior standing and running trim, except shoe and crown molds.
 2. Wood-board paneling.
- B. Ease edges of lumber less than **1 inch (25 mm)** in nominal thickness to **1/16-inch (1.5-mm)** radius and edges of lumber **1 inch (25 mm)** or more in nominal thickness to **1/8-inch (3-mm)** radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours **unless longer conditioning is recommended by manufacturer.**

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.4 INSTALLATION OF STANDING AND RUNNING TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than **24 inches (610 mm)** long, except where necessary.
 - 2. Stagger joints in adjacent and related standing and running trim.
 - 3. **Miter** at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 - 4. Use scarf joints for end-to-end joints.
 - 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 6. Install trim after gypsum-board joint finishing operations are completed.
 - 7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 - 8. Fasten to prevent movement or warping.
 - 9. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 INSTALLATION OF SHELVING AND CLOTHES RODS

- A. Cut shelf cleats at ends of shelves about **1/2 inch (13 mm)** less than width of shelves and sand exposed ends smooth.

1. Install shelf cleats by fastening to framing or backing with finish nails or trim screws, set below face and filled.
 2. Space fasteners not more than **16 inches (400 mm)** o.c.
 3. Apply a bead of multipurpose construction adhesive to back of shelf cleats before installing.
 4. Remove adhesive that is squeezed out after fastening shelf cleats in place.
- B. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled.
1. Install shelves, fully seated on cleats, brackets, and supports.
- C. Install rod flanges for rods as indicated.
1. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors.
 2. Install rods in rod flanges.

3.6 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

3.7 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.8 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standing and running trim.
2. Closet and utility shelving.
3. Interior frames and jambs.
4. Wood furring, blocking, shims, and hanging strips for installing interior architectural woodwork items that are not concealed within other construction.
5. Shop priming of interior architectural woodwork.
6. Shop finishing of interior architectural woodwork.

B. Related Requirements:

1. **Section 061000 "Rough Carpentry"** for wood furring, blocking, shims, and hanging strips required for installing interior architectural woodwork that are concealed within other construction before interior architectural woodwork installation.
2. Section 062023 "Interior Finish Carpentry" for interior carpentry exposed to view that is not specified in this Section.

1.2 COORDINATION

- ##### A.
- Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections, to ensure that interior architectural woodwork can be supported and installed as indicated.

1.3 PREINSTALLATION MEETINGS

- ##### A.
- Preinstallation Conference: Conduct conference at Project site.

B.

Product Data: For the following:

1. Anchors.
2. Adhesives.
3. Shop finishing materials.
4. Wood-Preservative Treatment:
 - a. Include data and warranty information from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
 - b. Indicate type of preservative used and net amount of preservative retained.

- c. Include chemical-treatment manufacturer's written instructions for finishing treated material and manufacturer's written warranty.
 - C. Shop Drawings:
 - 1. Include the following:
 - a. Dimensioned plans, elevations, and sections.
 - b. Attachment details.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including blocking and reinforcement concealed by construction and specified in other Sections.
 - D. Samples: For each exposed product and for each shop-applied color and finish specified.
 - 1. Size:
 - a. Panel Products: **12 inches by 12 inches (300 mm by 300 mm)**.
 - b. Lumber Products: Not less than **5 inches (125 mm) wide by 12 inches (300 mm) long** for each species and cut, finished on one side and one edge.
 - E. Samples for Initial Selection: For each type of shop-applied exposed finish.
 - 1. Size:
 - a. Panel Products: **12 inches by 12 inches (300 mm by 300 mm)**.
 - b. Lumber Products: Not less than **5 inches (125 mm) wide by 12 inches (300 mm) long**, for each species and cut, finished on one side and one edge.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For **architectural woodwork manufacturer and Installer**.
 - B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. Adhesives.
 - C. Field quality-control reports.
- 1.5 CLOSEOUT SUBMITTALS
- A. Quality Standard Compliance Certificates: **AWI Quality Certification Program** certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Architectural Woodwork Standards, Section 2.
- B. Do not deliver interior architectural woodwork until painting and similar finish operations that might damage woodwork have been completed in installation areas.
- C. Store woodwork in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
 - 1. Handle and store fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions.

1.8 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install interior architectural woodwork until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of the construction period.
- B. Field Measurements: Where interior architectural woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where interior architectural woodwork is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL WOODWORK, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

2.2 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

- A. Architectural Woodwork Standards Grade: [**Premium**] [**Custom**] [**Economy**].
 - 1. Wood Species: **Eastern white pine, sugar pine, or western white pine.**
 - 2. Wood Moisture Content: **8 to 13** percent.

2.3 CLOSET AND UTILITY SHELVING

- A. Architectural Woodwork Standards Grade: **Custom.**
- B. Shelf Material: **3/4-inch (19-mm) veneer-faced panel product with solid-lumber edge.**
- C. Cleats: **3/4-inch (19-mm) solid lumber.**
- D. Metal Closet Rods: **1-5/16-inch- (33-mm-) diameter, chrome-plated-steel** tubes complying with BHMA A156.16, L03131.
- E. Metal Rod Flanges: **Chrome-plated steel.**
- F. Wood Finish: **As indicated on Drawings or in schedules.**

2.4 INTERIOR FRAMES AND JAMBS FOR OPAQUE FINISH

- A. Architectural Woodwork Standards Grade: **Custom.**
- B. Wood Species: **Eastern white pine, sugar pine, or western white pine.**
 - 1. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than **3 inches (76 mm)** wide.
 - 2. Wood Moisture Content: **8 to 13** percent.

2.5 HARDWOOD SHEET MATERIALS

- A. Composite Wood Products: Provide materials that comply with requirements of the Architectural Woodwork Standards for each type of interior architectural woodwork and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, **Grade 130**.
2. Particleboard: ANSI A208.1, **Grade M-2**.
3. Softwood Plywood: DOC PS 1, **medium-density overlay**.
4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Nailers: **Softwood or hardwood lumber**, kiln-dried to less than 15 percent moisture content.
- B. Provide self-drilling screws for metal-framing supports, as recommended by metal-framing manufacturer.
- C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.
 1. Provide metal expansion sleeves or expansion bolts for post-installed anchors.
 2. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- D. Installation Adhesive: Product recommended by fabricator for each substrate for secure anchorage.

2.7 FABRICATION

- A. Fabricate interior architectural woodwork to dimensions, profiles, and details indicated.
 1. Ease edges to radius indicated for the following:
 - a. Edges of Solid-Wood (Lumber) Members: **1/16 inch (1.5 mm)** unless otherwise indicated.
 - b. Edges of Rails and Similar Members More Than **3/4 Inch (19 mm)** Thick: **1/8 inch (3 mm)**.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site.
 1. Disassemble components only as necessary for shipment and installation.
 2. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

2.8 SHOP PRIMING

- A. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.
- B. Interior Architectural Woodwork for Opaque Finish: Shop prime with one coat of wood primer as specified in Section 099123 "Interior Painting."

1. Backpriming: Apply one coat of primer, compatible with finish coats, to concealed surfaces of woodwork. **Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.**
- C. Interior Architectural Woodwork for Transparent Finish: Shop-seal concealed surfaces with required pretreatments and first coat of finish as specified in Section 099300 "Staining and Transparent Finishing."
 1. Backpriming: Apply one coat of sealer, compatible with finish coats, to concealed surfaces of woodwork. **Apply two coats to surfaces installed in contact with concrete or masonry and to end-grain surfaces.**

2.9 SHOP FINISHING

- A. Finish interior architectural woodwork **indicated on Drawings** at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Preparation for Finishing: Comply with Architectural Woodwork Standards, Section 5 for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing interior architectural woodwork, as applicable to each unit of work.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition interior architectural woodwork to humidity conditions in installation areas for not less than 72 hours prior to beginning of installation.
- B. Before installing interior architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming of concealed surfaces.

3.2 INSTALLATION

- A. Grade: Install interior architectural woodwork to comply with same grade as item to be installed.
- B. Assemble interior architectural woodwork and complete fabrication at Project site to the extent that it was not completed during shop fabrication.
- C. Install interior architectural woodwork level, plumb, true in line, and without distortion.
 1. Shim as required with concealed shims.
 2. Install level and plumb to a tolerance of **1/8 inch in 96 inches (3 mm in 2400 mm)**.
- D. Scribe and cut interior architectural woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

- E. Anchor interior architectural woodwork to anchors or blocking built in or directly attached to substrates.
 - 1. Secure with countersunk, concealed fasteners and blind nailing.
 - 2. Use fine finishing nails **or finishing screws** for exposed fastening, countersunk and filled flush with interior architectural woodwork.
 - 3. For shop-finished items, use filler matching finish of items being installed.
- F. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
 - 2. Do not use pieces less than **60 inches (1500 mm)** long, except where shorter single-length pieces are necessary.
 - 3. Scarf running joints and stagger in adjacent and related members.
 - 4. Fill gaps, if any, between top of base and wall with **plastic wood filler; sand smooth; and finish same as wood base if finished.**
 - 5. Install standing and running trim with no more variation from a straight line than **1/8 inch in 96 inches (3 mm in 2400 mm).**

3.3 REPAIR

- A. Repair damaged and defective interior architectural woodwork, where possible, to eliminate functional and visual defects **and to result in interior architectural woodwork being in compliance with requirements of Architectural Woodwork Standards for the specified grade.**
- B. Where not possible to repair, replace defective woodwork.
- C. Shop Finish: Touch up finishing work specified in this Section after installation of interior architectural woodwork.
 - 1. Fill nail holes with matching filler where exposed.
 - 2. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- D. Field Finish: See **Section 099123 "Interior Painting"** for final finishing of installed interior architectural woodwork not indicated to be shop finished.

3.4 CLEANING

- A. Clean interior architectural woodwork on exposed and semiexposed surfaces.

END OF SECTION 064013

PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets that are concealed within other construction before cabinet installation.

1.2 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 087100 "Door Hardware" to manufacturer of architectural cabinets; coordinate Shop Drawings and fabrication with hardware requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Show large-scale details.
3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
5. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's or manufacturer's standard size.

- D. Samples for Initial Selection: For each type of exposed finish.
- E. Samples for Verification: For the following:
 - 1. Plastic Laminates: 12 by 12 inches, for each type, color, pattern, and surface finish required.
 - a. Provide one sample applied to core material with specified edge material applied to one edge.
 - 2. Thermally Fused Laminate (TFL) Panels: 12 by 12 inches, for each color, pattern, and surface finish.
 - a. Provide edge banding on one edge.
 - 3. Corner Pieces:
 - a. Cabinet-front frame joints between stiles and rails and at exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
 - b. Miter joints for standing trim.
 - 4. Exposed Cabinet Hardware and Accessories: One full-size unit for each type and finish.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and Installer.
- B. Product Certificates: For the following:
 - 1. Composite wood products.
 - 2. Thermally fused laminate panels.
 - 3. High-pressure decorative laminate.
 - 4. Glass.
 - 5. Adhesives.
- C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.
- D. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
 - 1. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.
- B. Installer Qualifications: Licensed participant in AWI's Quality Certification Program.

- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - 1. Build mockups of typical architectural cabinets as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

- A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.
- B. Environmental Limitations with Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.
- C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
- D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Section 087111 "Door Hardware (Descriptive Specification)" to fabricator of architectural woodwork: coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. Provide labels and certificates from AWI certification program indicating that woodwork and installation complies with requirements of grades specified.
 - 2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
- B. Architectural Woodwork Standards Grade: Premium.
- C. Type of Construction: Frameless.
- D. Door and Drawer-Front Style: Flush overlay.
 - 1. Reveal Dimension: As indicated.
- E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Formica Corporation.
 - b. Laminart LLC.
 - c. Pionite; a Panolam Industries International, Inc. brand.
 - d. Wilsonart LLC.
- F. Laminate Cladding for Exposed Surfaces:
 - 1. Horizontal Surfaces: Grade HGS.
 - 2. Postformed Surfaces: Grade HGP.
 - 3. Vertical Surfaces: Grade HGS.
 - 4. Edges: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
 - 5. Pattern Direction: As indicated.
- G. Materials for Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
 - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 3.0 mm thick, matching laminate in color, pattern, and finish.
 - b. Edges of Thermally Fused Laminate Panel Shelves: PVC or polyester edge banding.
 - c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Solid-hardwood lumber.
 3. Drawer Bottoms: Hardwood plywood.
- H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.
- J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. As selected by Architect from laminate manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Solid colors with core same color as surface, matte finish.
 - c. Wood grains, matte finish.
 - d. Patterns, matte finish.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Wood Moisture Content: 5 to 10 percent.
- B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
1. Recycled Content of MDF and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 20 percent.
 2. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade 130.
 3. Particleboard (Medium Density): ANSI A208.1, Grade M-2-Exterior Glue.
 4. Softwood Plywood: DOC PS 1, medium-density overlay.
 5. Thermally Fused Laminate (TFL) Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products in accordance with test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 3. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 4. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of architectural cabinets.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less in accordance with ASTM E84.
1. For panels 3/4 inch thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi; modulus of elasticity, 300,000 psi; internal bond, 80 psi; and screw-holding capacity on face and edge, 250 and 225 lbf, respectively.
 2. For panels 13/16 to 1-1/4 inches thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi; modulus of elasticity, 250,000 psi; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf, respectively.
 3. Manufacturers: Subject to compliance with requirements, available manufacturers offering:
 - a. Flakeboard Company Limited.
 - b. SierraPine.
- D. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less in accordance with ASTM E84.
- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Panel Source International, Inc.
 - 2) SierraPine.

2.4 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)".

- B. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch-thick metal, and as follows:
 - 1. Semiconcealed Hinges for Flush Doors: ANSI/BHMA A156.9, B01361.
 - 2. Semiconcealed Hinges for Overlay Doors: ANSI/BHMA A156.9, B01521.
- C. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 100 degrees of opening, self-closing.
- D. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.
- E. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.
- F. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
- G. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.
- H. Shelf Rests: ANSI/BHMA A156.9, B04013; metal two-pin with shelf hold-down clip.
- I. Drawer Slides: ANSI/BHMA A156.9.
 - 1. Standard Duty (Grade 1 and Grade 2): Side mount and extending under bottom edge of drawer.
 - 2. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.
 - a. Type: Full extension.
 - b. Material: Zinc-plated ball bearing slides.
 - c. Motion Feature: Push to open and Soft close dampener Self-closing mechanism.
 - 3. Pencil drawers not more than 3 inches high and not more than 24 inches wide, provide 50 lb load capacity.
 - 4. General-purpose drawers more than 3 inches high, but not more than 6 inches high and not more than 24 inches wide, provide 75 lb load capacity.
 - 5. File drawers more than 6 inches high or more than 24 inches wide, provide 100 lb load capacity.
 - 6. Lateral file drawers more than 6 inches high and more than 24 inches but not more than 30 inches wide, provide 150 lb load capacity.
 - 7. Lateral file drawers more than 6 inches high and more than 30 inches wide, provide 200 lb load capacity.
 - 8. Computer keyboard tray, provide 75 lb load capacity.
- J. Slides for Sliding Glass Doors: ANSI/BHMA A156.9, B07063; aluminum.
- K. Door Locks: ANSI/BHMA A156.11, E07121.
- L. Drawer Locks: ANSI/BHMA A156.11, E07041.
- M. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
- N. Tempered Float Glass for Cabinet Doors: ASTM C1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick unless otherwise indicated.
 - 1. Unframed Glass Doors: Seam exposed edges seamed before tempering.

- O. Decorative Glass for Cabinet Doors: Provide decorative glass complying with Section 088113 "Decorative Glass Glazing".
- P. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
 - 1. Color: Black.
- Q. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
 - 1. Satin Stainless Steel: ANSI/BHMA 630.
- R. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Do not use adhesives that contain urea formaldehyde.
- D. Adhesive for Bonding Plastic Laminate: Contact cement.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.
 - 2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

- E. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual".
 - 1. For glass in frames, secure glass with removable stops.
 - 2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

- A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
- C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
- D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
 - 1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 - 2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 FIELD QUALITY CONTROL

- A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.
 - 1. Inspection entity shall prepare and submit report of inspection.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied, cut-back-asphalt dampproofing.
 - 2. Cold-applied, emulsified-asphalt dampproofing.
- B. Related Requirements:
 - 1. Section 042200 "Concrete Unit Masonry" for mortar parge coat on masonry surfaces.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

- A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 PERFORMANCE REQUIREMENTS

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

2.3 COLD-APPLIED, CUT-BACK-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. APOC, Inc; a division of Gardner Industries.
 - 2. Henry Company; a Carlisle company.
 - 3. W. R. Meadows, Inc.
- B. Trowel Coats: ASTM D4586/D4586M, Type I, Class 1, fibered.
- C. Brush and Spray Coats: ASTM D4479/D4479M, Type I, fibered or nonfibered.

2.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. APOC, Inc; a division of Gardner Industries.
 - 2. Henry Company; a Carlisle company.
 - 3. W. R. Meadows, Inc.
- B. Trowel Coats: ASTM D1227, Type II, Class 1.
- C. Fibered Brush and Spray Coats: ASTM D1227, Type II, Class 1.
- D. Brush and Spray Coats: ASTM D1227, Type III, Class 1.

2.5 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Cut-Back-Asphalt Primer: ASTM D41/D41M.
- C. Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- D. Asphalt-Coated Glass Fabric: ASTM D1668/D1668M, Type I.

- E. Patching Compound: Asbestos-free fibered mastic of type recommended in writing by dampproofing manufacturer.
- F. Protection Course: ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners.
 - 1. Thickness: Nominal 1/8 inch.
 - 2. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer for protection course type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for surface smoothness, maximum surface moisture content, and other conditions affecting performance of the Work.
- B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for dampproofing application.
- B. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.
- C. Clean substrates of projections and substances detrimental to dampproofing work; fill voids, seal joints, and remove bond breakers if any.
- D. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections; cover with asphalt-coated glass fabric.

3.3 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.

2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
 - B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.
 - C. Where dampproofing exterior face of inner wythe of exterior masonry cavity walls, lap dampproofing at least 1/4 inch onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.
 1. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe.
 2. Lap dampproofing at least 1/4 inch onto shelf angles supporting veneer.
 - D. Where dampproofing interior face of above-grade, exterior concrete and masonry single-wythe masonry walls, continue dampproofing through intersecting walls by keeping vertical mortar joints at intersection temporarily open or by dampproofing wall before constructing intersecting walls.
- 3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING
- A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat.
 - B. Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft.

3.5 PROTECTION COURSE INSTALLATION

- A. Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.
 1. Support protection course over cured coating with spot application of adhesive type recommended in writing by protection-board manufacturer.
 2. Install protection course within 24 hours of dampproofing installation (while coating is tacky) to ensure adhesion.

END OF SECTION 071113

WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes penetrating water-repellent treatments for the following vertical surfaces:
 - 1. Concrete masonry units.
- B. Related Requirements:
 - 1. Section 042200 "Concrete Unit Masonry" for integral water-repellent admixture for unit masonry assemblies.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's printed statement of VOC content.
 - 2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.
- B. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches (300 by 300 mm) in size, with specified water-repellent treatment applied to half of each Sample.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Applicator
- B. Product Certificates: For each type of water repellent.
- C. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.
- B. Mockups: Prepare mockups of each required water repellent on each type of substrate required to demonstrate aesthetic effects, for preconstruction testing,] and to set quality standards for materials and execution.
 - 1. Locate mockups in locations that enable viewing under same conditions as the completed Work
 - a. Size: 5 sq. ft. each.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

- A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:
 - 1. Concrete surfaces and mortar have cured for not less than 14 days.
 - 2. Ambient temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C) and will remain so for 24 hours.
 - 3. Substrate is not frozen and substrate-surface temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C).
 - 4. Rain or snow is not predicted within 24 hours.
 - 5. Not less than 24 hours have passed since surfaces were last wet.
 - 6. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

- A. Silane, Penetrating Water Repellent: Clear, containing 100 percent solids of alkyltrialkoxysilanes; with alcohol, mineral spirits, water, or other proprietary solvent carrier; and with 400 g/L or less of VOCs.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338.:
www.wrmeadows.com.
 - 2. Materials. Subject to compliance with requirements, provide the following:
 - a. PENTREAT 244-100 Water Repellent Penetrating Sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.
 - 1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in [three] <Insert number> representative locations by method recommended by manufacturer.
 - 2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
 - 3. Verify that required repairs are complete, cured, and dry before applying water repellent.
- B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

- B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows.
 - 1. Cast-in-Place Concrete: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E1857
- C. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
 - 1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.
- B. Apply coating of water repellent on surfaces to be treated using low pressure sprayer [<50 psi)-) using a 0.1 gallon/minute (0.379 L/minute) spray rate, allowing the water repellent to totally saturate the surface. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.
 - 1. Vertical Applications Instructions
 - a. Apply to a visibly dry and absorbent surface.
 - b. Saturate from the bottom up, creating a 4" - 8" (10 - 20 cm) rundown below the spray contact point.
 - c. Let the first application penetrate for 3 – 5 minutes.
 - d. Re-saturate while surface is still wet.
 - e. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats.
 - f. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 FIELD QUALITY CONTROL

- A. Coverage Test: In the presence of Architect, hose down a dry, repellent-treated surface to verify complete and uniform product application. A change in surface color will indicate incomplete application.
 - 1. Notify Architect seven days in advance of the dates and times when surfaces will be tested.
 - 2. Reapply water repellent until coverage test indicates complete coverage.

3.5 CLEANING

- A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.
- B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071900

THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene foam-plastic board.
 - 2. Glass-fiber blanket.
 - 3. Mineral-wool blanket.
- B. Related Requirements:
 - 1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.

3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded polystyrene boards in this article are also called "XPS boards." Roman numeral designators in ASTM C 578 are assigned in a fixed random sequence, and their numeric order does not reflect increasing strength or other characteristics.
- B. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. DiversiFoam Products; CertiFoam 25.
 - b. Owens Corning; Foamular 250.
 - c. Kingspan Insulation North America; GreenGuard Type IV.
 2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
 3. Locations: Masonry cavity walls and other miscellaneous areas not indicated.
- C. Extruded Polystyrene Board, Type VI: ASTM C 578, Type VI, 40-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. DiversiFoam Products; CertiFoam 40.
 - b. Owens Corning; Foamular 400.
 - c. Kingspan Insulation North America; GreenGuard Type VI.
 2. Locations: Within the plenum box assemblies.
- D. Extruded Polystyrene Board, Type VI, Drainage Panels: ASTM C 578, Type VI, 40-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84; fabricated with shiplap or channel edges and with one side having grooved drainage channels.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. DiversiFoam Products; CertiFoam 40 with drainage channels.
 - b. Kingspan Insulation Limited; GreenGuard Drainage Channel.
 2. Locations: Below-grade foundation insulation.
- E. Extruded Polystyrene Board, Type V: ASTM C 578, Type V, 100-psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Chemical Company (The); Styrofoam Highload 100.
 - b. Owens Corning; Foamular 1000.
 2. Locations: Under-slab insulation, including under radiant slabs.

2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CertainTeed Corporation; Sustainable Insulation.
 - b. Johns Manville; a Berkshire Hathaway company; Unfaced Batts and Rolls.
 - c. Knauf Insulation; EcoBatt.
 - d. Owens Corning; EcoTouch PINK Fiberglas.
 2. Locations: In the stud cavity in exterior masonry walls and other miscellaneous locations not identified.

2.3 MINERAL-WOOL BLANKETS

- A. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Johns Manville; a Berkshire Hathaway company; Sound and Fire Block.
 - b. ROCKWOOL (ROXUL Inc.).
2. Locations: At rated assembly transitions.

2.4 ACCESSORIES

- A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF SLAB INSULATION

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.4 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Adhesive Installation: Install with adhesive according to manufacturer's written instructions.

3.5 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
 - 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

3.6 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically.

3.7 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Building wrap.
 - 2. Flexible flashing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dorken Systems Inc; Delta-Vent S.
 - b. DuPont Safety & Construction; Tyvek Commercialwrap.

- c. VaproShield USA; WrapShield IT.
 - 2. Water-Vapor Permeance: Not less than 20 perms per ASTM E 96/E 96M, Desiccant Method (Procedure A).
 - 3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E 2178.
 - 4. Allowable UV Exposure Time: Not less than six weeks.
 - 5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.2 FLEXIBLE FLASHING

- A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.030 inch.
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. DuPont Safety & Construction; StraightFlash.
 - b. Protecto Wrap Company; SafSeal 45 Butyl.
 - 2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.
- B. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.
- C. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
- 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.

2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.

C. Building Wrap: Comply with manufacturer's written instructions and warranty requirements.

1. Seal seams, edges, fasteners, and penetrations with tape.
2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.

1. Prime substrates as recommended by flashing manufacturer.
2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
3. Lap flashing over water-resistive barrier at bottom and sides of openings.
4. Lap water-resistive barrier over flashing at heads of openings.
5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION 072500

VAPOR RETARDERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Polyethylene vapor retarders.
 - 2. Fire-retardant, reinforced-polyethylene vapor retarders.
- B. Related Requirements:
 - 1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

- A. Polyethylene Vapor Retarders: ASTM D 4397, 10-mil- thick sheet, with maximum permeance rating of 0.1 perm.
- B. Under-slab Polyolefin Vapor Retarders: ASTM E1745, 15-mil- thick puncture-resistant sheet, with maximum permeance rating of 0.01 perm. Basis of design: StegoWrap.

2.2 FIRE-RETARDANT, REINFORCED-POLYETHYLENE VAPOR RETARDERS

- A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Sheet with outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of

nylon cord or polyester scrim and weighing not less than 20 lb/1000 sq. ft., with maximum permeance rating of 0.1 perm.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Raven Industries, Inc; Dura-Skrim 10FR
2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 75 and 200, respectively, per ASTM E 84.
3. Location: For use in plenum boxes.

2.3 ACCESSORIES

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- B. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

PART 3 - EXECUTION

3.1 INSTALLATION OF VAPOR RETARDERS

- A. Clean substrates of substances that are harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.
- B. Place vapor retarders on side of construction indicated on Drawings.
- C. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- D. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- F. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.2 PROTECTION

- A. Protect vapor retarders from damage until concealed by permanent construction.

END OF SECTION 072600

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Manufactured through-wall flashing.
 - 2. Formed low-slope roof sheet metal fabrications.
- B. Provide all labor, equipment, and materials to fabricate and install the following.
 - 1. Fascia and edge metal.
- C. Related Requirements:
 - 1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Section 077200 "Roof Accessories" for equipment supports, vents, and other manufactured roof accessory units.

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates if applicable.
 - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of roof-penetration flashing.
8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
9. Include details of special conditions.
10. Include details of connections to adjoining work.
11. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches.

C. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.
- C. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.

- D. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.
- E. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for membrane roof areas.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. Clear Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

- C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.

1. Finish: 2B (bright, cold rolled).

- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.

2. Exposed Coil-Coated Finish:

- a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by Architect from manufacturer's full range to match adjacent material colors.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

- a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

- b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
- 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- 4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- G. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

2.6 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch thick.
- B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 2 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
 - 1. Aluminum: 0.032 inch thick; adjacent to Aluminum Storefront.
 - 2. Galvanized Steel: 0.022 inch thick.
 - 3. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of welds and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Rivets: Rivet joints in uncoated aluminum and zinc where necessary for strength.

3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
- C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042200 "Concrete Unit Masonry."
- C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 2 inches beyond wall openings.

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SELF-ADHERING SHEET FLASHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Application of self-adhering sheet membrane flashing.

1.02 RELATED SECTIONS

- A. Section 042200 – Concrete Unit Masonry.
- B. Section 072100 - Thermal Insulation.
- C. Section 076200 – Sheet Metal Flashing and Trim.
- D. Section 079200 - Joint Sealants.
- E. Section 081113 – Hollow Metal Doors and Frames.

1.03 REFERENCES

- A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- B. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
- C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- E. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- F. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.
- G. ASTM E154-99 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- H. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- I. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
- J. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Pressure Difference. Air
- K. ASTM E2178-01 - Standard Test Method for Air Permeance of Building Materials.

- L. CGSB 37-GP-56M - Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

1.04 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of self-adhesive membranes.
- B. Obtain self-adhesive flashing membrane materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Store adhesives and primers at temperatures of 40° F (5° C) and above to facilitate handling.
- D. Store membrane cartons on pallets.
- E. Do not store at temperatures above 90° F (32° C) for extended periods.
- F. Keep away from sparks and flames.
- G. Completely cover when stored outside. Protect from rain.
- H. Protect materials during handling and application to prevent damage or contamination.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Product not intended for uses subject to abuse or permanent exposure to the elements.
- B. Protect rolls from direct sunlight until ready for use
- C. Do not apply membrane when air or surface temperatures are below 40° F (4° C).
- D. Do not apply to frozen surfaces.

PART 2 PRODUCTS – BASIS OF DESIGN

2.01 MANUFACTURER

- A. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Website: www.wrmeadows.com.

2.02 MATERIALS

- A. Rolled, Self-Adhering Sheet Flashing Membrane: 40 mils (1.0 mm) thick membrane.
1. Performance Based Specification: Self-adhering sheet flashing membrane shall have the following characteristics:
 - a. Color:
 - 1) Carrier Film: White.
 - 2) Polymeric Membrane: Black.
 - b. Thickness: 40 mils (1mm).
 - c. Tensile Strength Film:
 - 1) ASTM D412, modified (MD): 4,000 psi (27.6 MPa).
 - 2) ASTM D882 (MD): 23.5 lb./in. (4.1 N/mm).
 - d. Elongation Film:
 - 1) ASTM D412, modified (MD, %): 400 (Typical).
 - 2) ASTM D882 (MD, %): 400 Min.
 - e. Puncture Resistance, ASTM E154: 40 lbf (178 N) Min.
 - f. Water Vapor Permeance (free film), ASTM E 96, Procedure B: 0.035 Perms.
 - g. Air Permeability, ASTM E283 / E2178: 0.004 cfm/ft.² @ 75 Pa (1.57 lb / ft.²).
 - h. Lap Peel Strength @ 39° F (3.9° C), ASTM D903, 180 Bend: 10 lbf/in. (1.75 N/mm).
 - i. Low Temperature Flexibility @ -22° F (-30° C), CGSB 37-GP-56M: Pass
 2. Proprietary Based Specification:
 - a. AIR SHIELD THRU-WALL FLASHING by W. R. MEADOWS.

2.03 ACCESSORIES

- A. Surface Conditioner:
1. Temperatures above 40° F (4° C): Water-Based Adhesive
 - a. MEL-PRIME™ W/B Water-Based Adhesive by W. R. MEADOWS.
 2. Temperatures below 30° F (-1° C): Solvent-Based Adhesive.
 - a. MEL-PRIME VOC-Compliant Solvent-Based Adhesive or Standard Solvent-Based Adhesive by W. R. MEADOWS.
- B. Pointing Mastic: mastic for sealing penetrations and terminations of membrane.
1. POINTING MASTIC by W. R. MEADOWS.
- C. Concrete Repair Materials: MEADOW-PATCH™ 5 and 20 Concrete Repair Mortars.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive self-adhering flashing membrane.
- B. Clean and prepare surfaces to receive membrane in accordance with manufacturer's instructions.

- C. Do not apply membrane to surfaces unacceptable to manufacturer.
- D. All surfaces must be clean, smooth, and dry and must be clean of oil, dust, and excess mortar.
- E. Strike masonry joints flush.
- F. Patch all holes and voids and smooth out any surface misalignments.
- G. Concrete surfaces must be cured for a minimum of 14 days.
- H. If curing compounds are used, they must be clear, resin-based, and without oil, wax, or pigments.

3.03 APPLICATION OF SELF-ADHERING SHEET FLASHING

- A. Precut pieces of flashing to size to aid in handling.
- B. Prime surfaces to be covered in one working day with applicable adhesive.
- C. Remove release paper prior to application and apply membrane with a minimum overlap of 3" (75 mm) onto primed surface.
- D. Recess through wall flashing 1/2" (13 mm) from the face of the masonry.
- E. Roll membrane firmly into place with hand roller.
- F. Ensure membrane is fully adhered and remove all wrinkles and fish mouths.
- G. Overlap subsequent courses of membrane a minimum of 2" (50 mm) and ensure joints are fully adhered.
- H. Seal top edge of transition membrane with pointing mastic.
- I. Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

3.04 PROTECTION

- A. Cover self-adhering sheet flashing as soon as possible, since it is not designed for permanent exposure.

END OF SECTION 076526

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Preformed flashing sleeves.
- B. Related Sections:
 - 1. Section 077253 "Snow Guards" for snow guards.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof accessories.
 - 1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Required clearances.
- B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: As indicated on Drawings.

2.2 PREFORMED FLASHING SLEEVES

- A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted metal collar.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Custom Solution Roof and Metal Products.
 - b. Menzies Metal Products.
 2. Metal: Aluminum sheet, 0.063 inch thick.
 3. Diameter: As indicated on Drawings.
 4. Finish: Manufacturer's standard.
- B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Custom Solution Roof and Metal Products.
 - b. Menzies Metal Products.
 - c. Milcor; Commercial Products Group of Hart & Cooley, Inc.
 2. Metal: Aluminum sheet, 0.063 inch thick.
 3. Height: 13 inches.
 4. Diameter: As indicated on Drawings.
 5. Finish: Manufacturer's standard.

2.3 METAL MATERIALS

- A. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

- B. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Underlayment:
 - 1. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 2. Slip Sheet: Building paper, 3 lb/100 sq. ft. minimum, rosin sized.
 - 3. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 4. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
- C. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.
- D. Seal joints with butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SNOW GUARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Rail-type, seam-mounted snow guards.
- B. Related Sections:
 - 1. Section 133419 "Metal Building Systems".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
 - 1. Include details of rail-type snow guards.
- C. Samples:
 - 1. Rail-Type Snow Guards: Bracket and 12-inch-long rail.
 - a. For units with factory-applied finishes, submit manufacturer's standard color selections.
- D. Delegated-Design Submittal: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include calculation of number and location of snow guards.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that the engineer is licensed in the jurisdiction in which the Project is located.

- B. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating point of failure of attachment to roof system identical as that used on this Project.

1.5 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit adhesive-mounted snow guards to be installed according to adhesive manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design snow guards, including attachment to building, based on the following:
 - 1. Roof snow load, as indicated on Drawings.
 - 2. Snow drifting
 - 3. Roof slope.
 - 4. Roof type.
 - 5. Roof dimensions.
 - 6. Roofing substrate type and thickness.
 - 7. Snow guard type.
 - 8. Snow guard fastening method and strength.
 - 9. Snow guard spacing.
 - 10. Coefficient of Friction Between Snow and Roof Surface: 0.
 - 11. Factor of Safety: 2.
- B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 RAIL-TYPE SNOW GUARDS

- A. Seam-Mounted, Rail-Type Snow Guards:
 - 1. Basis-of-design product: ASG3000G-T-AL with 2 pipes by Alpine Snowguards, 289 Harrel St., Morrisville, VT 05661, www.alpinesnowguards.com. Provide the indicated product or an approved comparable product.

2. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with two rails.
3. Material and Finish: Aluminum; Powder Coat finish to match roof panels.
4. Seam clamps: ASTM B 221 aluminum extrusion or ASTM B 85/B 85M aluminum casting with stainless-steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.
 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare substrates for bonding snow guards.
- B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
 1. Space rows as indicated on Shop Drawings, as recommended by manufacturer.
- B. Attachment for Standing-Seam Metal Roofing:
 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
 2. Seam-Mounted, Rail-Type Snow Guards:
 - a. Install brackets to vertical ribs in straight rows.
 - b. Secure with stainless-steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
 - c. Torque set screw according to manufacturer's instructions.
 - d. Install cross members to brackets.

END OF SECTION 077253

JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Joints in or between fire-resistance-rated constructions.
 - 2. Joints at exterior curtain-wall/floor intersections.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants".
 - 2. Section 079219 "Acoustical Joint Sealants"

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Joint firestopping systems shall bear classification marking of a qualified testing agency.

- 1) UL in its "Fire Resistance Directory."
- 2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

- A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
- B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. ROCKWOOL (ROXUL Inc.).
 - d. Specified Technologies, Inc.
 - e. Thermafiber, Inc.; an Owens Corning company.
 2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
- C. Joints at Exterior Curtain-Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. 3M Fire Protection Products.
 - b. Hilti, Inc.
 - c. Johns Manville; a Berkshire Hathaway company.
 - d. ROCKWOOL (ROXUL Inc.).
 - e. Specified Technologies, Inc.
 - f. Thermafiber, Inc.; an Owens Corning company.
 2. F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
- D. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Before installing fire-resistive joint systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
 - 1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
 - 2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.
- C. Install elastomeric fill materials for fire-resistive joint systems by proven techniques to produce the following results:
 - 1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
 - 2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.

3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

- A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Designation of applicable testing agency.
 4. Date of installation.
 5. Manufacturer's name.
 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2393.
- B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
- C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials, in which joints occur.
- B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 JOINT FIRESTOPPING SYSTEM SCHEDULE

- A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN.
- B. Where Intertek Group-listed systems are indicated, they refer to design numbers in Intertek Group's "Directory of Listed Building Products" under product category Firestop Systems.
- C. Wall-to-Wall, Joint Firestopping Systems, FRJS-1:
 - 1. UL-Classified Systems: WW-D- 0000-0999.
 - 2. Assembly Rating: 1 hour or 2 hours.
 - 3. Nominal Joint Width: 1 inch.
 - 4. Movement Capabilities: Class II or Class III - 50 percent compression or extension.
 - 5. L-Rating at Ambient: Less than 1 cfm/ft.
 - 6. L-Rating at 400 Deg F: Less than 1 cfm/ft.
- D. Floor-to-Wall, Joint Firestopping Systems, FRJS-2:
 - 1. UL-Classified Systems: FW-D- 0000-0999.
 - 2. Assembly Rating: 1 hour or 2 hours.
 - 3. Nominal Joint Width: 1 inch.
 - 4. Movement Capabilities: Class II or Class III - 50 percent compression, extension, or horizontal shear.
 - 5. L-Rating at Ambient: Less than 1 cfm/ft.
 - 6. L-Rating at 400 Deg F: Less than 1 cfm/ft.
- E. Head-of-Wall, Fire-Resistive Joint Firestopping Systems, FRJS-3:
 - 1. UL-Classified Systems: HW-D- 0000-0999.
 - 2. Assembly Rating: 1 hour or 2 hours.
 - 3. Nominal Joint Width: 1 inch.
 - 4. Movement Capabilities: Class II or Class III - 25 percent compression or extension.
 - 5. L-Rating at Ambient: Less than 1 cfm/ft.
 - 6. L-Rating at 400 Deg F: Less than 1 cfm/ft.

END OF SECTION 078443

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Polysulfide joint sealants.
6. Butyl joint sealants.
7. Latex joint sealants.

- B. Related Requirements:

1. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 1. Joint-sealant application, joint location, and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- D. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- E. Field-Adhesion-Test Reports: For each sealant application tested.
- F. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C 1248 to determine stain potential of sealant when in contact with masonry substrates.
 - 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 - 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range to match adjacent material colors.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Corning Corporation.

- B. Silicone, S, NS, 35, NT: Single-component, nonsag, plus 35 percent and minus 35 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 35, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Corning Corporation.
- C. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
- D. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Uses T and NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Corning Corporation.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Sika Corporation; Joint Sealants.

2.4 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Bostik, Inc.
 - c. Sika Corporation; Joint Sealants.
- B. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Uses T and NT.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corp. - Construction Chemicals.

2.5 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. STPE, Mildew Resistant, S, NS, 50, NT: Mildew-resistant, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.

2.6 POLYSULFIDE JOINT SEALANTS

- A. Polysulfide, M, NS, 25, T, NT: Multicomponent, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, polysulfide joint sealant; ASTM C 920, Type M, Grade NS, Class 25, Use NT.

2.7 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. Bostik, Inc.

2.8 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. May National Associates, Inc.; a subsidiary of Sika Corporation.
 - b. Pecora Corporation.
 - c. Sherwin-Williams Company (The).

2.9 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adfast.
 - b. Alcot Plastics Ltd.
 - c. BASF Corp. - Construction Chemicals.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish systems.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to

comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Other joints as indicated on Drawings.
 - 2. Joint Sealant: Silicone, S, NS, 50, T, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in dimension stone cladding.
 - e. Joints in glass unit masonry assemblies.
 - f. Joints in exterior insulation and finish systems.
 - g. Joints between metal panels.
 - h. Joints between different materials listed above.
 - i. Perimeter joints between materials listed above and frames of doors windows and louvers.
 - 2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
 - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 - 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in stone flooring.
 - c. Control and expansion joints in brick flooring.
 - d. Control and expansion joints in tile flooring.
 - 2. Joint Sealant: Urethane, S, NS, 25, T, NT.

3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Tile control and expansion joints.
 - c. Vertical joints on exposed surfaces of unit masonry walls and partitions.
 - d. Joints on underside of plant-precast structural concrete planks.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
 1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
 1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 2. Joint Sealant: STPE, Mildew Resistant, S, NS, 50, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- G. Joint-Sealant Application: Concealed mastics.
 1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical joint sealants.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each acoustical joint sealant.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of acoustical joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Acoustical-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- B. Sample Warranties: For special warranties.

1.5 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

2.2 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Accumetric LLC.
 - b. Pecora Corporation.
 - c. Tremco Incorporated.
 - 2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.3 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming

joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
- B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

- C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding Doors.
 - 3. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical and access control door hardware.
 - 3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
 - 4. Automatic operators.
 - 5. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware".
 - 2. Division 26 Section "Electrical".
 - 3. Division 28 Section "Access Control".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.

- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handling and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
 2. PE - Pemko
 3. SU - Securitron
 4. YA - ASSA ABLOY ACCENTRA
 5. MC - Medeco
 6. RO - Rockwood
 7. RF - Rixson
 8. OT - Other

Hardware Sets

Set: 1.0

Doors: 100

2 Continuous Hinge

CFMxxxSLF PT

PE 087100

| | | | | | | |
|---|------------------------------------|--|----------|----|--------|---|
| 2 | Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 | Concealed Vert Rod Exit, Classroom | 6220 B MELR 503F K645xCT6SL Less Dogging | 630 | YA | 087100 | ⚡ |
| 1 | Concealed Vert Rod Exit, Exit Only | 6220 B MELR EO Less Dogging | 630 | YA | 087100 | ⚡ |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 2 | Door Pull | TBF158 | US32D-MS | RO | 087100 | |
| 2 | Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 2 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 2 | Sweep | 18041CNB | | PE | 087100 | |
| 1 | Threshold | 279x292AFGPK | | PE | 087100 | |
| 2 | ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 2 | ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 | Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 | Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 | Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: Perimeter / meeting stile gasketing by Alum Door / Frame Manufacturer.

- Door normally closed and locked
- Presenting valid credential shunts DPS and retracts latch permitting pulled entry.
- Depressing push rail shunts DPS for authorized exit.
- Entry by manual key alerts head end to entry w/ out audit trail unless power is off.
- FD access by mech key.
- Remote release via intercom.
- Free egress at all times.

Set: 2.0

Doors: 101

| | | | | | | |
|---|--------------------|-----------------|----------|----|--------|--|
| 2 | Continuous Hinge | CFMxxxSLF | | PE | 087100 | |
| 2 | Push Bar & Pull | TBF15847 T1HD | US32D-MS | RO | 087100 | |
| 2 | Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 2 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 2 | Sweep | 18041CNB | | PE | 087100 | |
| 1 | Threshold | 270A | | PE | 087100 | |

Notes: Perimeter / meeting stile gasketing by Alum Door / Frame Manufacturer.

Set: 3.0

Doors: 102

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Entry Lock | B AU 5407LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 4.0

Doors: 103A

| | | | | |
|-----------------------|-----------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 5.0

Doors: 103B, 120A, 120B

| | | | | | |
|-----------------------------------|---|-----|----|--------|---|
| 1 Continuous Hinge | CFMxxxSLF PT | | PE | 087100 | |
| 1 Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 Fire Rated Rim Exit, Nightlatch | 6100 (F or LD) ED B MELR AU627F K645xCT6SL | 630 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 252x3AFG Pemkote MSES25SS | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: •Door normally closed and locked

- Presenting valid credential shunts DPS and retracts latch permitting pulled entry.
- Depressing push rail shunts DPS for authorized exit.
- Entry by manual key alerts head end to entry w/ out audit trail unless power is off.
- FD access by mech key.
- Free egress at all times.

Set: 6.0

Doors: 104, 105

| | | | | |
|-------------------------------|-----------------|-------|----|--------|
| 3 Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | 087100 |
| 1 Door Pull | TBF157 | US32D | RO | 087100 |
| 1 Push Plate | 70C | US32D | RO | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 7.0

Doors: 106

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Classroom Lock | B AU 5408LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 8.0

Doors: 107, 108, 109, 110, 111

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Entry Lock | B AU 5407LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 9.0

Doors: 114B

| | | | | |
|-----------------------|--------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2314 {NRP] | US32D | MK | 087100 |
| 1 Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 |

| | | | | | |
|---|----------------|-----------------|-----|----|--------|
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Gasketing | 312CR | | PE | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 9.1

Doors: 114A

| | | | | | |
|---|---------------------|-----------------|-------|----|--------|
| 3 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Gasketing | S88 LAR | | PE | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.0

Doors: 115

| | | | | | |
|---|--------------------------|-----------------------|-------|----|--------|
| 3 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Storeroom or Closet Lock | B AU 5405LN Temp Core | 626 | YA | 087100 |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.1

Doors: 119

| | | | | | |
|---|--------------------------|-----------------------|-------|----|--------|
| 4 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Storeroom or Closet Lock | B AU 5405LN Temp Core | 626 | YA | 087100 |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.2

Doors: 116

| | | | | | |
|-----------------------------|---|-------|----|--------|---|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 | |
| 1 Fail Secure Lock | B AU 5491LN Temp Core REX | 626 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | S88 LAR | | PE | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 270A | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |
| 1 Wiring Diagram | - Elevation and Point to Point as Specified | | OT | | |

Set: 10.3

Doors: 118

| | | | | | |
|-----------------------------|---|-------|----|--------|---|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 | |
| 1 Fail Secure Lock | B AU 5491LN Temp Core REX | 626 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 270A | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |
| 1 Wiring Diagram | - Elevation and Point to Point as Specified | | OT | | |

Set: 11.0

Doors: 117A

| | | | | |
|----------------------------------|------------------------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 Fire Rated Rim Exit, Classroom | 6100 (F or LD)ED AU626F K645xCT6SL | 630 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Sweep | 18041CNB | | PE | 087100 |
| 1 Threshold | 270A | | PE | 087100 |

Set: 12.0

Doors: 117B

| | | | | | |
|-----------------------------------|--|-----|----|--------|---|
| 1 Continuous Hinge | CFMxxxSLF PT | | PE | 087100 | |
| 1 Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 Fire Rated Rim Exit, Nightlatch | 6100 (F or LD) ED B MELR AU627F K645xCT6SL | 630 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 252x3AFG Pemkote MSES25SS | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: •Door normally closed and locked

•Presenting valid credential shunts DPS and retracts latch permitting pulled entry.

•Depressing push rail shunts DPS for authorized exit.

•Entry by manual key alerts head end to entry w/ out audit trail unless power is off.

•FD access by mech key.

•Free egress at all times.

Set: 88.0

Doors: OH01, OH02, OH03, OH04, OH05, OH06, OH07

| | | | |
|---------------------------|-----------|----|-----------|
| 1 Small Format Inter Core | 33600006N | 26 | MC 087100 |
|---------------------------|-----------|----|-----------|

Notes: Provide core/cylinder as directed by architect. Coordinate locking requirements w/ specialty door supplier.

END OF SECTION 080671

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 08 Section "Access Control".
6. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
7. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. 10. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of anchorages, joints, field splices, and connections.
 6. Details of accessories.
 7. Details of moldings, removable stops, and glazing.
 8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on SDI-113, ASTM C1363, ASTM C1199 and ASTM E1423. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
 - 1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with SDI-113, ASTM C1363, ASTM C1199 and ASTM E143 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.34, R-Value 2.92, including insulated door, thermal-break frame and threshold.
 - 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
- F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and

Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. Curries Company (CU).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
 - 1. Design: Flush panel.
 - 2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds or thermally enhanced stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".
 - a. Provide 22-gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
 - b. Thermal properties to rate at a fully operable minimum U-Factor 0.34 and R-Value 2.92, including insulated door, thermal-break frame and threshold.
- C.
 - 1. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
 - 2. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
 - 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the

face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Manufacturers Basis of Design:

1. Interior - Curries Company (CU) - Polystyrene Core - 707 Series.
2. Exterior - Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) - Mercury 3 Thermal Break TQ Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) - CM Series.

b. Curries Company (CU) - M Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate,

frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 - 3. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.
- D. Hollow Metal Frames:
 - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 2. Welded Frames: Weld joints continuously through full throat width of frames, including rabbets, soffits, and stops; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 - 3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
 - 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 - 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 - 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 - 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 - 8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
 - 9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 10. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
- 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.8 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
- 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware"
 - 2. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham Wood Doors; ASSA ABLOY Group company.
4. Lambton Doors.
5. Marshfield Door Systems, Inc.
6. Mohawk Flush Doors, Inc.
7. Oshkosh Door Company.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. WDMA I.S.1-A Performance Grade: Heavy Duty.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, [Grade LD-1] [or] [Grade LD-2].
 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking, in doors indicated to have closers.
 - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.

- a. Screw Withdrawal, Face: 700 lbf.
- b. Screw Withdrawal, Edge: 400 lbf.

F. Mineral-Core Doors:

- 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
- 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking.
 - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch midrail blocking, in doors indicated to have armor plates.
 - d. 5-inch midrail blocking, in doors indicated to have exit devices.
- 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 475 lbf per WDMA T.M.-10.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

- 1. Grade: Custom (Grade A faces).
- 2. Species: Select white maple.
- 3. Cut: Plain sliced (flat sliced).
- 4. Match between Veneer Leaves: Book match.
- 5. Assembly of Veneer Leaves on Door Faces: Running match.
- 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
- 7. Exposed Vertical Edges: Same species as faces - edge Type A.
- 8. Core: Particleboard.
- 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
- 10. WDMA I.S.1-A Performance Grade: Heavy Duty.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Grade: Custom.
 - 2. Finish: WDMA TR-4 conversion varnish or WDMA TR-6 catalyzed polyurethane.
 - 3. Staining: As selected by Architect from manufacturer's full range.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Service doors.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Include description of automatic-closing device and testing and resetting instructions.

- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

- 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 5. Include diagrams for power, signal, and control wiring.

- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Bottom bar with sensor edge.
3. Guides.
4. Brackets.
5. Hood.
6. Locking device(s).
7. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 DOOR ASSEMBLY

- A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cookson Company.
 - b. Cornell.
 - c. Overhead Door Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 100,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
1. Include tamperproof cycle counter.
- C. STC Rating: 26.
- D. Door Curtain Material: Galvanized steel.
- E. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- H. Hood: Aluminum.
1. Shape: Square.
 2. Mounting: Face of wall.
- I. Locking Devices: Equip door with locking device assembly.
1. Locking Device Assembly: Single-jamb side locking bars, operable from outside with cylinder.

J. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Operator Location: Wall.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior.
5. Motor Electrical Characteristics:
 - a. Horsepower: 1/2 hp.
 - b. Voltage: 480V ac, three phase, 60 Hz.
6. Emergency Manual Operation: Chain type.
7. Obstruction-Detection Device: Automatic pneumatic sensor edge on bottom bar.
 - a. Sensor Edge Bulb Color: Black.
8. Control Station(s): Interior mounted.

K. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.3 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Aluminum: 0.040-inch-thick aluminum sheet complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 CURTAIN ACCESSORIES

- A. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.8 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
 - 1. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
 - 1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 - 2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 - 3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

- F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
 - 1. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
 - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Mill Finish: Manufacturer's standard.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
 - 3. Test door closing when activated by detector or alarm-connected automatic-closing system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components,

lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTIONAL DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Flat door sections with sensor edge on bottom section.
 - 2. Frame for paneled door sections; of each width of stile and rail required.

3. Panel for raised-panel door sections; not smaller than required to show raised-panel profile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sectional doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Failure of components or operators before reaching required number of operation cycles.
 - c. Faulty operation of hardware.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
 - e. Delamination of exterior or interior facing materials.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional doors from single source from single manufacturer.
 - 1. Obtain operators and controls from sectional door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors insulated and shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: As indicated on Drawings.
 - 2. Testing: According to ASTM E 330.
 - 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.
- C. Windborne-Debris Impact Resistance: Provide glazed sectional doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 2.
 - 1. Large Missile Test: For overhead coiling doors located within 30 feet of grade.

2.3 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.
 - 1. Basis-of-design product: Thermacore 592 by Overhead Door, 2501 S. State Hwy 121 Bus., Suite 200, Lewisville, TX 75067, www.overheaddoor.com. Provide the indicated product or an approved comparable product.
 - 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. C.H.I. Overhead Doors, Inc.
 - b. Overhead Door Corporation.
 - c. Rite-Hite Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- D. R-Value: 17.5 deg F x h x sq. ft./Btu.
- E. Steel Sections: Zinc-coated (galvanized) steel sheet with G90 zinc coating.
 - 1. Section Thickness: 2 inches.
 - 2. Exterior-Face, Steel Sheet Thickness: 0.015-inch- nominal coated thickness.
 - a. Surface: Manufacturer's standard, ribbed.
 - 3. Insulation: Foamed in place.
 - 4. Interior Facing Material: 1/8-inch-thick, manufacturer's standard material.
- F. Track Configuration: Standard-lift, High-lift, or Vertical-lift track as indicated on Drawings.
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.
- H. Windows: Approximately 24 by 11 inches, with square corners, and spaced apart the approximate distance as indicated on Drawings; in one row(s) at height indicated on Drawings; installed with glazing of the following type:
 - 1. Insulating Glass: Manufacturer's standard.
- I. Roller-Tire Material: Manufacturer's standard.
- J. Locking Devices: Equip door with locking device assembly.
 - 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumbturn.
- K. Counterbalance Type: Torsion spring.
- L. Electric Door Operator:
 - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 - 2. Operator Type: Manufacturer's standard for door requirements.

3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior, clean, and dry.
5. Emergency Manual Operation: Chain type.
6. Obstruction-Detection Device: Automatic photoelectric sensor and electric sensor edge on bottom section. Provide 2 photoelectric sensors at doors per door schedule. Mounting heights to be determined in field.

a. Sensor Edge Bulb Color: Black.

7. Control Station: Interior-side mounted where indicated on drawings.

M. Door Finish:

1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
2. Finish of Interior Facing Material: Finish as indicated by manufacturer's designations.

2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.
1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch-nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch-thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.
- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
- E. Provide reinforcement for hardware attachment.
- F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.
- G. Interior Facing Material: Manufacturer's standard material complying with the acceptance criteria of DASMA 107, with indicated thickness.
- H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

2.6 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
 - 1. Galvanized Steel: ASTM A 653/A 653M, minimum G60 zinc coating.
 - 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
 - 3. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
 - a. For Vertical Track: Intermittent, jamb brackets attached to track and attached to wall.
 - b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.
- B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.
- C. Windows: Manufacturer's standard window units of type, size, and in arrangement indicated. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

2.7 HARDWARE

- A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch-nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible. Provide double-end hinges where required, for doors more than 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch-diameter roller tires for 3-inch-wide track and 2-inch-diameter roller tires for 2-inch-wide track.

2.8 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.9 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.
- C. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5 to 1.

- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
 - 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised position and directly connected to door with drawbar.
 - 2. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall above door and connected to torsion shaft with an adjustable coupling or drive chain.
 - 3. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
 - 1. Electrical Characteristics:
 - a. Phase: Three phase.
 - b. Volts: 480 V.
 - c. Hertz: 60.
 - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
 5. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
 - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.
 2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom section. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - a. Self-Monitoring Type: Four-wire configured device designed to interface with door-operator control circuit to detect damage to or disconnection of sensor edge.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
- D. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780/A 780M.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

FIBERGLASS SANDWICH PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Walls
 - a. Flat insulated, translucent sandwich panels
 - b. Aluminum clampite installation system
 - c. Aluminum sill flashing
- B. Related Sections:
 - 1. Section 133419 Metal Building Systems

1.2 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.
- B. Submit shop drawings. Include plans, elevations, and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.
 - 1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
 - a. Sandwich panels: 7" x 12" units
 - b. Factory finished aluminum: 3" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
- E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Reports required (if applicable) are:
 - a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
 - b. Burn Extent (ASTM D 635)
 - c. Color Difference (ASTM D 2244)
 - d. Impact Strength (UL 972)
 - e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
 - f. Bond Shear Strength (ASTM D 1002)

- g. Beam Bending Strength (ASTM E 72)
- h. Insulation U-Factor (NFRC 100)
- i. NFRC System U-Factor Certification (NFRC 700)
- j. NFRC Visible Light Transmittance (NFRC 202)
- k. Solar Heat Gain Coefficient (NFRC or Calculations)
- l. Condensation Resistance Factor (AAMA 1503) (Thermally Broken, insulated panels only)
- m. Air Leakage (ASTM E 283)
- n. Structural Performance (ASTM E 330)
- o. Water Penetration (ASTM E 331)
- p. Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)

1.3 CLOSEOUT SUBMITTALS

- A. Provide field maintenance manual to include in project maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:

- 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
- 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.
- 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.5 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
 - 1. When requested, include span analysis data.
 - 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 - 3. Structural Loads (Walls). Provide system capable of handling the following loads:

- a. Positive Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]
- b. Negative Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]

B. Deflection Limits:

- 1. Walls: Limited to [L/60] or <Insert Deflection> of clear span for each assembly component.

C. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- 1. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

- A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within one year from the commencement date. The commencement date of the warranty shall be the date of substantial completion, but no more than six months from date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Kalwall Corporation, Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com

2.2 PANEL COMPONENTS

- A. Face Sheets:

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
 2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 25 and smoke developed no greater than 450 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1”.
 3. Exterior face sheets:
 - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after [3] [5] years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of **230 ft. lbs.** without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.
 - c. Strength: Exterior face sheet shall be uniform in strength, with panel meeting ASTM E1996 and ASTM E1886 or TAS 201, 202 and 203.
 - d. Erosion Protection: Integral, embedded-glass erosion barrier.
 4. Appearance:
 - a. Exterior face sheet: Smooth, white in color.
 - b. Interior face sheet: Smooth, white in color.
 - c. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- B. Grid Core:
1. Thermally Broken Composite I-beam grid core shall be of alloy and temper recommended by manufacturer with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16”.
 2. I-beam Thermal break: Minimum 1”, thermoset fiberglass composite. Poured and de-bridged thermal break is not acceptable.
- C. Laminate Adhesive:
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council “Acceptance Criteria for Sandwich Panel Adhesives”.
 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.3 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
 - 1. Thickness: **4 inches**
 - 2. Grid Core Insulation: Fill panel cores with **air**
 - 3. Panel U-factor by NFRC certified laboratory:
 - a. **4"** thermally broken
 - 4. Complete insulated panel system shall have NFRC certified U-factor of 0.55U
 - 5. Visible Light Transmittance (VLT): 23%
 - 6. Solar heat gain coefficient 0.30
 - 7. Grid pattern as viewed: Nominal size 12"x12"
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.
- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
 - 1. Absence of flame penetration through the wall assembly at any time.
 - 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
 - 3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Thermally broken, insulated panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

2.4 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clamp-tite installation system (Wall):
 - 1. **Thermally Broken-Flat** clamp-tite screw type closure system shall be of extruded aluminum alloy and temper as recommended by manufacturer.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clamp-tite installation system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum clamp-tite installation system, excluding final fasteners to the building.
- D. Finish:
 - 1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be **selected from manufacturer's standard KCRF colors**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure, and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.
 - 2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.
 - 1. Anchor component parts securely in place by permanent mechanical attachment system.
 - 2. Accommodate thermal and mechanical movements.
 - 3. Seal aluminum clampite installation system as shown on the manufacturer's fabrication drawings and suggested installation instructions.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.4 FIELD QUALITY CONTROL

- A. Water Test: Installer to test a representative section of installed materials according to procedures in AAMA 501.2.
- B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.5 CLEANING

- A. Clean the panel system, interior and exterior, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 06 Section "Rough Carpentry".
 - 2. Division 08 Section "Door Schedule".
 - 3. Division 08 Section "Door Hardware Schedule".
 - 4. Division 08 Section "Hollow Metal Doors and Frames".
 - 5. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 6. Division 28 Section "Access Control".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 105 - Installation of Smoke Door Assemblies.
 - 6. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. UL 305 - Panic Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

- a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the

manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" heavy weight.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
 - a. Ives (IV) - 5BB Series, 5-knuckle.
 - b. McKinney (MK) - TA/T4A Series, 5-knuckle.
 - c. dormakaba BEST (ST) - F/FBB Series, 5-knuckle.

2.2 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

- a. Ives (IV).
- b. Pemko (PE).
- c. dormakaba BEST (ST).

2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. Securitron (SU) - EL-CEPT Series.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

- a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
- b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney (MK) - QC-C Series.

2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
- 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
- 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Facility Restricted Keyway.
- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents.
 1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 2. Manufacturers:
 - a. Medeco (MC) - X4.
 - b. No Substitution.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical locksets shall have the following functions and features:
 - a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
 - b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
 - c. Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.
 - d. Two-year limited warranty on electrified functions.
2. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 5400LN Series.
 - b. dormakaba BEST (BE) - 9K Series.
 - c. Schlage (SC) - ND Series.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

- B. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 6000 Series.
 - b. dormakaba (DO) - 9000 Series.
 - c. Falcon (FA) - 24/25 Series.

2.9 SURFACE DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..

1. Manufacturers:

- a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
- b. Norton Rixson (NO) - 7500 Series.
- c. Sargent Manufacturing (SA) - 351 Series.

2.10 ELECTROMECHANICAL DOOR OPERATORS

- A. Electromechanical Door Operators (Moderate Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that are UL325/991 and UL10C certified and comply with requirements for the Americans with Disabilities Act (ADA). Operators shall accommodate openings up to 200 pounds and 48" wide.

1. Provide operators with features as follows:
 - a. Non-handed with push and pull side mounting.
 - b. Activation by push button, hands-free or radio frequency devices.
 - c. Adjustable opening force and closing power.
 - d. Two-year limited warranty.
 - e. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building's IT required.
 - 1) Simple setup with no app required.
 - 2) View status and make adjustments without removing the cover.
 - 3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
 - f. Mounting backplate to simplify and speed up installation.
2. Operators shall have the following functionality:
 - a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
 - b. Emergency Interface Relay: Door closes and ignores any activation input until signal is discontinued.
 - c. Infinite Hold Open: Door will hold open at set position until power is turned off.
 - d. Latch Assist: At closed position, after an activation, the door is pulled in. After the door has closed, the door is pulled in to assist with latch release/engagement.
 - e. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
 - f. Open Delay: Delays operator opening for locking hardware.
 - g. Outside Wall Switch Disable: When contact is closed, outside wall switch is disabled.
 - h. Power Assist: Senses the door is being opened manually and applies small amount of power to assist the user in opening the door with force less than 5 lbs. The door opens only as far as it is moved manually, then closes once released.
 - i. Power Close: Additional force to assist door closing between 7° and 2°.
 - j. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
 - k. Selector Mode Switch: Off disables the signal inputs, on activates the signal inputs, hold open activates the unit to the hold open position.

- l. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open the second door will open once vestibule door delay has expired. Delay shall be adjustable.
- m. Executive Mode Feature: When the door receives an activation signal it opens and remains open until either a second signal is received, or the door is manually moved in closing direction.

3. Manufacturers:

- a. Norton Rixson (NO) - 6200 Series.

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood (RO).
- c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

- a. Norton Rixson (RF).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 1. National Guard Products (NG).
 2. Pemko (PE).
 3. Reese Enterprises, Inc. (RE).

2.13 ELECTRONIC ACCESSORIES

- A. Intelligent Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
 1. Power supplies shall meet all functions and features as specified herein.
 - a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.
 - b. Dedicated fast charger to prolong battery life with low battery cutoff to protect batteries from deep discharge.
 - c. Enhanced surge immunity for input/output protection
 - d. Separate, dedicated battery charging circuit to keep locks cooler.
 - e. Dual-color LED visual notification to prevent applying incorrect voltages to the power supply.
 - f. Instant auto-switch to battery on AC loss.
 - g. Expandable up to 16 outputs in the standard enclosure
 - h. Integrated fire alarm interface to allow main output shutdown or disconnect on a per output basis when using an R8 output module.
 - i. Network ready and remotely manage locks and connected devices when using an M8 managed output module on network models.
 - j. Lifetime replacement, no-fault, no questions asked warranty.
 2. Manufacturers:
 - a. Securitron (SU) - AQL Series.

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION 087100

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Glass for windows, doors, interior borrowed lites, and storefront framing.
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For tinted glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. JE Berkowitz, LP.
 - 2. Viracon, Inc.
 - 3. Vitro Architectural Glass.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
 - 1. Obtain tinted glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
1. Design Wind Pressures: As indicated on Drawings.
 2. Design Snow Loads: As indicated on Drawings.
 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
1. Large-Missile Test: For glazing located within 30 feet of grade.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 1/4 inch.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Dow Corning Corporation.
 - c. Sika Corporation.
 2. Applications: Insulated Glass Units.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section references specification sections relating to commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Sliding Doors.
 - 3. Other doors to the extent indicated.
- B. Commercial door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical and access control door hardware.
 - 3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.
 - 4. Automatic operators.
 - 5. Cylinders specified for doors in other sections.
- C. Related Sections:
 - 1. Division 08 Section "Door Hardware".
 - 2. Division 26 Section "Electrical".
 - 3. Division 28 Section "Access Control".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. State Building Codes, Local Amendments.

- E. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Refer to "PART 3 – EXECUTION" for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

- A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
1. Quantities listed are for each pair of doors, or for each single door.
 2. The supplier is responsible for handling and sizing all products.
 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Products listed in the hardware sets shall be supplied by and in accordance with the requirements described in the specification section as noted for each item.
1. Section 08 71 00 – Door Hardware.
- C. Manufacturer's Abbreviations:
1. MK - McKinney
 2. PE - Pemko
 3. SU - Securitron
 4. YA - ASSA ABLOY ACCENTRA
 5. MC - Medeco
 6. RO - Rockwood
 7. RF - Rixson
 8. OT - Other

Hardware Sets

Set: 1.0

Doors: 100

2 Continuous Hinge

CFMxxxSLF PT

PE 087100

| | | | | | | |
|---|------------------------------------|--|----------|----|--------|---|
| 2 | Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 | Concealed Vert Rod Exit, Classroom | 6220 B MELR 503F K645xCT6SL Less Dogging | 630 | YA | 087100 | ⚡ |
| 1 | Concealed Vert Rod Exit, Exit Only | 6220 B MELR EO Less Dogging | 630 | YA | 087100 | ⚡ |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 2 | Door Pull | TBF158 | US32D-MS | RO | 087100 | |
| 2 | Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 2 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 2 | Sweep | 18041CNB | | PE | 087100 | |
| 1 | Threshold | 279x292AFGPK | | PE | 087100 | |
| 2 | ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 2 | ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 | Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 | Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 | Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: Perimeter / meeting stile gasketing by Alum Door / Frame Manufacturer.

- Door normally closed and locked
- Presenting valid credential shunts DPS and retracts latch permitting pulled entry.
- Depressing push rail shunts DPS for authorized exit.
- Entry by manual key alerts head end to entry w/ out audit trail unless power is off.
- FD access by mech key.
- Remote release via intercom.
- Free egress at all times.

Set: 2.0

Doors: 101

| | | | | | | |
|---|--------------------|-----------------|----------|----|--------|--|
| 2 | Continuous Hinge | CFMxxxSLF | | PE | 087100 | |
| 2 | Push Bar & Pull | TBF15847 T1HD | US32D-MS | RO | 087100 | |
| 2 | Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 2 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 2 | Sweep | 18041CNB | | PE | 087100 | |
| 1 | Threshold | 270A | | PE | 087100 | |

Notes: Perimeter / meeting stile gasketing by Alum Door / Frame Manufacturer.

Set: 3.0

Doors: 102

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Entry Lock | B AU 5407LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 4.0

Doors: 103A

| | | | | |
|-----------------------|-----------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 5.0

Doors: 103B, 120A, 120B

| | | | | | |
|-----------------------------------|---|-----|----|--------|---|
| 1 Continuous Hinge | CFMxxxSLF PT | | PE | 087100 | |
| 1 Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 Fire Rated Rim Exit, Nightlatch | 6100 (F or LD) ED B MELR AU627F K645xCT6SL | 630 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 252x3AFG Pemkote MSES25SS | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: •Door normally closed and locked

- Presenting valid credential shunts DPS and retracts latch permitting pulled entry.
- Depressing push rail shunts DPS for authorized exit.
- Entry by manual key alerts head end to entry w/ out audit trail unless power is off.
- FD access by mech key.
- Free egress at all times.

Set: 6.0

Doors: 104, 105

| | | | | |
|-------------------------------|-----------------|-------|----|--------|
| 3 Hinge, Full Mortise, Hvy Wt | T4A3786 [NRP] | US26D | MK | 087100 |
| 1 Door Pull | TBF157 | US32D | RO | 087100 |
| 1 Push Plate | 70C | US32D | RO | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 7.0

Doors: 106

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Classroom Lock | B AU 5408LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 8.0

Doors: 107, 108, 109, 110, 111

| | | | | |
|---------------------------|-----------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2714 [NRP] | US26D | MK | 087100 |
| 1 Entry Lock | B AU 5407LN Temp Core | 626 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Gasketing | S88 LAR | | PE | 087100 |

Set: 9.0

Doors: 114B

| | | | | |
|-----------------------|--------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 |

| | | | | | |
|---|----------------|-----------------|-----|----|--------|
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Gasketing | 312CR | | PE | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 9.1

Doors: 114A

| | | | | | |
|---|---------------------|-----------------|-------|----|--------|
| 3 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Passage Latch | AU 5401LN | 626 | YA | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Gasketing | S88 LAR | | PE | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.0

Doors: 115

| | | | | | |
|---|--------------------------|-----------------------|-------|----|--------|
| 3 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Storeroom or Closet Lock | B AU 5405LN Temp Core | 626 | YA | 087100 |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.1

Doors: 119

| | | | | | |
|---|--------------------------|-----------------------|-------|----|--------|
| 4 | Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 | Storeroom or Closet Lock | B AU 5405LN Temp Core | 626 | YA | 087100 |
| 1 | Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 | Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 | Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 | Sweep | 18041CNB | | PE | 087100 |
| 1 | Threshold | 270A | | PE | 087100 |

Set: 10.2

Doors: 116

| | | | | | |
|-----------------------------|---|-------|----|--------|---|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 | |
| 1 Fail Secure Lock | B AU 5491LN Temp Core REX | 626 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | S88 LAR | | PE | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 270A | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |
| 1 Wiring Diagram | - Elevation and Point to Point as Specified | | OT | | |

Set: 10.3

Doors: 118

| | | | | | |
|-----------------------------|---|-------|----|--------|---|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 | |
| 1 Fail Secure Lock | B AU 5491LN Temp Core REX | 626 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 270A | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |
| 1 Wiring Diagram | - Elevation and Point to Point as Specified | | OT | | |

Set: 11.0

Doors: 117A

| | | | | |
|----------------------------------|------------------------------------|-------|----|--------|
| 3 Hinge, Full Mortise | TA2314 {NRP} | US32D | MK | 087100 |
| 1 Fire Rated Rim Exit, Classroom | 6100 (F or LD)ED AU626F K645xCT6SL | 630 | YA | 087100 |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 |
| 1 Wall Stop | 403 / 441CU | US26D | RO | 087100 |
| 1 Sweep | 18041CNB | | PE | 087100 |
| 1 Threshold | 270A | | PE | 087100 |

Set: 12.0

Doors: 117B

| | | | | | |
|-----------------------------------|--|-----|----|--------|---|
| 1 Continuous Hinge | CFMxxxSLF PT | | PE | 087100 | |
| 1 Electric Power Transfer | Provided by others | 630 | SU | 087100 | ⚡ |
| 1 Fire Rated Rim Exit, Nightlatch | 6100 (F or LD) ED B MELR AU627F K645xCT6SL | 630 | YA | 087100 | ⚡ |
| 1 Small Format Inter Core | 33600006N | 26 | MC | 087100 | |
| 1 Conc Overhead Stop | 6-X36 | 630 | RF | 087100 | |
| 1 Surface Closer | 4400 (Tri Pack) | 689 | YA | 087100 | |
| 1 Gasketing | 312CR | | PE | 087100 | |
| 1 Sweep | 18041CNB | | PE | 087100 | |
| 1 Threshold | 252x3AFG Pemkote MSES25SS | | PE | 087100 | |
| 1 ElectroLynx Frame Harness | QC-C1500 | | MK | 087100 | ⚡ |
| 1 ElectroLynx Door Harness | QC-Cxxx LAR | | MK | 087100 | ⚡ |
| 1 Credential Reader | - Provided by Security Contractor | | OT | 281300 | ⚡ |
| 1 Position Switch | -Provided by Security Contractor | | SU | 281500 | ⚡ |
| 1 Power Supply | AQL102-E2 | | SU | 087100 | ⚡ |

Notes: •Door normally closed and locked

•Presenting valid credential shunts DPS and retracts latch permitting pulled entry.

•Depressing push rail shunts DPS for authorized exit.

•Entry by manual key alerts head end to entry w/ out audit trail unless power is off.

•FD access by mech key.

•Free egress at all times.

Set: 88.0

Doors: OH01, OH02, OH03, OH04, OH05, OH06, OH07

| | | | |
|---------------------------|-----------|----|-----------|
| 1 Small Format Inter Core | 33600006N | 26 | MC 087100 |
|---------------------------|-----------|----|-----------|

Notes: Provide core/cylinder as directed by architect. Coordinate locking requirements w/ specialty door supplier.

END OF SECTION 080671

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 08 Section "Access Control".
6. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
7. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. 10. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- C. Shop Drawings: Include the following:
 1. Elevations of each door design.
 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 4. Locations of reinforcement and preparations for hardware.
 5. Details of anchorages, joints, field splices, and connections.
 6. Details of accessories.
 7. Details of moldings, removable stops, and glazing.
 8. Details of conduit and preparations for power, signal, and control systems.
- D. Samples for Verification:
 1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40" above sill) or UL 10C.
 - 1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
 - 2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
 - 3. Smoke Control Door Assemblies: Comply with NFPA 105.
 - a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
- D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.
- E. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on SDI-113, ASTM C1363, ASTM C1199 and ASTM E1423. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
 - 1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with SDI-113, ASTM C1363, ASTM C1199 and ASTM E143 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.34, R-Value 2.92, including insulated door, thermal-break frame and threshold.
 - 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).
- F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and

Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
 - 1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
- B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
 - 1. Curries Company (CU).

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

- A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
- B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
 - 1. Design: Flush panel.
 - 2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds or thermally enhanced stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".
 - a. Provide 22-gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
 - b. Thermal properties to rate at a fully operable minimum U-Factor 0.34 and R-Value 2.92, including insulated door, thermal-break frame and threshold.
- C.
 - 1. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053 inch - 1.3-mm) thick steel, Model 2.
 - 2. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
 - 3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the

face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
 - a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Manufacturers Basis of Design:

1. Interior - Curries Company (CU) - Polystyrene Core - 707 Series.
2. Exterior - Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16" positive thermal break and integral vinyl weatherstripping.
- C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) - Mercury 3 Thermal Break TQ Series.

D. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

a. Curries Company (CU) - CM Series.

b. Curries Company (CU) - M Series.

E. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

F. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate,

frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

- B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C. Hollow Metal Doors:
 - 1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
 - 2. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 - 3. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.
- D. Hollow Metal Frames:
 - 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 2. Welded Frames: Weld joints continuously through full throat width of frames, including rabbets, soffits, and stops; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 - 3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
 - 4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 - 5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 - 6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 - 7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 - 8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
 - 9. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 10. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.
- E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
- 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.8 STEEL FINISHES

- A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
- 1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
- C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow metal work immediately after installation.
- C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware"
 - 2. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham Wood Doors; ASSA ABLOY Group company.
4. Lambton Doors.
5. Marshfield Door Systems, Inc.
6. Mohawk Flush Doors, Inc.
7. Oshkosh Door Company.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. WDMA I.S.1-A Performance Grade: Heavy Duty.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, [Grade LD-1] [or] [Grade LD-2].
 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking, in doors indicated to have closers.
 - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.

- a. Screw Withdrawal, Face: 700 lbf.
- b. Screw Withdrawal, Edge: 400 lbf.

F. Mineral-Core Doors:

- 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
- 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking.
 - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch midrail blocking, in doors indicated to have armor plates.
 - d. 5-inch midrail blocking, in doors indicated to have exit devices.
- 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 475 lbf per WDMA T.M.-10.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

- 1. Grade: Custom (Grade A faces).
- 2. Species: Select white maple.
- 3. Cut: Plain sliced (flat sliced).
- 4. Match between Veneer Leaves: Book match.
- 5. Assembly of Veneer Leaves on Door Faces: Running match.
- 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
- 7. Exposed Vertical Edges: Same species as faces - edge Type A.
- 8. Core: Particleboard.
- 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
- 10. WDMA I.S.1-A Performance Grade: Heavy Duty.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Grade: Custom.
 - 2. Finish: WDMA TR-4 conversion varnish or WDMA TR-6 catalyzed polyurethane.
 - 3. Staining: As selected by Architect from manufacturer's full range.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Service doors.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.

- 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Include description of automatic-closing device and testing and resetting instructions.

- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

- 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 5. Include diagrams for power, signal, and control wiring.

- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Bottom bar with sensor edge.
3. Guides.
4. Brackets.
5. Hood.
6. Locking device(s).
7. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 DOOR ASSEMBLY

- A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cookson Company.
 - b. Cornell.
 - c. Overhead Door Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 100,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
1. Include tamperproof cycle counter.
- C. STC Rating: 26.
- D. Door Curtain Material: Galvanized steel.
- E. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- H. Hood: Aluminum.
1. Shape: Square.
 2. Mounting: Face of wall.
- I. Locking Devices: Equip door with locking device assembly.
1. Locking Device Assembly: Single-jamb side locking bars, operable from outside with cylinder.

J. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Operator Location: Wall.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior.
5. Motor Electrical Characteristics:
 - a. Horsepower: 1/2 hp.
 - b. Voltage: 480V ac, three phase, 60 Hz.
6. Emergency Manual Operation: Chain type.
7. Obstruction-Detection Device: Automatic pneumatic sensor edge on bottom bar.
 - a. Sensor Edge Bulb Color: Black.
8. Control Station(s): Interior mounted.

K. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.3 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Aluminum: 0.040-inch-thick aluminum sheet complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 CURTAIN ACCESSORIES

- A. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.8 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
 - 1. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
 - 1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 - 2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 - 3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

- F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
 - 1. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
 - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Mill Finish: Manufacturer's standard.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
 - 3. Test door closing when activated by detector or alarm-connected automatic-closing system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components,

lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTIONAL DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Flat door sections with sensor edge on bottom section.
 - 2. Frame for paneled door sections; of each width of stile and rail required.

3. Panel for raised-panel door sections; not smaller than required to show raised-panel profile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sectional doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Failure of components or operators before reaching required number of operation cycles.
 - c. Faulty operation of hardware.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
 - e. Delamination of exterior or interior facing materials.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional doors from single source from single manufacturer.
 - 1. Obtain operators and controls from sectional door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors insulated and shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: As indicated on Drawings.
 - 2. Testing: According to ASTM E 330.
 - 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.
- C. Windborne-Debris Impact Resistance: Provide glazed sectional doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 2.
 - 1. Large Missile Test: For overhead coiling doors located within 30 feet of grade.

2.3 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.
 - 1. Basis-of-design product: Thermacore 592 by Overhead Door, 2501 S. State Hwy 121 Bus., Suite 200, Lewisville, TX 75067, www.overheaddoor.com. Provide the indicated product or an approved comparable product.
 - 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. C.H.I. Overhead Doors, Inc.
 - b. Overhead Door Corporation.
 - c. Rite-Hite Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- D. R-Value: 17.5 deg F x h x sq. ft./Btu.
- E. Steel Sections: Zinc-coated (galvanized) steel sheet with G90 zinc coating.
 - 1. Section Thickness: 2 inches.
 - 2. Exterior-Face, Steel Sheet Thickness: 0.015-inch- nominal coated thickness.
 - a. Surface: Manufacturer's standard, ribbed.
 - 3. Insulation: Foamed in place.
 - 4. Interior Facing Material: 1/8-inch-thick, manufacturer's standard material.
- F. Track Configuration: Standard-lift, High-lift, or Vertical-lift track as indicated on Drawings.
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.
- H. Windows: Approximately 24 by 11 inches, with square corners, and spaced apart the approximate distance as indicated on Drawings; in one row(s) at height indicated on Drawings; installed with glazing of the following type:
 - 1. Insulating Glass: Manufacturer's standard.
- I. Roller-Tire Material: Manufacturer's standard.
- J. Locking Devices: Equip door with locking device assembly.
 - 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumbturn.
- K. Counterbalance Type: Torsion spring.
- L. Electric Door Operator:
 - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 - 2. Operator Type: Manufacturer's standard for door requirements.

3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior, clean, and dry.
5. Emergency Manual Operation: Chain type.
6. Obstruction-Detection Device: Automatic photoelectric sensor and electric sensor edge on bottom section. Provide 2 photoelectric sensors at doors per door schedule. Mounting heights to be determined in field.

a. Sensor Edge Bulb Color: Black.

7. Control Station: Interior-side mounted where indicated on drawings.

M. Door Finish:

1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
2. Finish of Interior Facing Material: Finish as indicated by manufacturer's designations.

2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.
1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch-nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch-thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.
- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
- E. Provide reinforcement for hardware attachment.
- F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.
- G. Interior Facing Material: Manufacturer's standard material complying with the acceptance criteria of DASMA 107, with indicated thickness.
- H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

2.6 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
 - 1. Galvanized Steel: ASTM A 653/A 653M, minimum G60 zinc coating.
 - 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
 - 3. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
 - a. For Vertical Track: Intermittent, jamb brackets attached to track and attached to wall.
 - b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.
- B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.
- C. Windows: Manufacturer's standard window units of type, size, and in arrangement indicated. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

2.7 HARDWARE

- A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch-nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible. Provide double-end hinges where required, for doors more than 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch-diameter roller tires for 3-inch-wide track and 2-inch-diameter roller tires for 2-inch-wide track.

2.8 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.9 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.
- C. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5 to 1.

- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
 - 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised position and directly connected to door with drawbar.
 - 2. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall above door and connected to torsion shaft with an adjustable coupling or drive chain.
 - 3. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
 - 1. Electrical Characteristics:
 - a. Phase: Three phase.
 - b. Volts: 480 V.
 - c. Hertz: 60.
 - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
 5. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
 - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.
 2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom section. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - a. Self-Monitoring Type: Four-wire configured device designed to interface with door-operator control circuit to detect damage to or disconnection of sensor edge.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
- D. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780/A 780M.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

FIBERGLASS SANDWICH PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Walls
 - a. Flat insulated, translucent sandwich panels
 - b. Aluminum clampite installation system
 - c. Aluminum sill flashing
- B. Related Sections:
 - 1. Section 133419 Metal Building Systems

1.2 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.
- B. Submit shop drawings. Include plans, elevations, and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.
 - 1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
 - a. Sandwich panels: 7" x 12" units
 - b. Factory finished aluminum: 3" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
- E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Reports required (if applicable) are:
 - a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
 - b. Burn Extent (ASTM D 635)
 - c. Color Difference (ASTM D 2244)
 - d. Impact Strength (UL 972)
 - e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
 - f. Bond Shear Strength (ASTM D 1002)

- g. Beam Bending Strength (ASTM E 72)
- h. Insulation U-Factor (NFRC 100)
- i. NFRC System U-Factor Certification (NFRC 700)
- j. NFRC Visible Light Transmittance (NFRC 202)
- k. Solar Heat Gain Coefficient (NFRC or Calculations)
- l. Condensation Resistance Factor (AAMA 1503) (Thermally Broken, insulated panels only)
- m. Air Leakage (ASTM E 283)
- n. Structural Performance (ASTM E 330)
- o. Water Penetration (ASTM E 331)
- p. Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)

1.3 CLOSEOUT SUBMITTALS

- A. Provide field maintenance manual to include in project maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:

- 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
- 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.
- 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.5 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
 - 1. When requested, include span analysis data.
 - 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 - 3. Structural Loads (Walls). Provide system capable of handling the following loads:

- a. Positive Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]
- b. Negative Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]

B. Deflection Limits:

- 1. Walls: Limited to [L/60] or <Insert Deflection> of clear span for each assembly component.

C. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- 1. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

- A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within one year from the commencement date. The commencement date of the warranty shall be the date of substantial completion, but no more than six months from date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Kalwall Corporation, Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com

2.2 PANEL COMPONENTS

- A. Face Sheets:

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
 2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 25 and smoke developed no greater than 450 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1”.
 3. Exterior face sheets:
 - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after [3] [5] years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of **230 ft. lbs.** without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.
 - c. Strength: Exterior face sheet shall be uniform in strength, with panel meeting ASTM E1996 and ASTM E1886 or TAS 201, 202 and 203.
 - d. Erosion Protection: Integral, embedded-glass erosion barrier.
 4. Appearance:
 - a. Exterior face sheet: Smooth, white in color.
 - b. Interior face sheet: Smooth, white in color.
 - c. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- B. Grid Core:
1. Thermally Broken Composite I-beam grid core shall be of alloy and temper recommended by manufacturer with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16”.
 2. I-beam Thermal break: Minimum 1”, thermoset fiberglass composite. Poured and de-bridged thermal break is not acceptable.
- C. Laminate Adhesive:
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council “Acceptance Criteria for Sandwich Panel Adhesives”.
 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.3 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
 - 1. Thickness: **4 inches**
 - 2. Grid Core Insulation: Fill panel cores with **air**
 - 3. Panel U-factor by NFRC certified laboratory:
 - a. **4"** thermally broken
 - 4. Complete insulated panel system shall have NFRC certified U-factor of 0.55U
 - 5. Visible Light Transmittance (VLT): 23%
 - 6. Solar heat gain coefficient 0.30
 - 7. Grid pattern as viewed: Nominal size 12"x12"
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.
- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
 - 1. Absence of flame penetration through the wall assembly at any time.
 - 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
 - 3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Thermally broken, insulated panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

2.4 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clamp-tite installation system (Wall):
 - 1. **Thermally Broken-Flat** clamp-tite screw type closure system shall be of extruded aluminum alloy and temper as recommended by manufacturer.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clamp-tite installation system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum clamp-tite installation system, excluding final fasteners to the building.
- D. Finish:
 - 1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be **selected from manufacturer's standard KCRF colors**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure, and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.
 - 2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.
 - 1. Anchor component parts securely in place by permanent mechanical attachment system.
 - 2. Accommodate thermal and mechanical movements.
 - 3. Seal aluminum clampite installation system as shown on the manufacturer's fabrication drawings and suggested installation instructions.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.4 FIELD QUALITY CONTROL

- A. Water Test: Installer to test a representative section of installed materials according to procedures in AAMA 501.2.
- B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.5 CLEANING

- A. Clean the panel system, interior and exterior, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 06 Section "Rough Carpentry".
 - 2. Division 08 Section "Door Schedule".
 - 3. Division 08 Section "Door Hardware Schedule".
 - 4. Division 08 Section "Hollow Metal Doors and Frames".
 - 5. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
 - 6. Division 28 Section "Access Control".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 105 - Installation of Smoke Door Assemblies.
 - 6. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. UL 305 - Panic Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
 1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

- a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

- A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.
- B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the

manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BUTT HINGES

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:
 - a. Two Hinges: For doors with heights up to 60 inches.
 - b. Three Hinges: For doors with heights 61 to 90 inches.
 - c. Four Hinges: For doors with heights 91 to 120 inches.
 - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - b. Sizes from 3'1" to 4'0": 5" heavy weight.
3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
 - a. Ives (IV) - 5BB Series, 5-knuckle.
 - b. McKinney (MK) - TA/T4A Series, 5-knuckle.
 - c. dormakaba BEST (ST) - F/FBB Series, 5-knuckle.

2.2 CONTINUOUS HINGES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

- a. Ives (IV).
- b. Pemko (PE).
- c. dormakaba BEST (ST).

2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

- a. Securitron (SU) - EL-CEPT Series.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

- a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
- b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

- a. McKinney (MK) - QC-C Series.

2.4 DOOR OPERATING TRIM

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

- 1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
- 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
- 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:
 - a. Hiawatha, Inc. (HI).
 - b. Rockwood (RO).
 - c. Trimco (TC).

2.5 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Facility Restricted Keyway.
- C. Small Format Interchangeable Cores: Provide small format interchangeable cores (SFIC) as specified, core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents.
 1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
 2. Manufacturers:
 - a. Medeco (MC) - X4.
 - b. No Substitution.
- E. Keying System: Each type of lock and cylinders to be factory keyed.
 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.

2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Three (3).
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical locksets shall have the following functions and features:
 - a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
 - b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
 - c. Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.
 - d. Two-year limited warranty on electrified functions.
2. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 5400LN Series.
 - b. dormakaba BEST (BE) - 9K Series.
 - c. Schlage (SC) - ND Series.

2.7 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
7. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
8. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

9. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
10. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
11. Rail Sizing: Provide exit device rails factory sized for proper door width application.
12. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

- B. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:
 - a. ASSA ABLOY ACCENTRA (YA) - 6000 Series.
 - b. dormakaba (DO) - 9000 Series.
 - c. Falcon (FA) - 24/25 Series.

2.9 SURFACE DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Cycle Testing: Provide closers which have surpassed 15 million cycles.
4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..

1. Manufacturers:

- a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
- b. Norton Rixson (NO) - 7500 Series.
- c. Sargent Manufacturing (SA) - 351 Series.

2.10 ELECTROMECHANICAL DOOR OPERATORS

- A. Electromechanical Door Operators (Moderate Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that are UL325/991 and UL10C certified and comply with requirements for the Americans with Disabilities Act (ADA). Operators shall accommodate openings up to 200 pounds and 48" wide.

1. Provide operators with features as follows:
 - a. Non-handed with push and pull side mounting.
 - b. Activation by push button, hands-free or radio frequency devices.
 - c. Adjustable opening force and closing power.
 - d. Two-year limited warranty.
 - e. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building's IT required.
 - 1) Simple setup with no app required.
 - 2) View status and make adjustments without removing the cover.
 - 3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
 - f. Mounting backplate to simplify and speed up installation.
2. Operators shall have the following functionality:
 - a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
 - b. Emergency Interface Relay: Door closes and ignores any activation input until signal is discontinued.
 - c. Infinite Hold Open: Door will hold open at set position until power is turned off.
 - d. Latch Assist: At closed position, after an activation, the door is pulled in. After the door has closed, the door is pulled in to assist with latch release/engagement.
 - e. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
 - f. Open Delay: Delays operator opening for locking hardware.
 - g. Outside Wall Switch Disable: When contact is closed, outside wall switch is disabled.
 - h. Power Assist: Senses the door is being opened manually and applies small amount of power to assist the user in opening the door with force less than 5 lbs. The door opens only as far as it is moved manually, then closes once released.
 - i. Power Close: Additional force to assist door closing between 7° and 2°.
 - j. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
 - k. Selector Mode Switch: Off disables the signal inputs, on activates the signal inputs, hold open activates the unit to the hold open position.

- l. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open the second door will open once vestibule door delay has expired. Delay shall be adjustable.
- m. Executive Mode Feature: When the door receives an activation signal it opens and remains open until either a second signal is received, or the door is manually moved in closing direction.

3. Manufacturers:

- a. Norton Rixson (NO) - 6200 Series.

2.11 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

- a. Hiawatha, Inc. (HI).
- b. Rockwood (RO).
- c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

- a. Norton Rixson (RF).

2.12 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 1. National Guard Products (NG).
 2. Pemko (PE).
 3. Reese Enterprises, Inc. (RE).

2.13 ELECTRONIC ACCESSORIES

- A. Intelligent Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
 1. Power supplies shall meet all functions and features as specified herein.
 - a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.
 - b. Dedicated fast charger to prolong battery life with low battery cutoff to protect batteries from deep discharge.
 - c. Enhanced surge immunity for input/output protection
 - d. Separate, dedicated battery charging circuit to keep locks cooler.
 - e. Dual-color LED visual notification to prevent applying incorrect voltages to the power supply.
 - f. Instant auto-switch to battery on AC loss.
 - g. Expandable up to 16 outputs in the standard enclosure
 - h. Integrated fire alarm interface to allow main output shutdown or disconnect on a per output basis when using an R8 output module.
 - i. Network ready and remotely manage locks and connected devices when using an M8 managed output module on network models.
 - j. Lifetime replacement, no-fault, no questions asked warranty.
 2. Manufacturers:
 - a. Securitron (SU) - AQL Series.

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
 - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION 087100

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Glass for windows, doors, interior borrowed lites, and storefront framing.
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For tinted glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. JE Berkowitz, LP.
 - 2. Viracon, Inc.
 - 3. Vitro Architectural Glass.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
 - 1. Obtain tinted glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
1. Design Wind Pressures: As indicated on Drawings.
 2. Design Snow Loads: As indicated on Drawings.
 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
1. Large-Missile Test: For glazing located within 30 feet of grade.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 1/4 inch.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Dow Corning Corporation.
 - c. Sika Corporation.
 2. Applications: Insulated Glass Units.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
 - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware"
 - 2. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- C. Samples for Initial Selection: For factory-finished doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Algoma Hardwoods, Inc.
2. Eggers Industries.
3. Graham Wood Doors; ASSA ABLOY Group company.
4. Lambton Doors.
5. Marshfield Door Systems, Inc.
6. Mohawk Flush Doors, Inc.
7. Oshkosh Door Company.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. WDMA I.S.1-A Performance Grade: Heavy Duty.
- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
- D. Particleboard-Core Doors:
1. Particleboard: ANSI A208.1, [Grade LD-1] [or] [Grade LD-2].
 2. Blocking: Provide wood blocking in particleboard-core doors as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking, in doors indicated to have closers.
 - b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.
- E. Structural-Composite-Lumber-Core Doors:
1. Structural Composite Lumber: WDMA I.S.10.

- a. Screw Withdrawal, Face: 700 lbf.
- b. Screw Withdrawal, Edge: 400 lbf.

F. Mineral-Core Doors:

- 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
- 2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware. follows:
 - a. 5-inch top-rail blocking.
 - b. 5-inch bottom-rail blocking, in doors indicated to have protection plates.
 - c. 5-inch midrail blocking, in doors indicated to have armor plates.
 - d. 5-inch midrail blocking, in doors indicated to have exit devices.
- 3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
 - a. Screw-Holding Capability: 475 lbf per WDMA T.M.-10.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors:

- 1. Grade: Custom (Grade A faces).
- 2. Species: Select white maple.
- 3. Cut: Plain sliced (flat sliced).
- 4. Match between Veneer Leaves: Book match.
- 5. Assembly of Veneer Leaves on Door Faces: Running match.
- 6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
- 7. Exposed Vertical Edges: Same species as faces - edge Type A.
- 8. Core: Particleboard.
- 9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.
- 10. WDMA I.S.1-A Performance Grade: Heavy Duty.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 - 1. Comply with NFPA 80 requirements for fire-rated doors.

- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Factory cut and trim openings through doors.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 - 3. Louvers: Factory install louvers in prepared openings.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Transparent Finish:
 - 1. Grade: Custom.
 - 2. Finish: WDMA TR-4 conversion varnish or WDMA TR-6 catalyzed polyurethane.
 - 3. Staining: As selected by Architect from manufacturer's full range.
 - 4. Effect: Open-grain finish.
 - 5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Service doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of overhead coiling door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
 - 3. Include description of automatic-closing device and testing and resetting instructions.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
 - 5. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Bottom bar with sensor edge.
3. Guides.
4. Brackets.
5. Hood.
6. Locking device(s).
7. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.

1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 DOOR ASSEMBLY

- A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cookson Company.
 - b. Cornell.
 - c. Overhead Door Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 100,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
1. Include tamperproof cycle counter.
- C. STC Rating: 26.
- D. Door Curtain Material: Galvanized steel.
- E. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
- F. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.
- G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
- H. Hood: Aluminum.
1. Shape: Square.
 2. Mounting: Face of wall.
- I. Locking Devices: Equip door with locking device assembly.
1. Locking Device Assembly: Single-jamb side locking bars, operable from outside with cylinder.

J. Electric Door Operator:

1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
2. Operator Location: Wall.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior.
5. Motor Electrical Characteristics:
 - a. Horsepower: 1/2 hp.
 - b. Voltage: 480V ac, three phase, 60 Hz.
6. Emergency Manual Operation: Chain type.
7. Obstruction-Detection Device: Automatic pneumatic sensor edge on bottom bar.
 - a. Sensor Edge Bulb Color: Black.
8. Control Station(s): Interior mounted.

K. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.3 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A 653/A 653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
 2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
 - 1. Aluminum: 0.040-inch-thick aluminum sheet complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

2.6 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 CURTAIN ACCESSORIES

- A. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.8 COUNTERBALANCE MECHANISM

- A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless or welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

- C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
- D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.
- E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door Operator Location(s): Operator location indicated for each door.
 - 1. Wall Mounted: Operator is mounted to the inside front wall on the left or right side of door and connected to door drive shaft with drive chain and sprockets. Side room is required for this type of mounting. Wall-mounted operator can also be mounted above or below shaft; if above shaft, headroom is required.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
 - 1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
 - 2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 - 3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
- E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

- F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
 - 1. Pneumatic Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
 - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.10 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

- A. Mill Finish: Manufacturer's standard.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
 - 3. Test door closing when activated by detector or alarm-connected automatic-closing system. Reset door-closing mechanism after successful test.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components,

lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance, including emergency callback service, during normal working hours.
2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTIONAL DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of sectional door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profile door sections, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies. Indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
 - 4. Include diagrams for power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied finishes.
 - 1. Include Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
 - 1. Flat door sections with sensor edge on bottom section.
 - 2. Frame for paneled door sections; of each width of stile and rail required.

3. Panel for raised-panel door sections; not smaller than required to show raised-panel profile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sectional doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Failure of components or operators before reaching required number of operation cycles.
 - c. Faulty operation of hardware.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.
 - e. Delamination of exterior or interior facing materials.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain sectional doors from single source from single manufacturer.
 - 1. Obtain operators and controls from sectional door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Sectional doors insulated and shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
 - 1. Design Wind Load: As indicated on Drawings.
 - 2. Testing: According to ASTM E 330.
 - 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
 - 4. Operability under Wind Load: Design overhead coiling doors to remain operable under design wind load, acting inward and outward.
- C. Windborne-Debris Impact Resistance: Provide glazed sectional doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 2.
 - 1. Large Missile Test: For overhead coiling doors located within 30 feet of grade.

2.3 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.
 - 1. Basis-of-design product: Thermacore 592 by Overhead Door, 2501 S. State Hwy 121 Bus., Suite 200, Lewisville, TX 75067, www.overheaddoor.com. Provide the indicated product or an approved comparable product.
 - 2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. C.H.I. Overhead Doors, Inc.
 - b. Overhead Door Corporation.
 - c. Rite-Hite Corporation.
- B. Operation Cycles: Door components and operators capable of operating for not less than 50,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- D. R-Value: 17.5 deg F x h x sq. ft./Btu.
- E. Steel Sections: Zinc-coated (galvanized) steel sheet with G90 zinc coating.
 - 1. Section Thickness: 2 inches.
 - 2. Exterior-Face, Steel Sheet Thickness: 0.015-inch- nominal coated thickness.
 - a. Surface: Manufacturer's standard, ribbed.
 - 3. Insulation: Foamed in place.
 - 4. Interior Facing Material: 1/8-inch-thick, manufacturer's standard material.
- F. Track Configuration: Standard-lift, High-lift, or Vertical-lift track as indicated on Drawings.
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.
- H. Windows: Approximately 24 by 11 inches, with square corners, and spaced apart the approximate distance as indicated on Drawings; in one row(s) at height indicated on Drawings; installed with glazing of the following type:
 - 1. Insulating Glass: Manufacturer's standard.
- I. Roller-Tire Material: Manufacturer's standard.
- J. Locking Devices: Equip door with locking device assembly.
 - 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumbturn.
- K. Counterbalance Type: Torsion spring.
- L. Electric Door Operator:
 - 1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
 - 2. Operator Type: Manufacturer's standard for door requirements.

3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior, clean, and dry.
5. Emergency Manual Operation: Chain type.
6. Obstruction-Detection Device: Automatic photoelectric sensor and electric sensor edge on bottom section. Provide 2 photoelectric sensors at doors per door schedule. Mounting heights to be determined in field.

a. Sensor Edge Bulb Color: Black.

7. Control Station: Interior-side mounted where indicated on drawings.

M. Door Finish:

1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
2. Finish of Interior Facing Material: Finish as indicated by manufacturer's designations.

2.4 MATERIALS, GENERAL

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.
1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch-nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch-thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.
- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.
- E. Provide reinforcement for hardware attachment.
- F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.
- G. Interior Facing Material: Manufacturer's standard material complying with the acceptance criteria of DASMA 107, with indicated thickness.
- H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation.

2.6 TRACKS, SUPPORTS, AND ACCESSORIES

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
 - 1. Galvanized Steel: ASTM A 653/A 653M, minimum G60 zinc coating.
 - 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.
 - 3. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
 - a. For Vertical Track: Intermittent, jamb brackets attached to track and attached to wall.
 - b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced attachments to overhead structural members.
- B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.
- C. Windows: Manufacturer's standard window units of type, size, and in arrangement indicated. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed doors and elastic glazing compound for wood doors, as required. Provide removable stops of same material as door-section frames.

2.7 HARDWARE

- A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch-nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible. Provide double-end hinges where required, for doors more than 16 feet wide unless otherwise recommended by door manufacturer.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 3-inch-diameter roller tires for 3-inch-wide track and 2-inch-diameter roller tires for 2-inch-wide track.

2.8 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
 - 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
 - 2. Keys: Three for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.9 COUNTERBALANCE MECHANISM

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.
- C. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5 to 1.

- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.10 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Comply with NFPA 70.
 - 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
 - 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised position and directly connected to door with drawbar.
 - 2. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall above door and connected to torsion shaft with an adjustable coupling or drive chain.
 - 3. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
 - 1. Electrical Characteristics:
 - a. Phase: Three phase.
 - b. Volts: 480 V.
 - c. Hertz: 60.
 - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
 4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
 5. Use adjustable motor-mounting bases for belt-driven operators.
- E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- F. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
 - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.
 2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom section. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
 - a. Self-Monitoring Type: Four-wire configured device designed to interface with door-operator control circuit to detect damage to or disconnection of sensor edge.
- G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- H. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.
- I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

- A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Examine locations of electrical connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks:
 - 1. Fasten vertical track assembly to opening jambs and framing, spaced not more than 24 inches apart.
 - 2. Hang horizontal track assembly from structural overhead framing with angles or channel hangers attached to framing by welding or bolting, or both. Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install according to UL 325.

3.3 STARTUP SERVICES

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
- D. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780/A 780M.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

FIBERGLASS SANDWICH PANEL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the insulated, translucent sandwich panel system and accessories as shown and specified. Work includes providing and installing:
 - 1. Walls
 - a. Flat insulated, translucent sandwich panels
 - b. Aluminum clampite installation system
 - c. Aluminum sill flashing
- B. Related Sections:
 - 1. Section 133419 Metal Building Systems

1.2 SUBMITTALS

- A. Submit manufacturer's product data. Include construction details, material descriptions, profiles, and finishes of components.
- B. Submit shop drawings. Include plans, elevations, and details.
- C. Submit manufacturer's color charts showing the full range of colors available for factory finished exposed aluminum.
 - 1. When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below.
 - a. Sandwich panels: 7" x 12" units
 - b. Factory finished aluminum: 3" long sections
- D. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
- E. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
 - 1. Reports required (if applicable) are:
 - a. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
 - b. Burn Extent (ASTM D 635)
 - c. Color Difference (ASTM D 2244)
 - d. Impact Strength (UL 972)
 - e. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)
 - f. Bond Shear Strength (ASTM D 1002)

- g. Beam Bending Strength (ASTM E 72)
- h. Insulation U-Factor (NFRC 100)
- i. NFRC System U-Factor Certification (NFRC 700)
- j. NFRC Visible Light Transmittance (NFRC 202)
- k. Solar Heat Gain Coefficient (NFRC or Calculations)
- l. Condensation Resistance Factor (AAMA 1503) (Thermally Broken, insulated panels only)
- m. Air Leakage (ASTM E 283)
- n. Structural Performance (ASTM E 330)
- o. Water Penetration (ASTM E 331)
- p. Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure (ASTM E2707)

1.3 CLOSEOUT SUBMITTALS

- A. Provide field maintenance manual to include in project maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:

- 1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
- 2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by an accredited agency.
- 3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.

- B. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing Kalwall panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.

1.5 PERFORMANCE REQUIREMENTS

- A. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.
 - 1. When requested, include span analysis data.
 - 2. Standard panel system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
 - 3. Structural Loads (Walls). Provide system capable of handling the following loads:

- a. Positive Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]
- b. Negative Wind Load (PSF): <Insert Number> PSF [Ultimate] or [ASD]

B. Deflection Limits:

- 1. Walls: Limited to [L/60] or <Insert Deflection> of clear span for each assembly component.

C. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- 1. Temperature Change (Range): 110 deg F (43 deg C), ambient; 150 deg F (66 deg C), material surfaces.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
- B. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.7 WARRANTY

- A. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system work, which fails in material or workmanship, within one year from the commencement date. The commencement date of the warranty shall be the date of substantial completion, but no more than six months from date of delivery. Failure of material or workmanship shall include deterioration of finish on metal in excess of normal weathering; and defects in accessories; insulated, translucent sandwich panels; and other components of the work

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
- B. Kalwall Corporation, Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: info@kalwall.com

2.2 PANEL COMPONENTS

- A. Face Sheets:

1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
 - a. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
 - b. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
 2. Interior face sheets:
 - a. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 25 and smoke developed no greater than 450 when tested in accordance with UL 723.
 - b. Burn extent by ASTM D 635 shall be no greater than 1”.
 3. Exterior face sheets:
 - a. Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after [3] [5] years outdoor South Florida weathering at 5° facing south as measured on a white sample, with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
 - b. Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of **230 ft. lbs.** without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.
 - c. Strength: Exterior face sheet shall be uniform in strength, with panel meeting ASTM E1996 and ASTM E1886 or TAS 201, 202 and 203.
 - d. Erosion Protection: Integral, embedded-glass erosion barrier.
 4. Appearance:
 - a. Exterior face sheet: Smooth, white in color.
 - b. Interior face sheet: Smooth, white in color.
 - c. Face sheets shall not vary more than $\pm 10\%$ in thickness and be uniform in color.
- B. Grid Core:
1. Thermally Broken Composite I-beam grid core shall be of alloy and temper recommended by manufacturer with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16”.
 2. I-beam Thermal break: Minimum 1”, thermoset fiberglass composite. Poured and de-bridged thermal break is not acceptable.
- C. Laminate Adhesive:
1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council “Acceptance Criteria for Sandwich Panel Adhesives”.
 2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
 3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
 - a. 50% Relative Humidity at 68° F: 540 PSI
 - b. 182° F: 100 PSI
 - c. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI
 - d. Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

2.3 PANEL CONSTRUCTION

- A. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
1. Thickness: **4 inches**
 2. Grid Core Insulation: Fill panel cores with **air**
 3. Panel U-factor by NFRC certified laboratory:
 - a. **4"** thermally broken
 4. Complete insulated panel system shall have NFRC certified U-factor of 0.55U
 5. Visible Light Transmittance (VLT): 23%
 6. Solar heat gain coefficient 0.30
 7. Grid pattern as viewed: Nominal size 12"x12"
- B. Standard panels shall deflect no more than 1.9" at 30 PSF in 10'-0" span without a supporting frame by ASTM E 72.
- C. Panels shall meet the conditions of acceptance according to ASTM E2707 Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure:
1. Absence of flame penetration through the wall assembly at any time.
 2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 60-min observation period.
 3. Absence of evidence of flame, glow, and smoke if the test is terminated prior to the completion of the 60-min observation period.
- D. Thermally broken, insulated panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

2.4 ALUMINUM CLAMPTITE INSTALLATION SYSTEM

- A. Aluminum clamp-tite installation system (Wall):
1. **Thermally Broken-Flat** clamp-tite screw type closure system shall be of extruded aluminum alloy and temper as recommended by manufacturer.
- B. Sealing tape: Manufacturer's standard, pre-applied to aluminum clamp-tite installation system at the factory under controlled conditions.
- C. Fasteners: 300 series stainless steel screws for aluminum clamp-tite installation system, excluding final fasteners to the building.
- D. Finish:
1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be **selected from manufacturer's standard KCRF colors**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer shall examine substrates, supporting structure, and installation conditions.
- B. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection:
 - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by sealant manufacturer for this purpose.
 - 2. Where aluminum will contact concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by sealant manufacturer.

3.3 INSTALLATION

- A. Install the panel system in accordance with the manufacturer's fabrication drawings and suggested installation instructions.
 - 1. Anchor component parts securely in place by permanent mechanical attachment system.
 - 2. Accommodate thermal and mechanical movements.
 - 3. Seal aluminum clampite installation system as shown on the manufacturer's fabrication drawings and suggested installation instructions.
- B. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers fabrication drawings and suggested installation instructions.

3.4 FIELD QUALITY CONTROL

- A. Water Test: Installer to test a representative section of installed materials according to procedures in AAMA 501.2.
- B. Repair or replace work that does not pass testing or that is damaged by testing and retest work.

3.5 CLEANING

- A. Clean the panel system, interior and exterior, immediately after installation.
- B. Refer to manufacturer's written recommendations.

END OF SECTION 084523

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Glass for windows, doors, interior borrowed lites, and storefront framing.
 - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. IBC: International Building Code.
- D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.
- D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.
- B. Product Certificates: For glass.
- C. Product Test Reports: For tinted glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.
 - 1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test report.
- E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.
- D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.9 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
 - 1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
 - 2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
 - 3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
 - 4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
 - 5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
 - 1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

- B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
 - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
 - 1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. JE Berkowitz, LP.
 - 2. Viracon, Inc.
 - 3. Vitro Architectural Glass.
- B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
 - 1. Obtain tinted glass from single source from single manufacturer.
- C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.
1. Design Wind Pressures: As indicated on Drawings.
 2. Design Snow Loads: As indicated on Drawings.
 3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
 4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
1. Large-Missile Test: For glazing located within 30 feet of grade.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
 2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
 - 1. Minimum Glass Thickness for Exterior Lites: 1/4 inch.
 - 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.
- B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.
- C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
- D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
 2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
 3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
 3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. BASF Corp. - Construction Chemicals.
 - b. Dow Corning Corporation.
 - c. Sika Corporation.
 2. Applications: Insulated Glass Units.

2.8 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 804.3 tape, where indicated.
 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.9 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.10 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
 - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until right before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
 - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.
- D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Non-load-bearing steel framing systems for interior partitions.
 - 2. Suspension systems for interior ceilings and soffits.

- B. Related Requirements:

- 1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of code-compliance certification for studs and tracks.
- B. Evaluation Reports: For embossed steel studs and tracks and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.5 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association the Steel Framing Industry Association or the Steel Stud Manufacturers Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- B. Horizontal Deflection: For wall assemblies, limited to 1/360 of the wall height based on horizontal loading of 5 lbf/sq. ft..

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or embossed steel studs and tracks.
 - 1. Steel Studs and Tracks:
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ClarkDietrich Building Systems.
 - 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.
 - b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
 - c. Depth: As indicated on Drawings.
 - 2. Embossed Steel Studs and Tracks: Roll-formed and embossed with surface deformations to stiffen the framing members so that they are structurally equivalent to conventional ASTM C 645 steel studs and tracks.
 - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) ClarkDietrich Building Systems.

- 2) MarinoWARE.
 - 3) SCAFCO Steel Stud Company.
 - b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
 - c. Depth: As indicated on Drawings.
 - C. Slip-Type Head Joints: Where indicated, provide one of the following:
 1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch minimum vertical movement.
 2. Single Long-Leg Track System: ASTM C 645 top track with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top track and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
 3. Double-Track System: ASTM C 645 top outer tracks, inside track with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
 4. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
 - D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Metal Thickness: 0.0269 inch.
 - E. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
 1. Depth: 1-1/2 inches.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch-thick, galvanized steel.
 - F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 1. Minimum Base-Metal Thickness: 0.0296 inch.
 2. Depth: 7/8 inch.
- 2.3 SUSPENSION SYSTEMS
- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.
 - B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
 - C. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.

1. Depth: 2 inches.

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: As required by horizontal deflection performance requirements or 16 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: As required by horizontal deflection performance requirements or 16 inches o.c. unless otherwise indicated.
 - 3. Tile Backing Panels: As required by horizontal deflection performance requirements or 16 inches o.c. unless otherwise indicated.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
 - 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
 - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Hangers: 48 inches o.c.
 - 2. Carrying Channels (Main Runners): 48 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 - 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 - 4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 - 5. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.
- 2. Tile backing panels.

- B. Related Requirements:

- 1. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
- 2. Section 093013 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
- 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

- C. Samples for Verification: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch-long length for each trim accessory indicated.
- 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Georgia-Pacific Gypsum LLC.

2. Thickness: 5/8 inch.
 3. Long Edges: Tapered.
- B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 1/2 inch.
 2. Long Edges: Tapered.
- C. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch, Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

- A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.
1. Core: 5/8 inch, Type X.
 2. Long Edges: Tapered.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. CertainTeed Corporation.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 2. Core: 1/2 inch, regular type.
 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
- B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. C-Cure.
 - b. CertainTeed Corporation.
 - c. James Hardie Building Products, Inc.

2. Thickness: 1/2 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Gypsum.
 - b. CertainTeed Corporation.
 - c. Georgia-Pacific Gypsum LLC.
2. Core: 5/8 inch, Type X.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (control) joint.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
3. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use **[drying-type, all-purpose compound]** high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.
3. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound.

2.8 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Accumetric LLC.
 - b. Pecora Corporation.
 - c. Specified Technologies, Inc.
- F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

- G. Vapor Retarder: As specified in Section 072600 "Vapor Retarders."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels, not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.

3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 1. Wallboard Type: As indicated on Drawings.
 2. Type X: Vertical surfaces unless otherwise indicated.
 3. Ceiling Type: Ceiling surfaces.
 4. Mold-Resistant Type: As indicated on Drawings.
 5. Glass-Mat Interior Type: As indicated on Drawings.
- B. Single-Layer Application:
 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- C. Multilayer Application:

1. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
 2. Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 APPLYING TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at locations indicated to receive tile. Install with 1/4-inch gap where panels abut other construction or penetrations.
- B. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- C. Water-Resistant Backing Board: Install where indicated with 1/4-inch gap where panels abut other construction or penetrations.
- D. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners unless otherwise indicated.
 2. LC-Bead: Use at exposed panel edges.
 3. L-Bead: Use where indicated.
 4. U-Bead: Use at exposed panel edges where indicated.

3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3: Where indicated on Drawings.
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 099123 "Interior Painting."
- E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.
- G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid surface thresholds.
 - 2. Waterproof membrane for thinset application at shower.
 - 3. Crack isolation membrane.
 - 4. Metal edge strips.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 - 2. Section 092900 "Gypsum Board" for cementitious backer units and glass-mat, water-resistant backer board.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required.
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory for each color and finish required.
 - 4. Stone thresholds in 6-inch lengths.
 - 5. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
- C. Product Certificates: For each type of product.
- D. Product Test Reports: For tile-setting and -grouting products and certified porcelain tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Tile: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
 - 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs Ceramic Tile Education Foundation Certified Installers.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
 1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
1. Stone thresholds.
 2. Waterproof membrane.
 3. Crack isolation membrane.
 4. Metal edge strips.

2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

- A. Ceramic Tile Type CT-1: Ceramic wall tile.
1. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Garden State Tile.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Daltile.
 - d. Interceramic.
 2. Certification: Tile certified by the Porcelain Tile Certification Agency.
 3. Face Size: 4 by 12 inches.
 4. Thickness: 8 mm.
 5. Face: Plain with square edges.
 6. Dynamic Coefficient of Friction: Not less than 0.42.
 7. Tile Color, Glaze, and Pattern: Match Architect's sample.
 8. Grout Color: Match Architect's sample.

B. Ceramic Tile Type CT-2: Ceramic wall tile.

1. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Garden State Tile.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Daltile.
 - d. Interceramic.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 4 by 12 inches.
4. Thickness: 8 mm.
5. Face: Plain with square edges.
6. Dynamic Coefficient of Friction: Not less than 0.42.
7. Tile Color, Glaze, and Pattern: Match Architect's sample.
8. Grout Color: Match Architect's sample.

C. Porcelain Floor Tile Type FT-1: Porcelain floor tile.

1. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Garden State Tile.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Daltile.
 - d. Interceramic.
2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 24 by 12 inches.
4. Thickness: 8 mm.
5. Face: Plain with square edges. Rectified
6. Dynamic Coefficient of Friction: Not less than 0.42.
7. Tile Color, Glaze, and Pattern: Match Architect's sample.
8. Grout Color: Match Architect's sample.

D. Porcelain Cove Base Type PB-1: Porcelain cove base.

1. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Garden State Tile.
 - b. American Olean; a division of Dal-Tile Corporation.
 - c. Daltile.
 - d. Interceramic.

2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: 6 by 12 inches.
4. Thickness: 8 mm.
5. Face: Plain with square edges.
6. Dynamic Coefficient of Friction: Not less than 0.42.
7. Tile Color, Glaze, and Pattern: Match Architect's sample.
8. Grout Color: Match Architect's sample.

2.4 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.
- B. Solid Surface Thresholds: ASTM C 615 with polished finish.
 1. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Corian.
 - b. Siltech.
 2. Description: Uniform, stone without veining.
 3. Description: Match Architect's sample.

2.5 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Schluter Systems; Schluter-KERDI.
 2. Location: Shower 315.

2.6 CRACK ISOLATION MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

2.7 SETTING MATERIALS

- A. Standard Dry-Set Mortar (Thinset): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Bostik, Inc.
 - b. LATICRETE SUPERCAP, LLC.
 - c. MAPEI Corporation.
 - 2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- B. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Atlas Minerals & Chemicals, Inc.
 - b. Bostik, Inc.
 - c. MAPEI Corporation.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.8 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, consisting of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Cement Grout: ANSI A118.6.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ARDEX Americas.

- b. LATICRETE SUPERCAP, LLC.
- c. MAPEI Corporation.

C. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Manufacturers: Basis of design product: Laticrete Spectralock IG 2000. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. ARDEX Americas.
 - b. LATICRETE SUPERCAP, LLC.
 - c. MAPEI Corporation.
2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
 1. Manufacturers: Basis of Design product as indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Blanke Corporation.
 - b. Ceramic Tool Company, Inc.
 - c. Schluter Systems.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Bonsal American, an Oldcastle company.
 - b. Custom Building Products.

- c. Southern Grouts & Mortars, Inc.

2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles 8 by 8 inches or larger.
 - c. Tile floors consisting of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Porcelain Tile: 1/4 inch.

- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
- H. Solid Surface Thresholds: Install solid surface thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
 - 1. Do not extend waterproof membrane or crack isolation membrane under thresholds set in standard dry-set mortar. Fill joints between such thresholds and adjoining tile set on crack isolation membrane with elastomeric sealant.
- I. Metal Edge Strips: Install at locations indicated.
- J. Floor Sealer: Apply floor sealer to grout joints in tile floors according to floor-sealer manufacturer's written instructions. As soon as floor sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION AT SHOWER

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

- A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
- B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation (Restrooms and Locker Rooms): TCNA F125-Full; thinset mortar on crack isolation membrane.

- a. Ceramic Tile Type: Porcelain tile.
- b. Thinset Mortar: Standard dry-set mortar.
- c. Grout: Standard sanded cement grout.

2. Ceramic Tile Installation (Shower 315): TCNA F131; water-cleanable, tile-setting epoxy over waterproof membrane; epoxy grout.

- a. Ceramic Tile Type: Porcelain tile.
- b. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Masonry or Concrete: Shower 315.

1. Ceramic Tile Installation: TCNA W202; thinset mortar over waterproof membrane.

- a. Ceramic Tile Type: Porcelain tile.
- b. Thinset Mortar: Water-cleanable, tile-setting epoxy.
- c. Grout: Water-cleanable epoxy grout.

C. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation (Restrooms and Locker Rooms): TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.

- a. Ceramic Tile Type: Porcelain Tile.
- b. Thinset Mortar: Standard dry-set mortar.
- c. Grout: Sand-portland cement grout.

***** [OR] *****

2. Ceramic Tile Installation (Restrooms and Locker Rooms): TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

- a. Ceramic Tile Type: Porcelain Tile.
- b. Thinset Mortar: Standard dry-set mortar.
- c. Grout: Sand-portland cement grout.

D. Shower Wall Installations, Wood or Metal Studs or Furring: Shower 315.

1. Ceramic Tile Installation Shower 315.: TCNA B412; water-cleanable, tile-setting epoxy over waterproof membrane on cementitious backer units or fiber-cement backer board.

- a. Ceramic Tile Type: Porcelain Tile.
- b. Grout: Water-cleanable epoxy grout.

***** [OR] *****

2. Ceramic Tile Installation Shower 315.: TCNA B419; thinset mortar over waterproof membrane on coated glass-mat, water-resistant gypsum backer board.

- a. Ceramic Tile Type: Porcelain Tile.
- b. Grout: Water-cleanable epoxy grout.

END OF SECTION 093013

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes acoustical panels and exposed suspension systems for interior ceilings.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for attachment supports for exposed suspension systems.
- C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
 - 1. Acoustical Panels: Set of 6-inch-square Samples of each type, color, pattern, and texture.
 - 2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.
- D. Delegated-Design Submittal: For seismic restraints for ceiling systems.
 - 1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension-system members.
 2. Structural members to which suspension systems will be attached.
 3. Method of attaching hangers to building structure.
 - a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
 4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
 5. Size and location of initial access modules for acoustical panels.
 6. Items penetrating finished ceiling and ceiling-mounted items including, but not limited to the following:
 - a. Lighting fixtures.
 - b. Diffusers.
 - c. Grilles.
 - d. Speakers.
 - e. Sprinklers.
 - f. Access panels.
 - g. Perimeter moldings.
 7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
 8. Minimum Drawing Scale: 1/8 inch = 1 foot.
- B. Qualification Data: For testing agency.
- C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
- E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
 - 2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - 1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic restraints for ceiling systems.
- B. Seismic Performance: Suspended ceilings shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E 1264.
2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL PANELS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. American Gypsum.
2. Armstrong World Industries, Inc.
3. CertainTeed Corporation.
4. USG.

- B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

- C. Classification: Provide panels as follows:

1. ACT 1: Where indicated.
 - a. Type and Form: Type III, mineral base with painted finish; Form 1, nodular.
 - b. Pattern: E (lightly textured) I (embossed) K (surface scored).
2. ACT 2: Where indicated.
 - a. Type and Form: Type XX, high-density, ceramic- and mineral-base panels with scrubbable finish, resistant to heat, moisture, and corrosive fumes.
 - b. Pattern: CE (perforated, small holes and lightly textured).

- D. Color: White.

- E. Light Reflectance (LR): Not less than 0.80.

- F. Ceiling Attenuation Class (CAC): Not less than 35.

- G. Noise Reduction Coefficient (NRC): Not less than 0.65 for ACT 1 and 0.55 for ACT 2.

- H. Articulation Class (AC): Not less than 180.

- I. Edge/Joint Detail: As indicated by manufacturer's designation.

- J. Thickness: As indicated on Drawings.

- K. Modular Size: 24 by 48 inches.

- L. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong World Industries, Inc.
 - 2. CertainTeed Corporation.
 - 3. USG.
- B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.
 - 1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.
- C. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch-wide metal caps on flanges.
 - 1. Structural Classification: Intermediate-duty system.
 - 2. End Condition of Cross Runners: Override (stepped) type.
 - 3. Face Design: Flat, flush.
 - 4. Cap Material: Cold-rolled steel.
 - 5. Cap Finish: Painted white.

2.5 ACCESSORIES

- A. Wire Hangers, Braces, and Ties: Provide wires as follows:
 - 1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- diameter wire.
- B. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
- C. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

- D. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.
- E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

2.6 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

- A. Install acoustical panel ceilings according to ASTM C 636/C 636M, seismic design requirements, and manufacturer's written instructions.
- B. Suspend ceiling hangers from building's structural members and as follows:
 - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 6. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
 7. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
1. Arrange directionally patterned acoustical panels as follows:
 - a. As indicated on reflected ceiling plans.
 2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
 3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
 4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

5. Install seismic clips in areas as required by delegated design; space according to panel manufacturer's written instructions unless otherwise indicated.
6. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

- A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.
- B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.
- B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl base.
 - 2. Vinyl molding accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.
- C. Product Schedule: For resilient base and accessory products.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 VINYL BASE

- A. Manufacturers: Basis of design product indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (vinyl, thermoplastic).
 - 1. Group: II (layered).
 - 2. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet.
 - b. Style B, Cove: Provide in areas with resilient floor coverings.
- C. Minimum Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Cut lengths 48 inches long or coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Inside Corners: Preformed.
- H. Colors and Patterns: Match Architect's sample.

2.2 VINYL MOLDING ACCESSORY

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Burke Mercer Flooring Products; a division of Burke Industries Inc.
 - 2. Johnsonite; a Tarkett company.
 - 3. Roppe Corporation, USA.
- B. Description: Vinyl reducer strip for resilient floor covering, joiner for tile and carpet, and transition strips.
- C. Profile and Dimensions: As indicated.
- D. Locations: Provide vinyl molding accessories in areas indicated.
- E. Colors and Patterns: Match Architect's sample.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
- C. Metal Edge Strips: Extruded aluminum with mill finish, nominal 2 inches wide, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum horizontal surfaces thoroughly.
 - 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Vinyl composition floor tile.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of resilient floor tile.
 - 1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.
- C. Samples for Verification: Full-size units of each color and pattern of floor tile required.
- D. Welded-Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.
- E. Product Schedule: For floor tile.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL COMPOSITION FLOOR TILE

- A. Manufacturers: Basis of design product as indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Armstrong World Industries, Inc.
 2. Congoleum Corporation.
 3. Johnsonite; a Tarkett company.
 4. Mannington Mills.
 5. Mohawk Industries.
- B. Tile Standard: ASTM F 1700, Class 3, surface pattern.
- C. Wearing Surface: Embossed.
- D. Thickness: 4.5mm, minimum.
- E. Size: 9.25 by 59 inches.
- F. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Seamless-Installation Accessories:
 1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
 - 4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 - 1. Lay tiles in pattern indicated.

- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles in pattern of colors and sizes indicated.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Seamless Installation:
 - 1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to fuse sections permanently into a seamless flooring installation. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
 - 1. Remove adhesive and other blemishes from surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

TILE CARPETING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fully-adhered carpet tile
 - 2. Accessories.
- B. Related Sections:
 - 1. Section 096513 - Resilient Base and Accessories.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D2859 - Standard Specification for Ignition Characteristics of Finished Textile Floor Covering Materials.
- B. California Department of Health Services:
 - 1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- C. Carpet and Rug Institute:
 - 1. CRI Carpet Installation Standard - Standard for Installation of Commercial Carpet.
 - 2. CRI Green Label Plus Testing Program.
 - 3. CRI Model Specifications for Commercial Carpets.
- D. Consumer Products Safety Commission:
 - 1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.
- E. National Fire Protection Association:

1. NFPA 253 - Standard Method of Test for Critical Radiant Flux for Floor Covering Systems Using a Radiant Heat Energy Source.
- F. South Coast Air Quality Management District:
1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

- A. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- B. Shop Drawings: Indicate locations and direction of carpet tile.
- C. Samples:
 1. Submit 3 full-size carpet tiles with attached cushion illustrating full range of color, texture and pattern variations for each carpet color selected.
- D. Maintenance Data

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.
- B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Section 01 77 00 - Project Closeout: Requirements for maintenance materials.
- B. Extra Stock Materials:
 1. Furnish extra materials matching products installed, packaged with protective covering for storage and identified with labels describing contents. Provide material equal to 5% of amount installed.

1.6 QUALITY ASSURANCE

- A. Surface Burning Characteristics:

1. Floor Finishes: Comply with one of the following:
 - a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
 - b. CPSC 16 CFR 1630.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years documented experience.
- B. Installer: Company specializing in performing work of this section with experience approved by manufacturer.
 1. FCIB or IFCI certified carpet installers.

1.8 AMBIENT CONDITIONS

- A. Section 01 51 00 - Temporary Facilities: Ambient conditions control facilities for product storage and installation.
- B. Store materials in area of installation for 48 hours prior to installation.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include the following:
 1. Mohawk Group (Basis of Design)
 2. Shaw Contract
 3. Bentley Mills
- B. Acceptable products that may be incorporated into the Work include, but are not limited to, the following:
 1. CPT1 Tile Carpet - Basis of Design
 - a. Collection: Mohawk Group
 - b. Style: Distressed Twill GT469
 - c. Tile Size: 12" X 36", nominal
 - d. Manufactured in one color dye lot
 - e. 100% Solution Dyed
 - f. Construction: Loop Nylon
 - g. Color: Refer to basis of design on Architect's drawings.

2. CPT2 Tile Carpet - Basis of Design
 - a. Collection: Mohawk Group
 - b. Style: Material Narratives GT458
 - c. Tile Size: As per manufacturer
 - d. Manufactured in one color dye lot
 - e. 100% Solution Dyed
 - f. Construction: Loop Nylon
 - g. Color: Refer to basis of design on Architect's drawings.

2.2 ACCESSORIES

- A. Flooring Transition/Reducers: Refer to A141 for recommended vinyl/rubber and Schluter edges and transitions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 77 00 - Project Closeout: Requirements for installation examination.
- B. Verify floor surfaces are smooth and flat within tolerances specified in Section 03 30 00 and are ready to receive work.

3.2 PREPARATION

- A. Section 01 77 00 - Project Closeout: Requirements for installation preparation.
- B. Prepare concrete floor as per manufacturer's written recommendations.
- C. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- D. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- E. Clean substrate.

3.3 INSTALLATION

- A. Install carpet tile in accordance with CRI Carpet Installation Standard.

- B. Do not mix carpet from different cartons unless from same dye lot.
- C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- D. Install carpet tile in pattern as indicated on drawings.
- E. Locate change of color or pattern between rooms under door centerline.
- F. Fully adhere carpet tile to substrate.
- G. Adhere carpet tile with self-stick adhesive backing by removing protective membrane and pressing tile back onto clean and dry substrate.
- H. Trim carpet tile neatly at walls and around interruptions.
- I. Extend carpet under removable flanges and furnishings and into alcoves and closets of each space.
- J. Complete installation of edge strips, concealing exposed edges. Anchor guards to substrate.

3.4 CLEANING

- A. Section 01 77 00 - Project Closeout: Requirements for cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

3.5 PROTECTION

- A. Section 01 77 00 - Project Closeout: Requirements for protecting finished Work.
- B. Cover carpeting in traffic areas with protective non-staining building paper. Do not use plastic sheeting.

END OF SECTION 096813

INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel and iron.
 - 2. Galvanized metal.
 - 3. Gypsum board.
- B. Related Requirements:
 - 1. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
 - 2. Section 055213 "Pipe and Tube Railings" for shop priming and painting pipe and tube railings.
 - 3. Section 099600 "High-Performance Coatings" for tile-like coatings.

1.3 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- B. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Basis of Design manufacturers as indicated in Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Benjamin Moore & Co.
 - 2. Dulux (formerly ICI Paints); a brand of AkzoNobel.
 - 3. Dunn-Edwards Corporation.
 - 4. Kelly-Moore Paint Company Inc.
 - 5. PPG Paints.
 - 6. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: Match Architect's samples.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with

rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Fiber-Cement Board: 12 percent.
 - 2. Gypsum Board: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
 2. SSPC-SP 3.
 3. SSPC-SP 7/NACE No. 4.
 4. SSPC-SP 11.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
1. Paint the following work where exposed in occupied spaces:
 - a. Equipment, including panelboards.
 - b. Uninsulated metal piping.
 - c. Uninsulated plastic piping.

- d. Pipe hangers and supports.
- e. Metal conduit.
- f. Plastic conduit.
- g. Other items as directed by Architect.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Water-Based Light Industrial Coating System MPI INT 5.1B:
 - a. Prime Coat: Primer, rust-inhibitive, water based MPI #107.
 - 1) Basis of design: SW Pro Industrial Pro-Cryl Universal Acrylic Primer B66W310.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.

- 1) Basis of design: SW Pro Industrial DTM High Performance Acrylic Semi-Gloss B66W1150 Series.

B. Galvanized-Metal Substrates:

1. Latex System MPI INT 5.3J:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - 1) Basis of design: SW Pro Industrial Pro-Cryl Universal Acrylic Primer B66W310.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.
 - 1) Basis of design: SW Pro Industrial DTM High Performance Acrylic Semi-Gloss B66W1150 Series.

C. Gypsum Board Substrates:

1. Latex over Latex Sealer System MPI INT 9.2A:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - 1) Basis of design: SW ProMar 200 Zero VOC Interior Latex Primer B28W2600.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.
 - 1) Basis of design: SW ProMar 200 Zero VOC Interior Latex Eg-Shel B30W2600 Series
2. High-Performance Architectural Polyurethane System MPI INT 9.2L:
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - 1) Basis of design: SW ProMar 200 Zero VOC Interior Latex Eg-Shel B30W2600 Series
 - b. Intermediate Coat: Two-component polyurethane-fortified coating and cross-linker, matching topcoat.
 - a. Topcoat: Two-component polyurethane-fortified coating and cross-linker.
 - 1) Basis of design: Scuff Master Scrubtough Max.

END OF SECTION 099123

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Galvanized metal.
 - b. Concrete masonry units (CMUs).
- B. Related Requirements:
 - 1. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings with coatings specified in this Section.
 - 2. Section 099123 "Interior Painting" for general field painting.

1.3 DEFINITIONS

- A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.

- B. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. Devoe Paint Company; Akzo Nobel.
3. PPG Paints.
4. Sherwin-Williams Company (The).

- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior High-Performance Coating Schedule or Interior High-Performance Coating Schedule for the coating category indicated.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 3. Products shall be of same manufacturer for each coat in a coating system.
- C. Colors: As selected by Architect from manufacturer's full range or As indicated in color schedule.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Fiber-Cement Board: 12 percent.
 - 3. Masonry (Clay and CMUs): 12 percent.
 - 4. Wood: 15 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- E. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
 1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer[,] but not less than the following:
 1. SSPC-SP 10/NACE No. 2.
- G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 1. Use applicators and techniques suited for coating and substrate indicated.
 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.5 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Alkyd Gloss System MPI EXT 5.3B:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - 1) Basis of design: SW Pro Industrial Pro-Cryl Universal Acrylic Primer B66W310.
 - b. Intermediate Coat: Alkyd, matching topcoat.
 - c. Topcoat: Silicone Alkyd, gloss, MPI #48.
 - 1) Basis of design: SW Steel Spec Fast Dry Alkyd B55W00811.
- B. CMU Substrates:
 - 1. Epoxy-Modified Latex System MPI INT 4.2J:
 - a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
 - 1) Basis of design: SW PrepRite Block Filler B25W25.
 - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6), MPI #115.
 - 1) Basis of design: SW Waterbased Catalyzed Epoxy B73 Series.
- C. Steel Substrates:

1. Epoxy-Modified Latex System MPI INT 5.1K:
 - a. Prime Coat: Primer, rust inhibitive, water based, MPI #107.
 - 1) Basis of design: SW Pro Industrial Pro-Cryl Universal Acrylic Primer B66W310.
 - b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
 - c. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6), MPI #115.
 - 1) Basis of design: SW Waterbased Catalyzed Epoxy B73 Series.

D. Galvanized-Metal Substrates:

1. High Performance Architectural Latex System MPI INT 5.3M:
 - a. Prime Coat: Primer, galvanized, water based, MPI #134.
 - 1) Basis of design: SW Pro Industrial Pro-Cryl Universal Acrylic Primer B66W310.
 - b. Intermediate Coat: Acrylic latex, matching topcoat.
 - c. Topcoat: Acrylic latex, MPI #141.
 - 1) Basis of design: SW Pro Industrial Acrylic Semi-Gloss Coating, B66W00651.

END OF SECTION 099600

ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes room-identification signs that are directly attached to the building.

1.3 DEFINITIONS

- A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

- A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For room-identification signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
 - 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
 - 1. Room-Identification Signs: Full-size Sample.

2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
3. Exposed Accessories: Full-size Sample of each accessory type.
4. Full-size Samples, if approved, will be returned to Contractor for use in Project.

- E. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Variable Component Materials: 12 replaceable text inserts and interchangeable characters (letters, numbers, and graphic elements) of each type.
 2. Tools: One set(s) of specialty tools for assembling signs and replacing variable sign components.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.10 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image.
 - c. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.2 ROOM-IDENTIFICATION SIGNS

- A. Room-Identification Sign: Sign system with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. **Manufacturers:** Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Takeform signage.
 - b. 290 sign systems
 - c. [ACE Sign Systems, Inc.](#)
 - d. [ASI Sign Systems, Inc.](#)
 - e. [Diskey Architectural Signage Inc.](#)
 - f. [Seton Identification Products.](#)
 - 2. Laminated-Sheet Sign: Photopolymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: **0.125 inch (3.18 mm) minimum.**
 - b. Surface-Applied Graphics: Applied vinyl film.
 - c. Subsurface Graphics: Slide-in changeable insert.
 - d. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Sign-Panel Perimeter: Finish edges smooth.

- a. Edge Condition: Square cut.
- b. Corner Condition in Elevation: Rounded to radius indicated.
- 4. Mounting: Surface mounted to wall with two-face tape.
- 5. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range and variable content as scheduled. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).
- B. Vinyl Film: UV-resistant vinyl film with pressure-sensitive, permanent adhesive; die cut to form characters or images as indicated on Drawings.
- C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
 - 4. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
- B. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

- C. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
 - 1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Furnish two blank inserts for each sign for Owner's use.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Accessibility: Install signs in locations on walls as indicated on Drawings and according to the accessibility standard.
- C. Mounting Methods:
 - 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423.16

PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for blocking.
 - 2. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

- B. Shop Drawings: For toilet compartments.

- 1. Include plans, elevations, sections, details, and attachment details.
 - 2. Show locations of cutouts for compartment-mounted toilet accessories.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show locations of floor drains.

- C. Samples for Initial Selection: For each type of toilet compartment material indicated.

- 1. Include Samples of hardware and accessories involving material and color selection.

- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

- 1. Each type of material, color, and finish required for toilet compartments, prepared on ~~6-inch-~~ (152-mm-) square Samples of same thickness and material indicated for Work.

2. Each type of hardware and accessory.

- E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.

1. Door Hinges: One hinge(s) with associated fasteners.
2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
3. Door Bumper: One bumper(s) with associated fasteners.
4. Door Pull: One door pull(s) with associated fasteners.
5. Fasteners: Ten fasteners of each size and type.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

- A. Manufacturers: Basis of design product: Hiny Hiders by Scranton Products. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Global Partitions; ASI Group.
 2. Knickerbocker Partition Corporation.
 3. Scranton Products.
- B. Toilet-Enclosure Style: Floor anchored.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than **1 inch (25 mm)** thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
 2. Heat-Sink Strip: Manufacturer's standard continuous, stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
 3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.
- E. Pilaster Shoes: Manufacturer's standard design; stainless steel.
1. Polymer Color and Pattern: Matching pilaster.
- F. Brackets (Fittings):
1. Stirrup Type: Ear or U-brackets, clear-anodized aluminum.

2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
1. Material: Clear-anodized aluminum.
 2. Hinges: Manufacturer's standard integral hinge for solid-plastic doors, allowing emergency access by lifting door.
 3. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.

6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ~~ASTM B 221~~ (ASTM B 221M).

C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

D. Stainless-Steel Castings: ASTM A 743/A 743M.

E. Zamac: ASTM B 86, commercial zinc-alloy die castings.

2.5 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

C. Door Size and Swings: Unless otherwise indicated, provide ~~24-inch-~~ (610-mm-) wide, in-swinging doors for standard toilet compartments and ~~36-inch-~~ (914-mm-) wide, out-swinging doors with a minimum ~~32-inch-~~ (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

1. Confirm location and adequacy of blocking and supports required for installation.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: **1/2 inch (13 mm)**.
 - b. Panels and Walls: **1 inch (25 mm)**.
 - 2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Floor-Anchored Units: Set pilasters with anchors penetrating not less than **2 inches (51 mm)** into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.
- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Corner guards.
- 2. Abuse-resistant wall coverings.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications" for pipe guards and wheel guards.
- 2. Section 087100 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: For each type of wall and door protection showing locations and extent.

- 1. Include plans, elevations, sections, and attachment details.

- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

- 1. Include Samples of accent strips and accessories to verify color selection.

- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:

- 1. Corner Guards: 12 inches long. Include example top caps.
- 2. Abuse-Resistant Wall Covering: 6 by 6 inches square.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of handrail.
- B. Material Certificates: For each type of exposed plastic material.
- C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 48-inch- long units.
 - 2. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
 - a. Store corner-guard covers in a vertical position.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

2.3 CORNER GUARDS

- A. Surface-Mounted, Plastic-Cover Corner Guards: Manufacturer's standard assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.
 - 1. Manufacturers: Basis of design product is included in the drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Construction Specialties, Inc.

- b. [Korogard Wall Protection Systems; a division of RJF International Corporation.](#)
 - c. [Pawling Corporation.](#)
- 2. Cover: Extruded rigid plastic, minimum 0.078-inch wall thickness; as follows:
 - a. Profile: Nominal 3-inch-long leg and 1/4-inch corner radius.
 - b. Height: 4 feet.
 - c. Color and Texture: As selected by Architect from manufacturer's full range. Basis of design color and texture provided in the drawings.
- 3. Continuous Retainer: Minimum 0.060-inch-thick, one-piece, extruded aluminum.
- 4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
- 5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.4 ABUSE-RESISTANT WALL COVERINGS

- A. Abuse-Resistant Sheet Wall Covering: Fabricated from semirigid, plastic sheet wall-covering material.
 - 1. [Manufacturers:](#) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [Construction Specialties, Inc.](#)
 - b. [Korogard Wall Protection Systems; a division of RJF International Corporation.](#)
 - c. [Pawling Corporation.](#)
 - 2. Size: 48 by 96 inches for sheet.
 - 3. Sheet Thickness: 0.040 inch.
 - 4. Color and Texture: As selected by Architect from manufacturer's full range. Basis of design color and texture provided in the drawings.
 - 5. Height: As indicated.
 - 6. Trim and Joint Moldings: Extruded rigid plastic that matches wall-covering color.
 - 7. Mounting: Adhesive.

2.5 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or Class 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft.-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
- C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

- D. Adhesive: As recommended by protection product manufacturer.

2.6 FABRICATION

- A. Fabricate wall protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
- C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.7 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall protection.

- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall protection in locations and at mounting heights indicated on Drawings.
- C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
 - 1. Provide anchoring devices and suitable locations to withstand imposed loads.
 - 2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
 - 3. Adjust end and top caps as required to ensure tight seams.
- D. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Washroom accessories.
2. Shower room accessories.
3. Warm-air dryers.
4. Underlavatory guards.
5. Custodial accessories.

- B. Related Requirements:

1. Section 093013 "Ceramic Tiling" for ceramic toilet and bath accessories.

1.3 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

- B. Samples: Full size, for each exposed product and for each finish specified.

1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 WASHROOM ACCESSORIES

- A. Source Limitations: Obtain from single source from single manufacturer for each type of product listed.

- B. Toilet Tissue (Jumbo-Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Tork

- b. Bobrick Washroom Equipment, Inc.
- c. Bradley Corporation.

- 2. Description: Two-roll unit with sliding panel to expose other roll.
- 3. Mounting: Surface mounted.
- 4. Capacity: 10-inch- diameter rolls.
- 5. Material and Finish: ABS plastic, black or gray.
- 6. Lockset: Tumbler type.
- 7. Refill Indicator: Pierced slots at front.

C. Waste Receptacle:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
- 2. Mounting: Semirecessed.
- 3. Minimum Capacity: 12 gal.
- 4. Material and Finish: Stainless steel, No. 4 finish (satin).
- 5. Liner: Reusable vinyl liner.
- 6. Lockset: Tumbler type for waste receptacle.

D. Grab Bar:

- 1. Manufacturers: Basis of design product provided in the Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
- 2. Mounting: Flanges with concealed fasteners.
- 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
- 4. Outside Diameter: 1-1/2 inches.
- 5. Configuration and Length: As indicated on Drawings.

E. Sanitary-Napkin Disposal Unit:

- 1. Manufacturers: Basis of design product provided in the Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

- a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Mounting: Partition mounted, dual access or Surface mounted.
 3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
 4. Receptacle: Removable.
 5. Material and Finish: Stainless steel, No. 4 finish (satin).

F. Mirror Unit:

1. Manufacturers: Basis of design product provided in the Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Frame: Stainless-steel channel.
 - a. Corners: Mitered and mechanically interlocked.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
4. Size: As indicated on Drawings.

G. Coat Hook:

1. Manufacturers: Basis of design product provided in the Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: Single-prong unit.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

H. High-Speed Warm-Air Dryer:

1. Manufacturers: Basis of design product provided in the Drawings. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. American Dryer, Inc.
 - b. Excel Dryer Inc.
 - c. Saniflow Hand Dryer Corporation.
2. Description: High-speed, warm-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.
4. Operation: Electronic-sensor activated with operation time of 10 to 20 seconds.
5. Cover Material and Finish: Zinc Alloy, with electrostatically applied epoxy paint, gray.
6. Electrical Requirements: 115 V, 13 A, 1500 W.

2.3 UNDERLAVATORY GUARDS

A. Underlavatory Guard:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Buckaroos, Inc.
 - b. Plumberex Specialty Products, Inc.
2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.4 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Utility Shelf:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.

3. Size: 16 inches long by 6 inches deep.
4. Material and Finish: Not less than nominal 0.05-inch-thick stainless steel, No. 4 finish (satin).

C. Mop and Broom Holder:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. AJW Architectural Products.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
 - a. Shelf: Not less than nominal 0.05-inch-thick stainless steel.
 - b. Rod: Approximately 1/4-inch-diameter stainless steel.

2.5 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
- B. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
- C. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- E. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- F. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.6 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

EMERGENCY AID SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Automated external defibrillators (AEDs).
- B. Automated external defibrillator (AED) cabinets.
- C. Accessories.

1.02 DEFINITIONS

- A. Automated External Defibrillator (AED): A Food and Drug Administration (FDA)-approved portable device, which automatically analyzes the heart rhythm and recognizes the presence of ventricular fibrillation and/or tachycardia. If defibrillation is warranted, the AED automatically charges and prompts (visual and/or audio) the operator to deliver an electrical shock.

1.03 SUBMITTALS

- A. See Section 013300 - submittal procedures.
- B. Product Data: Provide AED operational features; color and finish; anchorage details; and installation instructions.
- C. Shop Drawings: Indicate locations of cabinets; cabinet physical dimensions; installation procedures; accessories required for complete installation.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test schedules and recertification requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Automated External Defibrillators (AEDs):
 - 1. Basis of Design: Philips Medical Systems, Philips HeartStart OnSite AED. www.usa.philips.com.
 - 2. Stryker Corporation; HeartSine samaritan PAD 350P Defibrillator - PAD 350p. www.stryker.com/#sle.
 - 3. ZOLL Medical Corporation; Zoll AED Plus. www.zoll.com/#sle.

B. Emergency Aid Cabinets and Accessories:

1. Basis of Design: Activar Construction Products Group, Inc. - JL Industries; LifeStart 1400 Series AED Cabinet. www.activarcpg.com.
2. Substitutions: See Section 012500 – Substitution Procedures.

2.02 ACCESSORIES

- A. Plastic Wall Signage.
- B. Floor Signs.
- C. Floor Marking Kits.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level located as indicated on drawings.
- C. Secure rigidly in place.
- D. Place **AEDs** in cabinets.
- E. Wall Signs:
 1. Location: Where shown.
 2. Apply on walls after field painting is completed and has been accepted.

3.03 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust cabinet doors to operate smoothly without binding. Verify that alarms and integral locking devices operate properly.

- C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes. Replace cabinets that cannot be restored to factory-finished appearance. Use materials and procedures recommended by cabinet manufacturer.

3.04 CLOSEOUT ACTIVITIES

- A. Demonstrate proper operation of AED to Owner's designated representative.

END OF SECTION 104300

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
 - a. Review locations for fire extinguisher with Fire Marshal, Owner, Architect & Construction Manager prior to installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

1.5 INFORMATIONAL SUBMITTALS

- A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Babcock-Davis.
 - c. Badger Fire Protection.
 - d. Guardian Fire Equipment, Inc.
 - e. Kidde Residential and Commercial Division.
 - f. Pyro-Chem; Tyco Fire Suppression & Building Products.
 - 2. Source Limitations: Obtain fire extinguishers and accessories, from single source from single manufacturer.
 - 3. Valves: Manufacturer's standard.
 - 4. Handles and Levers: Stainless steel.
 - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container (All locations except Truck Maintenance Area): UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

- C. Carbon Dioxide Type (Locate in Truck Maintenance Area only): UL-rated 10-B:C, 10-lb nominal capacity, with carbon dioxide in enameled-steel container.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Amerex Corporation.
 - b. Babcock-Davis.
 - c. Badger Fire Protection.
 - d. Guardian Fire Equipment, Inc.
 - e. Kidde Residential and Commercial Division.
 - f. Pyro-Chem; Tyco Fire Suppression & Building Products.
 - 2. Source Limitations: Obtain mounting brackets and fire extinguishers from single source from single manufacturer.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: Top of fire extinguisher to be at 42 inches above finished floor.

- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

METAL LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Knocked-down lockers.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.
- B. Shop Drawings: For metal lockers.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Show locker trim and accessories.
 - 3. Include locker identification system and numbering sequence.
- C. Samples: For each color specified, in manufacturer's standard size.
- D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.
- E. Samples for Verification: For the following products, in manufacturer's standard size:
 - 1. Lockers and equipment.
- F. Product Schedule: For lockers.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. The following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
 - a. Locks.
 - b. Blank identification plates.
 - c. Hooks.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.
- B. Deliver master and control keys to Owner by registered mail or overnight package service.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

- A. Coordinate sizes and locations of concrete bases for metal lockers.
- B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures.
 - b. Faulty operation of latches and other door hardware.
2. Damage from deliberate destruction and vandalism is excluded.
3. Warranty Period for Knocked-Down Metal Lockers: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers, locker benches, and accessories from single source from single locker manufacturer.
 1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 KNOCKED-DOWN LOCKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. ASI Storage Solutions; ASI Group.
 2. List Industries Inc.
 3. Olympus Lockers & Storage Products, Inc.
- B. Doors: One piece; fabricated from 0.060-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
 1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
 2. Stiffeners: Manufacturer's standard full-height stiffener fabricated from 0.048-inch nominal-thickness steel sheet; welded to inner face of doors.
 3. Sound-Dampening Panels: Manufacturer's standard, designed to stiffen doors and reduce sound levels when doors are closed, of die-formed metal with full perimeter flange and sound-dampening material; welded to inner face of doors.
 4. Door Style: Vented panel as follows:
 - a. Louvered Vents: No fewer than six louver openings at top and bottom for single-tier lockers.

- C. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
 - 1. Tops, Bottoms, and Intermediate Dividers: 0.024-inch nominal thickness, with single bend at sides.
 - 2. Backs and Sides: 0.024-inch nominal thickness, with full-height, double-flanged connections.
 - 3. Shelves: 0.024-inch nominal thickness, with double bend at front and single bend at sides and back.
- D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
 - 1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.
 - 2. Frame Vents: Fabricate face frames with vents.
- E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
 - 1. Continuous Hinges: Manufacturer's standard, steel, full height.
- F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
 - 1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks, built-in key locks, or padlocks; positive automatic latching and prelocking.
 - a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.105-inch nominal-thickness steel sheet; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
 - b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism and moving components isolated to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.
- G. Door Handle and Latch for Box Lockers: Stainless-steel strike plate with integral pull; with steel padlock loop that projects through metal locker door.
- H. Locks: Combination padlocks.
- I. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.
- J. Hooks: Manufacturer's standard ball-pointed hooks, aluminum or steel; zinc plated.

- K. Coat Rods: Manufacturer's standard.
- L. Coat Rods: 1-inch-diameter steel tube or rod, chrome finished.
- M. Continuous Sloping Tops: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch nominal-thickness steel sheet.
 - 1. Closures: Vertical-end type.
 - 2. Sloping-top corner fillers, mitered.
- N. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.
- O. Filler Panels: Fabricated from manufacturer's standard thickness, but not less than 0.036-inch nominal-thickness steel sheet.
- P. Boxed End Panels: Fabricated from 0.060-inch nominal-thickness steel sheet.
- Q. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
- R. Materials:
 - 1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
- S. Finish: Baked enamel or powder coat.
 - 1. Color: As selected by Architect from manufacturer's full range.

2.4 LOCKS

- A. Combination Padlock: Provided by Owner.
- B. Built-in Combination Lock: Key-controlled, three-number dialing combination locks; capable of at least five combination changes made automatically with a control key.
 - 1. Bolt Operation: automatically locking spring bolt.

2.5 FABRICATION

- A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
 - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.

2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.
 - B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
 - C. Equipment: Provide each locker with an identification plate and the following equipment:
 1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
 2. Coat Rods: In lieu of ceiling hook for metal lockers 24 inches high or more.
 3. Open-Front Athletic Lockers: Two single-prong wall hooks bolted to locker back and coat rod.
 - D. Knocked-Down Construction: Fabricate metal lockers by preassembling at plant prior to shipping, using manufacturer's nuts, bolts, screws, or rivets.
 - E. Accessible Lockers: Fabricate as follows:
 1. Locate bottom shelf no lower than 15 inches above the floor.
 2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
 - F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
 1. Sloping-top corner fillers, mitered.
 - G. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
 - H. Boxed End Panels: Fabricated with 1-inch-wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.
 1. Provide one-piece panels for double-row (back-to-back) locker ends.
 - I. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
 1. Provide one-piece panels for double-row (back-to-back) locker ends.
- 2.6 ACCESSORIES
- A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.
 - B. Anchors: Material, type, and size required for secure anchorage to each substrate.

1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install lockers level, plumb, and true; shim as required, using concealed shims.
 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
 3. Anchor back-to-back metal lockers to floor.
- B. Knocked-Down Lockers: Assemble with manufacturer's standard fasteners, with no exposed fasteners on door faces or face frames.
- C. Equipment:
 1. Attach hooks with at least two fasteners.
 2. Attach door locks on doors using security-type fasteners.
 3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
 - a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
 - b. Attach plates to upper shelf of each open-front metal locker, centered, with a least two aluminum rivets.
- D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
 1. Attach recess trim to recessed metal lockers with concealed clips.
 2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.

3. Attach sloping-top units to metal lockers, with closures at exposed ends.
 4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
 5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
- E. Fixed Benches: Provide no fewer than two pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.3 ADJUSTING

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

- A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.
- B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 105113

METAL CANOPIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fixed Metal Canopy

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features, and finishes for awnings.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, mounting heights, and attachment details.
 - 2. Detail fabrication and assembly of canopy.
 - 3. Include diagrams for power, signal, and control wiring.
 - 4. Show locations for blocking, reinforcement, and supplementary structural support.
 - 5. Graphics: Show text message, font, character sizes, and other graphic forms; character, word, and line spacing; margin widths; position of copy; and other information related to graphic design.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Samples for Verification: For the following:
 - 1. Frame Finish: Not less than **6-inch (150-mm)** lengths.
- E. Product Schedule: For awnings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For canopies to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

1.7 WARRANTY

- A. Special Warranty: Manufacturer and fabricator agree to repair or replace components of awnings that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including framework.
 - b. Deterioration of fabric including seam failure.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Faulty operation of operator.
 - 2. Canopy Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 Manufacturers

- A. Basis of Design: Mapes Canopies; 1-888-273-1132
- B. Mitchell Metals
- C. Skyscape Architectural Canopies

2.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 CANOPY MATERIALS

1. Decking shall consist of an interlocking roll-form 2 1/2W style pan (0.040" aluminum)
2. Intermediate framing members shall be extruded aluminum, alloy 6063-T6, in profile and thickness shown in current manufacturer brochures
3. Cantilever supported brackets shall be standard finish.
4. Fascia shall be standard extruded 8" J style.

2.4 Finishes

1. Finish type shall be 2-Coat Kynar Finish.

2.5 Fabrication

1. All Mapes canopies are shipped in preassembled sections for ease of installation.
2. All connections shall be mechanically assembled utilizing 3/16 fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
3. Concealed drainage. Water shall drain from covered surfaces into intermediate trough and be directed to Front Scupper.

PART 3 - Execution

3.1 Inspection

1. Confirm that surrounding area is ready for the canopy installation.
2. Installer shall confirm dimensions and elevations to be as shown on drawings provided by Mapes Industries.
3. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed

3.2 Installation

1. Installation shall be in strict accordance with manufacturer's shop drawings. Particular attention should be given to protecting the finish during handling and erection.

- 3.3 After installation, entire system shall be left in a clean condition.

END OF SECTION 107313.13

RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Microwave
 - 2. Refrigerator.
 - 3. Washer
 - 4. Dryer
- B. Related Equipment not included in this Section:
 - 1. Kitchen exhaust ventilation in Mechanical.
 - 2. Cleaning appliances (Owner Furnished)

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Product Certificates: For each type of appliance.
- C. Field quality-control reports.
- D. Sample Warranties: For manufacturers' special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintains, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Appliances to be supplied by Owner and installed by Contactor.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Examine walls, ceilings, and roofs for suitable conditions where overhead exhaust hoods will be installed.
- D. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance-performance parameters.
 - 2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
 - 3. Operational Test: After installation, start units to confirm proper operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
- B. An appliance will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain residential appliances.

END OF SECTION 113100

ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Manually operated roller shades with single rollers.

- B. Related Requirements:

- 1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
 - 2. Section 079200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

- B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

- C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

- D. Samples for Verification: For each type of roller shade.

- 1. Shadeband Material: Not less than 10 inches square. Mark interior face of material if applicable.
 - 2. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.
 - 3. Installation Accessories: Full-size unit, not less than 10 inches long.

- E. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: For each type of shadeband material.
- C. Product Test Reports: For each type of shadeband material, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

- A. Basis-of-design product: Roller shades FR by Hunter Douglas Contract, www.hunterdouglasarchitectural.com. Provide the indicated product or an approved comparable product.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Hunter Douglas Contract.
 - 2. Lutron Electronics Co., Inc.
 - 3. MechoShade Systems, Inc.
- C. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
 - 1. Bead Chains: Stainless steel.
 - a. Loop Length: Full length of roller shade.
 - b. Limit Stops: Provide upper and lower ball stops.
 - c. Chain-Retainer Type: Clip, jamb mount.
- D. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
 - 1. Roller Drive-End Location: Right side of interior face of shade.
 - 2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
 - 3. Shadeband-to-Roller Attachment: Manufacturer's standard method.
- E. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.
- F. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.
- G. Shadebands:

1. Shadeband Material: Light-filtering fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
 - a. Type: Enclosed in sealed pocket of shadeband material.
 - b. Color and Finish: As selected by Architect from manufacturer's full range. Basis of design color: White.

H. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
 - a. Shape: L-shaped.
 - b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches.
2. Endcap Covers: To cover exposed endcaps.
3. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
 - a. Closure-Panel Width: 3 inches.
4. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
5. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
6. Installation Accessories Color and Finish: As selected from manufacturer's full range. Basis of design color: White.

2.3 SHADEBAND MATERIALS

- A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
 1. Source: Roller shade manufacturer.
 2. Type: 100% Polyester.
 3. Weave: Mesh.
 4. Thickness: .015 inches.
 5. Weight: 4.72 oz./sq. yd..
 6. Roll Width: As indicated on Drawings.
 7. Orientation on Shadeband: Up the bolt.
 8. Openness Factor: 3 percent.

9. Color: As selected by Architect from manufacturer's full range. Basis of design color: White.

2.4 ROLLER SHADE FABRICATION

- A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
- B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
 1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
- C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
 1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
- B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 122413

SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.
4. Solid surface material apron fronts.
5. Solid surface material window sills.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop materials and window sills.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
 1. Show locations and details of joints.
 2. Show direction of directional pattern, if any.
- C. Samples for Verification: For the following products:
 1. Countertop material, 6 inches square.
 2. Wood trim, 8 inches long.
 3. One full-size solid surface material countertop, with front edge and backsplash, 8 by 10 inches, of construction and in configuration specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops and window sills.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. LG Chemical, Ltd.
 - b. DuPont Chemical.
 - c. Wilsonart.
 - 2. Type: Provide Standard type unless Special Purpose type is indicated.
 - 3. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
 - 4. Colors and Patterns: As selected by Architect from manufacturer's full range, with Basis of Design colors and patterns as indicated in the Drawings.

- B. Solid Wood Edges and Trim: Clear white oak lumber, free of defects, selected for compatible grain and color, and kiln dried to 7 percent moisture content.
- C. Particleboard: ANSI A208.1, Grade M-2.
- D. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WT's "Architectural Woodwork Standards."
 - 1. Grade: Custom.
- B. Configuration:
 - 1. Front: Straight, slightly eased at top.
 - 2. Backsplash: Straight, slightly eased at corner.
 - 3. End Splash: Matching backsplash.
- C. Countertops: 1/2-inch- thick, solid surface material with front edge built up with same material.
- D. Backsplashes: 1/2-inch- thick, solid surface material.
- E. Window sills: 1/2-inch-thick, solid surface material with rounded front edges.
- F. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Fabricate with loose backsplashes for field assembly.
- G. Joints: Fabricate sills and countertops without joints.
- H. Cutouts and Holes:
 - 1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
 - 2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.3 SUPPORT BRACKETS

- A. Support Brackets: Fabricated by welding miter cut extruded aluminum sections, grinding and deburring sharp edges and welds, drilling holes for field attachment, and factory finishing.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Rakks / Rangine Corporation
 - b. Richelieu Hardware Ltd.
 - c. Federal Brace
 2. Materials: Fabricate components from extruded aluminum sections complying with ASTM B221, 6063-T5 alloy and temper.
 3. Factory applied finishes: Exposed aluminum surfaces shall be free of scratches and other serious blemishes and be factory finished with powder paint coating complying with AAMA 605.2.
- B. Inside Wall Mount Counter Support Brackets:
 1. L-shaped bracket fabricated from aluminum T sections designed for supporting 25 inches deep counter.
 - a. Size: 18 inches tall by 20 inches deep. T extrusion: 2 inches by 2 inches by 1/4" thick.
 - b. Load capacity per bracket: 300 pounds.
 - c. Color: As selected by Architect.

2.4 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.
- B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops and sills level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
- B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
- D. Bracket Installation: Install support brackets in accordance with reviewed shop drawings and manufacturer's installation instructions.
 - 1. Install brackets at locations and heights indicated on Drawings. Verify locations in field with Architect.
 - 2. Install brackets rigidly to supporting substrate so that they are secure, plumb, and aligned.
 - 3. Install with fasteners of type, size, and quantity as supplied or recommended by bracket manufacturer for type of application and substrate.
- E. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- F. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in countertop edges at joints where indicated. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

- G. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- H. Install window sills by adhering to wall and window with adhesive. Mask areas adjacent to joints to prevent adhesive smears.
- I. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- J. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.
- K. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Structural-steel framing.
 - 2. Metal roof panels.
 - 3. Metal wall panels.
 - 4. Louvers
 - 5. Accessories.

- B. Related Requirements:

- 1. Section 055000 "Metal Fabrications".
 - 2. Section 077253 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface.
 - 3. Section 083613 "Sectional Doors" for sectional vehicular doors in metal building systems.
 - 4. Section 081113 "Hollow Metal Doors and Frames" for personal doors and frames.
 - 5. Section 084113 "Aluminum-Framed Entrances and Storefronts" for Entrance Storefront.
 - 6. Section 088000 "Glazing" for windows and frames.
 - 7. Section 089119 "Fixed Louvers" For louvers.

1.3 DEFINITIONS

- A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

- B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to metal building systems including, but not limited to, the following:
 - a. Condition of foundations and other preparatory work performed by other trades.
 - b. Structural load limitations.
 - c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
 - d. Required tests, inspections, and certifications.
 - e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.
 - 2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
 - b. Structural limitations of purlins and rafters during and after roofing.
 - c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
 - d. Temporary protection requirements for metal roof panel assembly during and after installation.
 - e. Roof observation and repair after metal roof panel installation.
 - 3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
 - b. Structural limitations of girts and columns during and after wall panel installation.
 - c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
 - d. Temporary protection requirements for metal wall panel assembly during and after installation.
 - e. Wall observation and repair after metal wall panel installation.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of metal building system component.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

- a. Metal roof panels.
 - b. Metal wall panels.
- B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:
 - 1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
 - 2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 - a. Show provisions for attaching mezzanines.
 - 3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
 - a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
 - b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
 - c. Show translucent panels.
 - 4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches:
 - a. Flashing and trim.
 - b. Gutters.
 - c. Downspouts.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For the following products:
 - 1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
 - 2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
 - 3. Accessories: Nominal 12-inch-long Samples for each type of accessory.
- E. Delegated-Design Submittal: For metal building systems.
 - 1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For erector and manufacturer.
- B. Welding certificates.
- C. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Name and location of Project.
 - 2. Order number.
 - 3. Name of manufacturer.
 - 4. Name of Contractor.
 - 5. Building dimensions including width, length, height, and roof slope.
 - 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 - 7. Governing building code and year of edition.
 - 8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
 - 9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
 - 10. Building-Use Category: Indicate category of building use and its effect on load importance factors.
- D. Erector Certificates: For qualified erector, from manufacturer.
- E. Material Test Reports: For each of the following products:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shop primers.
 - 5. Nonshrink grout.
- F. Source quality-control reports.
- G. Field quality-control reports.
- H. Sample Warranties: For special warranties.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panel finishes to include in maintenance manuals.

1.9 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.

1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
 2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.
- B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
- D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups for typical wall metal panel including accessories.
 - a. Size: 48 inches long by 48 inches.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- 1.10 DELIVERY, STORAGE, AND HANDLING
- A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
 - B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
 - C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- 1.11 FIELD CONDITIONS
- A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Buildings Company; a Nucor company.
 - 2. Behlen Mfg. Co.
 - 3. BlueScope Buildings North America, Inc.
 - 4. Ceco Building Systems; part of the Cornerstone Building Brands.
 - 5. Inland Building Systems; a Schulte Building Systems Company.
 - 6. Nucor Building Systems; a Nucor company.
 - 7. Star Building Systems, part of the Cornerstone Building Brands.
 - 8. VP Buildings; a United Dominion company.
- B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.
- B. Primary-Frame Type:

1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.
- C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.
- D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.
- E. Eave Height: There are multiple Eave Heights required. Refer to Architectural drawings for elevation and location.
- F. Bay Spacing: 20 feet (typical) and as indicated on Drawings.
- G. Roof Slope: See drawings (1 inch per 12 inches minimum).
- H. Roof System: Standing Seam, Foamed-Insulation-Core Metal Roof Panels: Structural metal panels consisting of an exterior standing seam with an interior tongue and groove joint, coupled with a vapor seal in the standing seam, and provides superior resistance to air and moisture intrusion. Attached with concealed fasteners to the structure.
- I. Exterior Wall System: Concealed Fastener, Insulated Metal Wall Panels with foam core: Structural metal panels consisting of exterior metal sheet with five major tapered inverted ribs **1 by 1/4 inches (25.4 by 6.4 mm)** with a mesa profile between the inverted ribs, and interior metal sheet with a Light Mesa profile, with factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.
- J. Face Sheets: Fabricate wall and roof panel face sheets to the profile and configuration indicated from structural quality, Grade C, Galvalume (aluminum/zinc coated). Wall panels to be 26-gage and roof panels to be 24-gage.
- K. Accessories: Provide the following sheet metal accessories factory- formed of the same material in the same finish as roof and wall panels:
 1. Flashings.
 2. Closers.
 3. Fillers.
- L. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with 1 inch thick sheet.
- M. Expansion Joints: Same material and finish as adjacent material where exposed, 1 inch thick, manufacturer's standard brake formed type, of profile to suit system.
- N. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.
- O. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal building system.
- B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
 - 1. Design Loads: As indicated on Drawing S001.
 - 2. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
 - 3. Deflection and Drift Limits: No greater than the following:
 - a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
 - b. Girts: Horizontal deflection of 1/240 of the span.
 - c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
 - d. Metal Wall Panels: Horizontal deflection of 1/240 of the span.
 - e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
 - f. Lateral Drift: Maximum of 1/200 of the building height.
- C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- E. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
- F. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.01 cfm/sq. ft. when tested according to ASTM E1680 or ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- G. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.01 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft..

- H. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft..
- I. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft..
- J. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.

2.4 STRUCTURAL-STEEL FRAMING

- A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."
- B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.
 - 2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted. Refer to drawings for locations.
 - 3. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipes or tubes, or shop-welded, built-up steel plates. Refer to drawings for locations.
 - 4. Long-Bay Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipes or tubes, or shop-welded, built-up steel plates. Refer to drawings for locations.
 - 5. Frame Configuration: Single gable, One directional sloped; Lean-to, with high side connected to and supported by another structure. Refer to drawings for locations.

6. Exterior Column: Tapered (typical). Uniform depth in Office Area and were indicated on drawings.
 7. Rafter: Tapered.
- E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
1. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
 - a. Depth: As needed to comply with system performance requirements.
 2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch-wide flanges. Girt depth 12" U.O.N. on drawings.
 - a. Depth: As required to comply with system performance requirements.
 3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
 4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch-diameter, cold-formed structural tubing to stiffen primary-frame flanges.
 5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
 6. Base Channel: Manufacturer's standard C-shaped sections, fabricated from zinc-coated (galvanized) steel sheet.
 7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
 8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
 9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- G. Bracing: Provide adjustable wind bracing using any method as follows:
1. Rods: ASTM A36/A36M; ASTM A572/A572M, Grade 50; or ASTM A529/A529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
 2. Cable: ASTM A475, minimum 1/4-inch-diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
 3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.

4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
- H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.
- I. Materials:
1. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 3. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.
 4. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
 5. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.
 6. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
 7. Non-High-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.
 - a. Finish: Plain.
 8. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
 - a. Finish: Plain.
 9. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
 10. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1 hardened carbon-steel washers.
 - a. Finish: Plain.
 11. Unheaded Anchor Rods: ASTM F1554, Grade 36.
 - a. Configuration: Straight.
 - b. Nuts: ASTM A563 heavy-hex carbon steel.
 - c. Plate Washers: ASTM A36/A36M carbon steel.
 - d. Washers: ASTM F436 hardened carbon steel.
 - e. Finish: Plain.

12. Headed Anchor Rods: ASTM F1554, Grade 36.

- a. Configuration: Straight.
- b. Nuts: ASTM A563 heavy-hex carbon steel.
- c. Plate Washers: ASTM A36/A36M carbon steel.
- d. Washers: ASTM F436 hardened carbon steel.
- e. Finish: Plain.

13. Threaded Rods: ASTM A193/A193M.

- a. Nuts: ASTM A563 heavy-hex carbon steel.
- b. Washers: ASTM F436 hardened carbon steel.
- c. Finish: Plain.

J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.

- 1. Clean and prepare in accordance with SSPC-SP2.
- 2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.
 - a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 METAL ROOF PANELS

- A. Standing Seam, Foamed-Insulation-Core Metal Roof Panels: Structural metal panels consisting of an exterior standing seam with an interior tongue and groove joint, coupled with a vapor seal in the standing seam, and provides superior resistance to air and moisture intrusion. Attached with concealed fasteners to the structure.
- B. Basis of Design: Metl-Span, CFR Insulated Metal Panel. Or approved equal.
 - 1. Provide Roof Panels by one of the following Manufacturers:
 - a. Metl-Span
 - b. Kingspan
 - c. Centria
 - d. MBCI
 - e. or Approved Equal
- C. G-90 Galvanized Coated Steel: ASTM A 653: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A 755/A 755M.
 - 1. Exterior Face Sheet: 22 gauge coated thickness, with stucco embossed surface.
 - a. Finish: Premium I Exterior Colors
 - b. Color: As selected by Architect from Metlspan's standard colors.
 - 2. Interior Face Sheet: 26 gauge coated thickness, with stucco embossed surface and planked profile.
 - a. Finish: Standard colors
 - b. Color: As selected by Architect from Metlspan's standard colors.

3. Endlaps: Provide panels with factory endlaps, notching, swedging and backer plates; where panel lengths permit.
- D. Low Eave Treatment: Provide cutback for trim/gutter installation; where panel lengths permit.
- E. Panel Width: 42 inches (1067 mm).
- F. Panel Thickness: 4 inch (64 mm).
- G. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent
 1. Closed Cell Content: 90% or more as determined by ASTM D 6226
 2. Compressive Strength: As required to meet structural performance requirements and with a minimum of 15 psi as determined by ASTM D 1621
 3. Minimum Density: 2.0 pcf (32 kg/m³) as determined by ASTM D 162.
 4. Thermal Resistance (R-Value): 30 minimum as determined by ASTM C 518 at 75 degrees Fahrenheit mean temperature.

2.6 METAL WALL PANELS

- A. Concealed Fastener, Insulated Metal Wall Panels with foam core: Structural metal panels consisting of exterior metal sheet with five major tapered inverted ribs 1 by 1/4 inches (25.4 by 6.4 mm) with a mesa profile between the inverted ribs, and interior metal sheet with a Light Mesa profile, with factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.
- B. Basis of Design: MWP-1: VERTICAL CF FLUTE; MWP-2: CF HORIZ. ARCHITECTURAL WALL PANEL
 1. Provide Siding by one of the following Manufacturers:
 - a. Metl-Span
 - b. Kingspan
 - c. Centria
 - d. MBCI
 - e. or Approved Equal
- C. G-90 galvanized coated steel conforming to ASTM A 653 and/or AZ50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, prepainted by the coil-coating process per ASTM A 755/A 755M.
 1. Exterior Face Sheet: 22 gauge thickness, with stucco embossed surface.
 - a. Finish: Modified silicone-polyester two-coat system.
 - b. Color: As selected by Architect from Metlspan's "Premium 1" Exterior Colors.
 2. Interior Face Sheet: 26 gauge thickness, with stucco embossed surface and Light Mesa profile.
 - a. Finish: Modified silicone-polyester two coat system.
 - b. Color: As selected by Architect from Metlspan's Standard Colors.
- D. Panel Width: 42 inches (1067 mm)
- E. Panel Thickness: 2.5 inch

- F. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent
1. Closed Cell Content: 90% or more as determined by ASTM D 6226
 2. Compressive Strength: As required to meet structural performance requirements and with a minimum of 15 psi as determined by ASTM D 1621
 3. Minimum Density: 2.0 pcf (32 kg/m³) as determined by ASTM D 1622
 4. Thermal Resistance R-Value: 19.3 Minimum per ASTM C 518 at 75 degrees Fahrenheit mean temperature.

2.7 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
 2. Clips: Manufacturer's standard, formed from steel sheet, designed to withstand negative-load requirements.
 3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from steel sheet.
 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch standoff; fabricated from extruded polystyrene.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
 1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
- E. Gutters: Form in 8' long sections, complete with end pieces, outlet tubes, and other special pieces as required. Size in accordance with SMACNA. Join sections with riveted and soldered or sealed joints. Provide expansion-type slip joint at center of runs. Furnish gutter supports spaced 36" o.c., constructed of same metal as gutters. Provide bronze, copper, or aluminum wire ball strainers at outlets. Finish to match roof fascia and rake.
 1. Profile: See Drawings for size.
 2. Color: Match Roof Panel Color
- F. Downspouts: Form in 10' long sections, complete with elbows and offsets. Join sections with 1-1/2" telescoping joints. Provide fasteners designed to hold downspouts securely 1" away from walls; locate fasteners at top and bottom and at approximately 5' o.c. in between. Finish to match wall panels. Provide transition boot to transfer water from downspout to below grade storm water piping.
 1. Profile: See Drawings for Size
 2. Color: Match Roof Panel Color
- G. Downspout Boots:
 1. See Civil Drawings.
- H. Louvers: See Section 089119 "Fixed Louvers".

2.8 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.
 2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
 3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
 5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
1. Make shop connections by welding or by using non-high-strength bolts.
 2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.
- F. Gutters and Downspouts:
1. Fabricate of same material and finish as roofing metal.
 2. Form gutters and downspouts and scuppers of profile and size indicated on drawings to collect and remove water. Fabricate with connection pieces.
 3. Fabricate support straps of same material and finish as roofing metal, color as selected.

2.9 SOURCE QUALITY CONTROL

- A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.
1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.
 - a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
 - 1. Engage land surveyor to perform surveying.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written instructions and drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base, Leveling Plates and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
 - 1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
 - a. Joint Type: Snug tightened or pretensioned as required by manufacturer.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
 - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 - 2. Locate and space wall girts to suit openings such as doors and windows.
 - 3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
 - 1. Tighten rod and cable bracing to avoid sag.
 - 2. Locate interior end-bay bracing only where indicated.
- I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same

profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

- C. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
 - 1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.
- D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
 - 2. Install metal panels perpendicular to structural supports unless otherwise indicated.
 - 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Locate metal panel splices over structural supports with end laps in alignment.
 - 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- E. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
 - 1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
- F. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
 - 1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
 - 1. Install ridge and hip caps as metal roof panel work proceeds.
 - 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
 - 1. Install clips to supports with self-drilling or self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 - 4. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 5. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
 - 6. Provide metal closures at peaks, rake edges, rake walls and each side of ridge and hip caps.
- C. Lap-Seam Metal Roof Panels: Fasten metal roof panels to supports with exposed fasteners at each lapped joint, at location and spacing recommended by manufacturer.
 - 1. Provide metal-backed sealing washers under heads of exposed fasteners bearing on weather side of metal roof panels.
 - 2. Provide sealant tape at lapped joints of metal roof panels and between panels and protruding equipment, vents, and accessories.
 - 3. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps and on side laps of nesting-type metal panels, on side laps of ribbed or fluted metal panels, and elsewhere as needed to make metal panels weatherproof to driving rains.
 - 4. At metal panel splices, nest panels with minimum 6-inch end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.
- D. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.
- E. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated.

Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Install screw fasteners in predrilled holes.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Insulated Metal Wall Panels: Install insulated metal wall panels on exterior side of girts. Attach panels to supports at each panel joint using concealed clip and fasteners at maximum 42 inches o.c., spaced not more than manufacturer's recommendation. Fully engage tongue and groove of adjacent insulated metal wall panels.

1. Install clips to supports with self-tapping fasteners.
2. Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels as weather seal.

D. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
 2. Tie downspouts to underground drainage system indicated.
- E. Louvers: Locate and place louver units level, plumb, and at indicated alignment with adjacent work.
1. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
 2. Provide perimeter reveals and openings of uniform width for sealants and joint fillers.
 3. Protect galvanized- and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of corrosion-resistant paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.
 4. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.
- F. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 ADJUSTING

- A. Adjustable Louvers: After completing installation, including work by other trades, lubricate, test, and adjust units to operate easily, free of warp, twist, or distortion as needed to provide fully functioning units.
 - 1. Adjust louver blades to be weathertight when in closed position.

3.10 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- D. Touchup Painting: Cleaning and touchup painting are specified in Section 099000 "Paintings and Coatings."
- E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- F. Louvers: Clean exposed surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

1. Restore louvers damaged during installation and construction period so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - a. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 133419

HEAVY-DUTY VEHICLE LIFTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Heavy Duty Vehicle lifts including safety equipment, controls and accessories of the following types:
 - 1. Modular in-ground axle engaging lifts 3 post MOD30 series.
 - 2. 75,000 lb parallelogram drive on flush-mounted lifts.

1.2 RELATED SECTIONS

- A. Section 033000 – Cast-in-Place Concrete

1.3 REFERENCES

- A. ALI: Automotive Lift Institute.
- B. ANSI/ALI ALCTV: Safety Requirements for the Construction, Testing, and Validation of Automotive Lifts.
- C. International Standards Organization (ISO): ISO 9001 Quality management systems - Requirements.
- D. Underwriters Laboratories Inc. (UL): UL201 - These requirements cover garage equipment, rated not more than 600 volts, for use in accordance with the National Electrical Code, NFPA 70.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013000 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation manual.
 - 4. Operations manual.
 - 5. Maintenance manual.
 - 6. Safety manual.
- C. Shop Drawings: Template drawings and load reactions for lift application.
- D. BIM Models: Manufacturer's Building Information Model for lifts.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Factory trained authorized company, company insured for completed operations of installing lift.

- B. In addition to the other requirements outlined herein, the lift or lifts, shall comply with all applicable requirements of ANSI standards. "Safety Requirements for the Construction, Care and Use of Automotive Lifts" as published by the American national Standards Institute. The lift company Quality Management System shall be ISO9001 certified.
- C. Lift and all components shall be new. Used or refurbished lift and components not acceptable.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty for failures due to defective materials and workmanship. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-design Manufacturer: Stertil-Koni, which is located at: 200 Log Canoe Circle; Stevensville, MD 21666; Toll Free Tel: 800-336-6637; Tel: 410-643-9001; Web: <https://stertil-koni.com>
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Rotary Lift.
 - 2. Hoffman Services.
 - 3. Stertil Koni.
 - 4. Mohawk Lifts.

2.2 MODULAR INGROUND AXLE ENGAGING LIFTS, 3 POST

- A. Three Post Inground Lift Model #96/3: As manufactured by Stertil Koni.
 - 1. Capacity: 96,000 lb (45,000 kg).
 - 2. Lifting cylinder assemblies: 3.
 - 3. Movable lifting cylinder assemblies: 2.
- B. Lift Characteristics/Construction Features:
 - 1. Lifting Units: Lift shall consist of three individual modular lifting assemblies in line with the longitudinal axis of the vehicle, each lifting cylinder so equipped as to engage the axle and suspension, as specified herein. Each modular lifting assembly, including the hydraulic system, shall be housed in a totally contained, environmentally safe containment. The movable post shall be equipped with automatic shutter-plate covers that move with the post so as to keep the trench opening covered at all times. All

trench cover plates, including recess covers shall be permanently attached to the floor openings for safety of the technician (trip hazard). The modular lifting system shall be a variable speed computer controlled equalization system to ensure vehicle stability based upon direct post height measurement. The operation of the lift shall be electro hydraulic.

- C. Movable Post Modular: The movable posts shall be equipped with a carriage assembly with permanent lubricated bearing wheels for smooth and proper movement in the structural channel track. The casing of the movable post shall be coated with EnviroGuard to a minimum 1/10 inch (2.5 mm) thickness for ultimate durability and maximum protection against deterioration due to electrolysis and/or harsh contaminants for ultimate durability and maximum protection against deterioration due to electrolysis and/or harsh contaminants.
1. Recessed track properly sized for movable post to provide proper engagement for vehicles ranging in wheel bases specified by fleet demand. The track shall have a pocket location to house the saddle and adapter assembly when lift is in the lowered position providing an unobstructed clear floor. The recess shall allow the superstructure and adapters to be stored completely below grade. When lowered, no part of the saddle or its adapters shall interfere with the drive over clearance of the bay. It shall not be necessary to remove adapters to achieve full drive over clearance and it shall not be required to remove or reposition the adapters in order to close the pit covers. All openings in the floor and gaps between floor and superstructure must be covered when the lift is down. Wheelbase adjustment shall be accomplished by a high efficiency system utilizing a 1/2 hp explosion proof electric motor, protected by a slip clutch.
 2. Moveable superstructure shall be of a low profile design.
 3. Piston Design, Capacity, and Rise:
 - a. 2-Stage piston with chrome surface not exposed to fluids in the containment. Seals should be accessed from floor level to reduce maintenance.
 - b. Minimum Full Rated Capacity: 30,000 lbs (13,608 kg).
 - c. Rise: 70 inches.
 - d. Lift locks: The lift lock shall be rated at same capacity as the corresponding jacking unit. The lock leg shall be two-stage telescoping. The lock leg shall be equipped with 18 locking positions. The locking latch shall be spring-loaded to the lock position and shall be released at the control console. The locking latch shall be gravity activated with a spring-loaded assist. Release mechanism shall be an air cylinder to minimize potential hydraulic leaks. Hydraulically operated or electrically operated safeties are not acceptable.
 4. Electro-Hydraulic Power Unit: The moveable modular unit shall be equipped with a 5 HP, explosion proof 3-phase motor. (All Models Bio-Fluid Compatible) The hydraulic system shall be completely housed within the modular containment unit.
 5. Modular Containment: The containment shall be coated internally and externally with EnviroGuard minimum coating of 1/10 inch (2.5 mm) thickness for ultimate durability and maximum protection against deterioration due to electrolysis and/or common environmental - shop fluids. EnviroGuard shall be an impermeable shell that is watertight, encapsulated against corrosion and electrolysis. All units shall be tested against electrolysis by way of a 30,000-volt stray current test. Parts treated with the EnviroGuard coating shall be warranted against corrosion or electrolysis for a prorated

period of 10 years. The Containment shall be equipped with a Liquid Detection System that shall relay visual notification to the lift control system upon detection of liquid accumulation in the containment. Fluids must be removed upon detection with optional automatic evacuation kit to an environmental location. Fluids can also be remove manually. The containment shall be equipped with a standard evacuation pipe.

- D. Stationary Post Modular (Reference Model Number MOD30) shall include: The stationary post shall be of the same design construction and rise as the moveable post.
1. Stationary Frame: The stationary frame unit will provide integral wheel chocks at floor level in order to accurately locate vehicle Wheel chocks shall be embedded below grade on both sides of the stationary module. No part of the wheel spotting system shall protrude above the floor surface to minimize trip hazards. The spotting dish shall be provided on both sides of the module
 2. The recess shall allow the superstructure and adapters to be stored completely below grade. When lowered, no part of the saddle or its adapters shall interfere with the drive over clearance of the bay. It shall not be necessary to remove adapters to achieve full drive over clearance or to close the pit covers. The recess area shall have cover doors to close over the opening when lift is not in use.
 3. Lift locks: The lift locks shall be of the same design and construction as the moveable post.
 4. Electro-Hydraulic Power Unit: The power unit shall be of the same construction and design as the moveable post.
- E. Stationary Modular Containment: The stationary modular containment shall be of the same design as the moveable post containment (refer to shop drawings for size exceptions)
- F. Controls Console Floor Mounted in Bay Only: The VEC equalized controls shall be in a surface mounted console 4 feet 3-7/32 inches high by 2 feet wide. The control shall include the following features and functions.
1. The control panel shall be equipped with a joystick type control for fore and aft movement of the piston and up down operation of the lift. The joystick control shall be equipped with a locking ring to prevent accidental engagement of the control when not in use. The joystick shall permit fine adjustment of the lifting carriage or moveable piston to permit accurate alignment of axles, unloading of wheels, and reinstallation of drive-train components
 2. The VEC equalization shall monitor all jacking assemblies in relation to each other. The equalization shall be accomplished through variable motor rotation without the use of flow metering valves or fluid measurement.
 3. The lift control panel shall be equipped with Inbay Technology allowing system communication through the use of an LCD Screen. The LCD screen shall provide onboard; Fault Codes, and site specific presets.
 4. The system shall provide the ability for the following facility required settings: Up to (25) memorized wheelbase locations as required by fleet. Up to (25) memorized height requirements as required by facility.
 5. The control system shall indicate to the operator when the lift is fully lowered to prevent damage to the vehicle, the lift and to eliminate tire damage.
 6. The control system shall indicate to the operator which lifting pistons are activated, when the moveable piston is moving fore and aft, when the moveable post is in its

- ### 2.3 75,000 LB PARALLELOGRAM DRIVE ON FLUSH MOUNTED LIFT

- a. Each hydraulic cylinder shall have a flow check integrally mounted to prevent collapse in the event of a major fluid leak.
- b. The lift shall be driven by a hydraulic pump of U.S. manufacturer, capable of supplying the appropriate psi and gpm to operate the lift.
- c. The lift shall be able to be lowered from any raised position by operation of a manual pump and valve.
- 4. Safety Locks:
 - a. Steel safety locks with a safety factor of not less than 3:1 shall be mounted one set to each lifting cylinder and shall allow the lift to be locked at a minimum of 8 different levels.
- 5. Control console shall house the following equipment:
 - a. Oil reservoir, suction strainer, low pressure return filter, hydraulic gear pump and manual pump.
 - b. Electrical enclosures for control components shall be NEMA 12 rated (minimum) and have the following controls mounted on them while still maintaining their sealing ability:
 - c. Systems disconnect.
 - d. "Power-On" pilot lamp.
 - e. "Raise" and "Lower" controls and "Press to lock lift" control.
 - f. "Operator Lock-Out" pilot lamp.
- 6. The control system shall be operated by a Programmable Logic Control (PLC) and lock-out all operations of lift controls if an unsafe condition exists due to insufficient air pressure to operate safety locks; displaced safety edges, locks not disengaged or uneven platform heights. This lock-out shall not be able to be reset unless unsafe condition has been corrected.
 - a. The control system shall ensure that lifting platforms differ in height by no more than 2 inches (51 mm). If platforms become uneven by a greater amount, the lift shall stop and lock-out operator.
- B. Capacity:
 - 1. Models 75/30F: 75,000 lbs. (34019 kg).
- C. Minimum Floor Thickness:
 - 1. Model 75/30F: 9 inch (229 mm).
- D. Equipment Foundation Requirements:
 - 1. Consult factory for drawings.
- E. Electronic Programmable Control Panel with Electric Power Unit, UL201 Compliant, 208/230/460 volt 3 phase 60 Hz Over Hydraulic Cylinder Drive: All models bio-fluid compatible.
- F. Legs: 6.
- G. Rise: 63 inches (All Models from top of runway to floor).
- H. Retracted Height Of Runways:
 - 1. Model 75/30F: Flush With Floor.

- I. Platform Length:
 - 1. Model 75/30F: 30 feet (9144 mm).
- J. Overall Length:
 - 1. Model 75/30F: 30 feet (9144 mm).
- K. Overall Width:
 - 1. Model 75/30F: 109 inch (2768 mm).
- L. Finishes:
 - 1. Red, RAL3002.
- M. Accessories:
 - 1. RJ25: Rolling Jacks 25,000 LB (11340 kg) capacity (each) 100 psi minimum - 120 psi maximum required.
 - 2. Lights: Built-in lights, heavy-duty 48" 115v fluorescent at front and rear. Include shatter-proof shield and 360 degree reflective lens.
 - 3. Air: Built-in quick disconnects for compressed air at front and rear.
- N. Lift shall be 3rd party certified by ETL testing laboratory and labeled with the ETL/Automotive Lift Institute (ALI) label that affirms the lifts meet conformance to all applicable provisions of American National Standard ANSI/ALI ALCTV and in compliance with International Building Code chapter 30 section 3001.2.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until supporting structures have been properly prepared.
- B. If supporting structure preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Coordinate all in-ground penetrations in the slab on grade.
- B. Install in strict accordance with manufacturer instructions and in proper relationship with adjacent construction. Test for proper operation and retest if necessary until satisfactory results are achieved.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 144500

Tasks

| Start | End | Duration (Days) | Label |
|--------------------------------|------------|-----------------|--|
| 9/3/2025 | 9/3/2025 | 1 | Construction Start |
| 9/4/2025 | 11/21/2026 | 444 | Construction Duration (GC to provide Schedule) |
| 11/22/2026 | 12/1/2026 | 10 | Project turnover to City |
| Insert new rows above this one | | | |

Milestones

| Date | Label |
|--------------------------------|--------------------------------------|
| 3/1/2025 | NTP: VE Design Serices |
| 4/8/2025 | Bid/Permit Set Issue |
| 5/14/2025 | Public Bid Phase Start |
| 5/28/2025 | PreBid Meeting |
| 5/19/2025 | City Issue Notice to Vacate |
| 6/27/2025 | Bid Close |
| 7/11/2025 | City Submit to City Council |
| 7/23/2025 | City Council Approval |
| 9/2/2025 | City Issues NTP |
| 9/3/2025 | Construction Start |
| 11/21/2025 | Rough Grading & Foundations Complete |
| 3/16/2026 | Start PEMB Erection |
| 7/31/2026 | Building Enclosed |
| 9/25/2026 | Site work Complete |
| 11/21/2026 | Construction Complete |
| 11/22/2026 | Project Turnover |
| Insert new rows above this one | |