

INVITATION FOR BIDS

2024-2025 UNIT RENOVATIONS PROJECT

Solicitation No. **CHA-009-PA7-2025-02**



CHESTER HOUSING AUTHORITY
1111 Avenue of the States
Chester, Pennsylvania 19013

CONSULTANTS:
REMINGTON & VERNICK ENGINEERS
555 Croton Road, Suite 401
King of Prussia, PA 19406
(610) 940-1050

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Notice To Bidders

2024 - 2025 Unit Renovations Chester Housing Authority

The Chester Housing Authority will utilize electronic bidding to receive sealed bids for **2024 - 2025 Unit Renovations**. Sealed bids must be submitted online through the PennBid (Bonfire) electronic procurement program prior to **June 19, 2025 at 10:00 AM EST**, at which time they will be opened and read aloud at the office of the Authority Engineer, Remington & Vernick Engineers, 555 Croton Road, Suite 401, King of Prussia, PA 19406.

All documents and solicitation details are available at no cost through PennBid (<https://pennbid.bonfirehub.com>).

Bidders are required to provide Bid Security in an amount equal to 5% of the total amount bid. Bid Security may be provided in the form of a certified check or a bid bond issued by a Surety Company licensed to transact such business in the Commonwealth of Pennsylvania.

Upon award of a contract, the Successful Bidder shall provide a Performance Bond and a Labor and Materials Payment Bond, each in the amount of 100% of the awarded contract value. Upon completion of the contract, the Successful Bidder shall provide a 1-year Maintenance Bond in the amount of 100% of the final contract value.

Bidders are required to comply with the Davis Bacon labor standards, including the payment of prevailing wages where applicable. Any and all questions are to be submitted through PennBid.

Only the Successful Bidder for a contract will be responsible for payment of a fee to PennBid and for bearing the cost thereof. The amount of the fee due to PennBid is either 1/3% (0.0033) of the initial contract award amount for fixed fee contracts or 1/6% (0.00166) of the expected contract value for term contracts and will be invoiced by PennBid to the successful bidder.



upon award of a contract by the Local Contracting Unit. The minimum fee is set at \$150.00 and the maximum fee is capped at \$6,000.00.

Ad Dates: 5/27 & 6/2

For Bidders and vendors

Using the PennBid™ electronic bid management system to respond to this Request-for-Proposal

The Chester Housing Authority (hereafter designated as "Owner") along with many PA municipalities, Authorities, and private firms is utilizing the PennBid™ electronic procurement Program for their solicitations, RFPs, and RFQs. Using PennBid is beneficial to both the agencies as well as the bidders. Costs and bidding effort is greatly reduced as bid documents are available online, all Q&As are via email, and sealed bids can be submitted and updated online. Interested bidders need to register only once, a free process that takes only a few minutes. Once registered, bidders have access to publically available bids and solicitations from every Agency within PennBid, plus are available for By-Invitation-Only RFPs and RFQs. Bidders can obtain all project documents and submit and update their confidential bids online.

Sealed Bid Confidentiality – The confidentiality of the sealed bid system is a cornerstone of the PennBid Program. At no time before Bid Opening can anyone see your electronic bid.

Confidentiality of Identity – When questions are asked and answered, bidder identity is not disclosed to other bidders.

1. Documents – All documents may be downloaded directly to your computer. Documents can be electronically sent to your suppliers and sub contractors.

2. Being added to the "Bidders List" – By downloading any document, you are automatically added to the list of bidders for this solicitation.

3. Questions – by clicking on the "Questions" tab, you can see all questions that have been asked and answered related to this solicitation. You can also ask questions directly through this tab. When the agency answers the question, both the question and answer is emailed directly to all bidders.

4. Submitting and Updating Bids – You may submit and update your bid anytime up to the bid due date and time by clicking on the "Bid" tab. You need only to provide the per unit price. The PennBid Program will automatically calculate the extended price (no more math errors). You can update any line item without affecting the rest of your quote.

What to submit with this bid

Click on the “**Bid**” tab

- Enter financial bid
- Answer questions (if any)
- Attach a single electronic file or zipped folder containing the documents listed below:
 - **Part II - Bid Package.** *This section can be found in the “Bid Submission Documents” folder on PennBid.*
 - **5% Bid Security.**

Important Note 1 – The award of the contract shall be made subject to the necessary moneys to do the work being provided by the Owner in a lawful manner. The contract to be executed by the successful bidder will provide that it shall not become effective until the necessary moneys to do the work have been provided by the Owner in a lawful manner. The award shall further be subjected to the securing of necessary State, Federal or Local permits governing the work.

Important Note 2 – Bidders are required to comply with the requirements of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101, et.seq.).

Bidders are required to comply with the Pennsylvania Prevailing Wage Act of 1961, P.L. 987, No. 442, where the estimated cost of the total project is in excess of twenty-five thousand dollars (\$25,000).

Important Note 3 – Upon request only, bidders will need to submit other documents in original form and signatures to the agency within 3 business days. Documents such as non-collusion affidavits, detailed financial information, paper bid bond, etc. will be requested prior to award.

Important Note 4 - If the PennBid Program is idle for 50 minutes, a logout warning will appear. Bidders **must** acknowledge. If bidder does not acknowledge that they want to continue working, they **will** be logged out and bidder’s data **will not** be saved or submitted.

How to submit your bid

The **Bid** tab contains the electronic bid form. All Per Unit Price fields must be filled out. To no-bid a line item, insert a zero (0). PennBid will automatically complete the line extensions and bid totals. At the bottom of the page, check the **Verification Statement** and click **Submit Bid**. Completed bid form can be printed or saved to Excel by clicking

the icons in the middle of the bid form page.

Submitting documents with electronic bid

An electronic copy of the documents listed above is to be submitted with the electronic bid. To attach these documents:

1. Fill out required documents and scan to create a single electronic file or save as a single zipped folder containing all documents
2. From the **Bid** tab, click on "browse" (middle of the page), then click on the file or zipped folder name. The file will be attached to your bid submission when the **Submit Bid** button is clicked.

Important Note 5 – when uploading a proposal or other document, the maximum individual file or folder size is 20Mb.

Verifying that your bid was submitted

If submitted properly, you will receive an acknowledgement appearing in the middle of your screen saying "Your bid has been submitted".

Withdrawing Your Bid

You may withdraw your bid anytime up to bid due date and time by simply clicking on Withdraw Bid, located at the bottom of the **Bid** tab.

Help Guides

There are several Help Guides available from the PennBid™ Home Page.

Additional Support

If additional support is needed, click on the "Contact Us" button located at the upper right of each PennBid screen or call us at (717) 488-0035.

**U.S. Department of Housing and
Urban Development**
Office of Public and Indian Housing

**Instructions to Bidders for Contracts
Public and Indian Housing Programs**

Instructions to Bidders for Contracts

Public and Indian Housing Programs

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1. Bid Preparation and Submission

(a) Bidders are expected to examine the specifications, drawings, all instructions, and, if applicable, the construction site (see also the contract clause entitled **Site Investigation and Conditions Affecting the Work** of the *General Conditions of the Contract for Construction*). Failure to do so will be at the bidders' risk.

(b) All bids must be submitted on the forms provided by the Public Housing Agency/Indian Housing Authority (PHA/IHA). Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder's name typed or printed on the bid sheet and each continuation sheet which requires the entry of information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent's authority. (Bidders should retain a copy of their bid for their records.)

(c) Bidders must submit as part of their bid a completed form HUD-5369-A, "Representations, Certifications, and Other Statements of Bidders."

(d) All bid documents shall be sealed in an envelope which shall be clearly marked with the words "Bid Documents," the Invitation for Bids (IFB) number, any project or other identifying number, the bidder's name, and the date and time for receipt of bids.

(e) If this solicitation requires bidding on all items, failure to do so will disqualify the bid. If bidding on all items is not required, bidders should insert the words "No Bid" in the space provided for any item on which no price is submitted.

(f) Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.

(g) Unless expressly authorized elsewhere in this solicitation, bids submitted by telegraph or facsimile (fax) machines will not be considered.

(h) If the proposed contract is for a Mutual Help project (as described in 24 CFR Part 905, Subpart E) that involves Mutual Help contributions of work, material, or equipment, supplemental information regarding the bid advertisement is provided as an attachment to this solicitation.

2. Explanations and Interpretations to Prospective Bidders

(a) Any prospective bidder desiring an explanation or interpretation of the solicitation, specifications, drawings, etc., must request it at least 7 days before the scheduled time for bid opening. Requests may be oral or written. Oral requests must be confirmed in writing. The only oral clarifications that will be provided will be those clearly related to solicitation procedures, i.e., not substantive technical information. No other oral explanation or interpretation will be provided. Any information given a prospective bidder concerning this solicitation will be furnished promptly to all other prospective bidders as a written amendment to the solicitation, if that information is necessary in submitting bids, or if the lack of it would be prejudicial to other prospective bidders.

(b) Any information obtained by, or provided to, a bidder other than by formal amendment to the solicitation shall not constitute a change to the solicitation.

3. Amendments to Invitations for Bids

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date on the bid form, or (3) by letter, telegram, or facsimile, if those methods are authorized in the solicitation. The PHA/IHA must receive acknowledgement by the time and at the place specified for receipt of bids. Bids which fail to acknowledge the bidder's receipt of any amendment will result in the rejection of the bid if the amendment(s) contained information which substantively changed the PHA's/IHA's requirements.

(c) Amendments will be on file in the offices of the PHA/IHA and the Architect at least 7 days before bid opening.

4. Responsibility of Prospective Contractor

(a) The PHA/IHA will award contracts only to responsible prospective contractors who have the ability to perform successfully under the terms and conditions of the proposed contract. In determining the responsibility of a bidder, the PHA/IHA will consider such matters as the bidder's:

- (1) Integrity;
- (2) Compliance with public policy;
- (3) Record of past performance; and
- (4) Financial and technical resources (including construction and technical equipment).

(b) Before a bid is considered for award, the bidder may be requested by the PHA/IHA to submit a statement or other documentation regarding any of the items in paragraph (a) above. Failure by the bidder to provide such additional information shall render the bidder nonresponsible and ineligible for award.

5. Late Submissions, Modifications, and Withdrawal of Bids

(a) Any bid received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it:

(1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);

(2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the PHA/IHA that the late receipt was due solely to mishandling by the PHA/IHA after receipt at the PHA/IHA; or

(3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and observed holidays.

(b) Any modification or withdrawal of a bid is subject to the same conditions as in paragraph (a) of this provision.

(c) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the bid, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, bidders should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(d) The only acceptable evidence to establish the time of receipt at the PHA/IHA is the time/date stamp of PHA/IHA on the proposal wrapper or other documentary evidence of receipt maintained by the PHA/IHA.

(e) The only acceptable evidence to establish the date of mailing of a late bid, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, bidders should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and Failure by a bidder to acknowledge receipt of the envelope or wrapper.

(f) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful bid that makes its terms more favorable to the PHA/IHA will be considered at any time it is received and may be accepted.

(g) Bids may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before the exact time set for opening of bids; provided that written confirmation of telegraphic or facsimile withdrawals over the signature of the bidder is mailed and postmarked prior to the specified bid opening time. A bid may be withdrawn in person by a bidder or its authorized representative if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

6. Bid Opening

All bids received by the date and time of receipt specified in the solicitation will be publicly opened and read. The time and place of opening will be as specified in the solicitation. Bidders and other interested persons may be present.

7. Service of Protest

(a) Definitions. As used in this provision:

"Interested party" means an actual or prospective bidder whose direct economic interest would be affected by the award of the contract.

"Protest" means a written objection by an interested party to this solicitation or to a proposed or actual award of a contract pursuant to this solicitation.

(b) Protests shall be served on the Contracting Officer by obtaining written and dated acknowledgement from —

[Contracting Officer designate the official or location where a protest may be served on the Contracting Officer]

(c) All protests shall be resolved in accordance with the PHA's/IHA's protest policy and procedures, copies of which are maintained at the PHA/IHA.

8. Contract Award

(a) The PHA/IHA will evaluate bids in response to this solicitation without discussions and will award a contract to the responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the PHA/IHA considering only price and any price-related factors specified in the solicitation.

(b) If the apparent low bid received in response to this solicitation exceeds the PHA's/IHA's available funding for the proposed contract work, the PHA/IHA may either accept separately priced items (see 8(e) below) or use the following procedure to determine contract award. The PHA/IHA shall apply in turn to each bid (proceeding in order from the apparent low bid to the high bid) each of the separately priced bid deductible items, if any, in their priority order set forth in this solicitation. If upon the application of the first deductible item to all initial bids, a new low bid is within the PHA's/IHA's available funding, then award shall be made to that bidder. If no bid is within the available funding amount, then the PHA/IHA shall apply the second deductible item. The PHA/IHA shall continue this process until an evaluated low bid, if any, is within the PHA's/IHA's available funding. If upon the application of all deductibles, no bid is within the PHA's/IHA's available funding, or if the solicitation does not request separately priced deductibles, the PHA/IHA shall follow its written policy and procedures in making any award under this solicitation.

(c) In the case of tie low bids, award shall be made in accordance with the PHA's/IHA's written policy and procedures.

(d) The PHA/IHA may reject any and all bids, accept other than the lowest bid (e.g., the apparent low bid is unreasonably low), and waive informalities or minor irregularities in bids received, in accordance with the PHA's/IHA's written policy and procedures.

(e) Unless precluded elsewhere in the solicitation, the PHA/IHA may accept any item or combination of items bid.

(f) The PHA/IHA may reject any bid as nonresponsive if it is materially unbalanced as to the prices for the various items of work to be performed. A bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated for other work.

(g) A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.

9. Bid Guarantee (applicable to construction and equipment contracts exceeding \$25,000)

All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. In the case where the work under the contract will be performed on an Indian reservation area, the bid guarantee may also be an irrevocable Letter of Credit (see provision 10, Assurance of Completion, below). Certified checks and bank drafts must be made payable to the order of the PHA/IHA. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in the rejection of the bid. Bid guarantees submitted by unsuccessful bidders will be returned as soon as practicable after bid opening.

10. Assurance of Completion

(a) Unless otherwise provided in State law, the successful bidder shall furnish an assurance of completion prior to the execution of any contract under this solicitation. This assurance may be [Contracting Officer check applicable items] —

[X] (1) a performance and payment bond in a penal sum of 100 percent of the contract price; or, as may be required or permitted by State law;

[] (2) separate performance and payment bonds, each for 50 percent or more of the contract price;

[] (3) a 20 percent cash escrow;

[] (4) a 25 percent irrevocable letter of credit; or,

[] (5) an irrevocable letter of credit for 10 percent of the total contract price with a monitoring and disbursements agreement with the IHA (applicable only to contracts awarded by an IHA under the Indian Housing Program).

(b) Bonds must be obtained from guarantee or surety companies acceptable to the U.S. Government and authorized to do business in the state where the work is to be performed. Individual sureties will not be considered. U.S. Treasury Circular Number 570, published annually in the Federal Register, lists companies approved to act as sureties on bonds securing Government contracts, the maximum underwriting limits on each contract bonded, and the States in which the company is licensed to do business. Use of companies listed in this circular is mandatory. Copies of the circular may be downloaded on the U.S. Department of Treasury website <http://www.fms.treas.gov/c570/index.html>, or ordered for a minimum fee by contacting the Government Printing Office at (202) 512-2168.

(c) Each bond shall clearly state the rate of premium and the total amount of premium charged. The current power of attorney for the person who signs for the surety company must be attached to the bond. The effective date of the power of attorney shall not precede the date of the bond. The effective date of the bond shall be on or after the execution date of the contract.

(d) Failure by the successful bidder to obtain the required assurance of completion within the time specified, or within such extended period as the PHA/IHA may grant based upon reasons determined adequate by the PHA/IHA, shall render the bidder ineligible for award. The PHA/IHA may then either award the contract to the next lowest responsible bidder or solicit new bids. The PHA/IHA may retain the ineligible bidder's bid guarantee.

11. Preconstruction Conference (applicable to construction contracts)

After award of a contract under this solicitation and prior to the start of work, the successful bidder will be required to attend a preconstruction conference with representatives of the PHA/IHA and its architect/engineer, and other interested parties convened by the PHA/IHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract (e.g., Equal Employment Opportunity, Labor Standards). The PHA/IHA will provide the successful bidder with the date, time, and place of the conference.

12. Indian Preference Requirements (applicable only if this solicitation is for a contract to be performed on a project for an Indian Housing Authority)

(a) HUD has determined that the contract awarded under this solicitation is subject to the requirements of section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b)). Section 7(b) requires that any contract or subcontract entered into for the benefit of Indians shall require that, to the greatest extent feasible

(1) Preferences and opportunities for training and employment (other than core crew positions; see paragraph (h) below) in connection with the administration of such contracts or subcontracts be given to qualified "Indians." The Act defines "Indians" to mean persons who are members of an Indian tribe and defines "Indian tribe" to mean any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians; and,

(2) Preference in the award of contracts or subcontracts in connection with the administration of contracts be given to Indian organizations and to Indian-owned economic enterprises, as defined in section 3 of the Indian Financing Act of 1974 (25 U.S.C. 1452). That Act defines "economic enterprise" to mean any Indian-owned commercial, industrial, or business activity established or organized for the purpose of profit, except that the Indian ownership must constitute not less than 51 percent of the enterprise; "Indian organization" to mean the governing body of any Indian tribe or entity established or recognized by such governing body; "Indian" to mean any person who is a member of any tribe, band, group, pueblo, or community which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs and any "Native" as defined in the Alaska Native Claims Settlement Act; and Indian "tribe" to mean any Indian tribe, band, group, pueblo, or community including Native villages and Native groups (including

corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

(b) (1) The successful Contractor under this solicitation shall comply with the requirements of this provision in awarding all subcontracts under the contract and in providing training and employment opportunities.

(2) A finding by the IHA that the contractor, either (i) awarded a subcontract without using the procedure required by the IHA, (ii) falsely represented that subcontracts would be awarded to Indian enterprises or organizations; or, (iii) failed to comply with the contractor's employment and training preference bid statement shall be grounds for termination of the contract or for the assessment of penalties or other remedies.

(c) If specified elsewhere in this solicitation, the IHA may restrict the solicitation to qualified Indian-owned enterprises and Indian organizations. If two or more (or a greater number as specified elsewhere in the solicitation) qualified Indian-owned enterprises or organizations submit responsive bids, award shall be made to the qualified enterprise or organization with the lowest responsive bid. If fewer than the minimum required number of qualified Indian-owned enterprises or organizations submit responsive bids, the IHA shall reject all bids and readvertise the solicitation in accordance with paragraph (d) below.

(d) If the IHA prefers not to restrict the solicitation as described in paragraph (c) above, or if after having restricted a solicitation an insufficient number of qualified Indian enterprises or organizations submit bids, the IHA may advertise for bids from non-Indian as well as Indian-owned enterprises and Indian organizations. Award shall be made to the qualified Indian enterprise or organization with the lowest responsive bid if that bid is -

(1) Within the maximum HUD-approved budget amount established for the specific project or activity for which bids are being solicited; and

(2) No more than the percentage specified in 24 CFR 905.175(c) higher than the total bid price of the lowest responsive bid from any qualified bidder. If no responsive bid by a qualified Indian-owned economic enterprise or organization is within the stated range of the total bid price of the lowest responsive bid from any qualified enterprise, award shall be made to the bidder with the lowest bid.

(e) Bidders seeking to qualify for preference in contracting or subcontracting shall submit proof of Indian ownership with their bids. Proof of Indian ownership shall include but not be limited to:

(1) Certification by a tribe or other evidence that the bidder is an Indian. The IHA shall accept the certification of a tribe that an individual is a member.

(2) Evidence such as stock ownership, structure, management, control, financing and salary or profit sharing arrangements of the enterprise.

(f) (1) All bidders must submit with their bids a statement describing how they will provide Indian preference in the award of subcontracts. The specific requirements of that statement and the factors to be used by the IHA in determining the statement's adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement shall be rejected as nonresponsive. The IHA may require that comparable statements be provided by subcontractors to the successful Contractor, and may require the Contractor to reject any bid or proposal by a subcontractor that fails to include the statement.

(2) Bidders and prospective subcontractors shall submit a certification (supported by credible evidence) to the IHA in any instance where the bidder or subcontractor believes it is infeasible to provide Indian preference in subcontracting. The acceptance or rejection by the IHA of the certification shall be final. Rejection shall disqualify the bid from further consideration.

(g) All bidders must submit with their bids a statement detailing their employment and training opportunities and their plans to provide preference to Indians in implementing the contract; and the number or percentage of Indians anticipated to be employed and trained. Comparable statements from all proposed subcontractors must be submitted. The criteria to be used by the IHA in determining the statement(s)'s adequacy are included as an attachment to this solicitation. Any bid that fails to include the required statement(s), or that includes a statement that does not meet minimum standards required by the IHA shall be rejected as nonresponsive.

(h) Core crew employees. A core crew employee is an individual who is a bona fide employee of the contractor at the time the bid is submitted; or an individual who was not employed by the bidder at the time the bid was submitted, but who is regularly employed by the bidder in a supervisory or other key skilled position when work is available. Bidders shall submit with their bids a list of all core crew employees.

(i) Preference in contracting, subcontracting, employment, and training shall apply not only on-site, on the reservation, or within the IHA's jurisdiction, but also to contracts with firms that operate outside these areas (e.g., employment in modular or manufactured housing construction facilities).

(j) Bidders should contact the IHA to determine if any additional local preference requirements are applicable to this solicitation.

(k) The IHA [] does [] does not [Contracting Officer check applicable box] maintain lists of Indian-owned economic enterprises and Indian organizations by specialty (e.g., plumbing, electrical, foundations), which are available to bidders to assist them in meeting their responsibility to provide preference in connection with the administration of contracts and subcontracts.

Instructions to Offerors Non-Construction

U.S. Department of Housing
and Urban Development
Office of Public and Indian Housing



- 03291 -

1. Preparation of Offers

(a) Offerors are expected to examine the statement of work, the proposed contract terms and conditions, and all instructions. Failure to do so will be at the offeror's risk.

(b) Each offeror shall furnish the information required by the solicitation. The offeror shall sign the offer and print or type its name on the cover sheet and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the offer. Offers signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the HA.

(c) Offers for services other than those specified will not be considered.

2. Submission of Offers

(a) Offers and modifications thereof shall be submitted in sealed envelopes or packages (1) addressed to the office specified in the solicitation, and (2) showing the time specified for receipt, the solicitation number, and the name and address of the offeror.

(b) Telegraphic offers will not be considered unless authorized by the solicitation; however, offers may be modified by written or telegraphic notice.

(c) Facsimile offers, modifications or withdrawals will not be considered unless authorized by the solicitation.

3. Amendments to Solicitations

(a) If this solicitation is amended, then all terms and conditions which are not modified remain unchanged.

(b) Offerors shall acknowledge receipt of any amendments to this solicitation by

- (1) signing and returning the amendment;
- (2) identifying the amendment number and date in the space provided for this purpose on the form for submitting an offer,
- (3) letter or telegram, or
- (4) facsimile, if facsimile offers are authorized in the solicitation. The HA/HUD must receive the acknowledgment by the time specified for receipt of offers.

4. Explanation to Prospective Offerors

Any prospective offeror desiring an explanation or interpretation of the solicitation, statement of work, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the submission of their offers. Oral explanations or instructions given before the award of the contract will not be binding. Any information given to a prospective offeror concerning a solicitation will be furnished promptly to all other prospective offerors as an amendment of the solicitation, if that information is necessary in submitting offers or if the lack of it would be prejudicial to any other prospective offerors.

5. Responsibility of Prospective Contractor

(a) The HA shall award a contract only to a responsible prospective contractor who is able to perform successfully under the terms and conditions of the proposed contract. To be determined responsible, a prospective contractor must -

- (1) Have adequate financial resources to perform the contract, or the ability to obtain them;

- (2) Have a satisfactory performance record;
- (3) Have a satisfactory record of integrity and business ethics;
- (4) Have a satisfactory record of compliance with public policy (e.g., Equal Employment Opportunity); and
- (5) Not have been suspended, debarred, or otherwise determined to be ineligible for award of contracts by the Department of Housing and Urban Development or any other agency of the U.S. Government. Current lists of ineligible contractors are available for inspection at the HA/HUD.

(b) Before an offer is considered for award, the offeror may be requested by the HA to submit a statement or other documentation regarding any of the foregoing requirements. Failure by the offeror to provide such additional information may render the offeror ineligible for award.

6. Late Submissions, Modifications, and Withdrawal of Offers

(a) Any offer received at the place designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it -

- (1) Was sent by registered or certified mail not later than the fifth calendar day before the date specified for receipt of offers (e.g., an offer submitted in response to a solicitation requiring receipt of offers by the 20th of the month must have been mailed by the 15th);
- (2) Was sent by mail, or if authorized by the solicitation, was sent by telegram or via facsimile, and it is determined by the HA/ HUD that the late receipt was due solely to mishandling by the HA/ HUD after receipt at the HA;
- (3) Was sent by U.S. Postal Service Express Mail Next Day Service - Post Office to Addressee, not later than 5:00 p.m. at the place of mailing two working days prior to the date specified for receipt of proposals. The term "working days" excludes weekends and U.S. Federal holidays; or
- (4) Is the only offer received.

(b) Any modification of an offer, except a modification resulting from the HA's request for "best and final" offer (if this solicitation is a request for proposals), is subject to the same conditions as in subparagraphs (a)(1), (2), and (3) of this provision.

(c) A modification resulting from the HA's request for "best and final" offer received after the time and date specified in the request will not be considered unless received before award and the late receipt is due solely to mishandling by the HA after receipt at the HA.

(d) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent either by registered or certified mail is the U.S. or Canadian Postal Service postmark both on the envelope or wrapper and on the original receipt from the U.S. or Canadian Postal Service. Both postmarks must show a legible date or the offer, modification, or withdrawal shall be processed as if mailed late. "Postmark" means a printed, stamped, or otherwise placed impression (exclusive of a postage meter machine impression) that is readily identifiable without further action as having been supplied and affixed by employees of the U.S. or Canadian Postal Service on the date of mailing. Therefore, offerors should request the postal clerk to place a hand cancellation bull's-eye postmark on both the receipt and the envelope or wrapper.

(e) The only acceptable evidence to establish the time of receipt at the HA is the time/date stamp of HA on the offer wrapper or other documentary evidence of receipt maintained by the HA.

(f) The only acceptable evidence to establish the date of mailing of a late offer, modification, or withdrawal sent by Express Mail Next Day Service-Post Office to Addressee is the date entered by the post office receiving clerk on the "Express Mail Next Day Service-Post Office to Addressee" label and the postmark on both the envelope or wrapper and on the original receipt from the U.S. Postal Service. "Postmark" has the same meaning as defined in paragraph (c) of this provision, excluding postmarks of the Canadian Postal Service. Therefore, offerors should request the postal clerk to place a legible hand cancellation bull's eye postmark on both the receipt and the envelope or wrapper.

(g) Notwithstanding paragraph (a) of this provision, a late modification of an otherwise successful offer that makes its terms more favorable to the HA will be considered at any time it is received and may be accepted.

(h) If this solicitation is a request for proposals, proposals may be withdrawn by written notice, or if authorized by this solicitation, by telegram (including mailgram) or facsimile machine transmission received at any time before award. Proposals may be withdrawn in person by a offeror or its authorized representative if the identity of the person requesting withdrawal is established and the person signs a receipt for the offer before award. If this solicitation is an invitation for bids, bids may be withdrawn at any time prior to bid opening.

7. Contract Award

(a) The HA will award a contract resulting from this solicitation to the responsible offeror whose offer conforming to the solicitation will be most advantageous to the HA, cost or price and other factors, specified elsewhere in this solicitation, considered.

(b) The HA may

- (1) reject any or all offers if such action is in the HA's interest,
- (2) accept other than the lowest offer,
- (3) waive informalities and minor irregularities in offers received, and (4) award more than one contract for all or part of the requirements stated.

(c) If this solicitation is a request for proposals, the HA may award a contract on the basis of initial offers received, without discussions. Therefore, each initial offer should contain the offeror's best terms from a cost or price and technical standpoint.

(d) A written award or acceptance of offer mailed or otherwise furnished to the successful offeror within the time for acceptance specified in the offer shall result in a binding contract without further action by either party. If this solicitation is a request for proposals, before the offer's specified expiration time, the HA may accept an offer, whether or not there are negotiations after its receipt, unless a written notice of withdrawal is received before award. Negotiations conducted after receipt of an offer do not constitute a rejection or counteroffer by the HA.

(e) Neither financial data submitted with an offer, nor representations concerning facilities or financing, will form a part of the resulting contract.

8. Service of Protest

Any protest against the award of a contract pursuant to this solicitation shall be served on the HA by obtaining written and dated acknowledgment of receipt from the HA at the address shown on the cover of this solicitation. The determination of the HA with regard to such protest or to proceed to award notwithstanding such protest shall be final unless appealed by the protestor.

9. Offer Submission

Offers shall be submitted as follows and shall be enclosed in a sealed envelope and addressed to the office specified in the solicitation. The proposal shall show **the hour and date specified in the solicitation for receipt, the solicitation number, and the name and address of the offeror, on the face of the envelope.**

It is very important that the offer be properly identified on the face of the envelope as set forth above in order to insure that the date and time of receipt is stamped on the face of the offer envelope. Receiving procedures are: date and time stamp those envelopes identified as proposals and deliver them immediately to the appropriate contracting official, and only date stamp those envelopes which do not contain identification of the contents and deliver them to the appropriate procuring activity only through the routine mail delivery procedure.

[Describe bid or proposal preparation instructions here:]

Instructions for Preparation of form HUD-51000

1. A separate breakdown is required for each project and prime contract instructions for preparation are given below.
 - a. **Heading.** Enter all identifying information required for both forms.
 - b. **Columns 1 and 2.** In column 1, enter the item numbers starting with No. 1, and in column 2 enter each principal division of work incorporated in the contract work.
 - (1) **Master List.** The Master list contains the basic items into which any construction contract may be subdivided for the purpose of preparing the Construction Progress Schedule and the Periodical Estimates for Partial Payments. Only those items shall be selected which apply to the particular contract. To ensure uniformity, no change shall be made in the item numbers. Generally, about 25 to 40 major items appear in a contract.
 - (2) **Items Subdivided.** In the Contractor's breakdown, against which all periodical estimates will be checked prior to payment, each major item must be subdivided into sub-items pertinent to the project involved and in agreement with the Contractor's intended basis for requesting monthly payments.
 - c. **Column 3.** Enter the total quantity for each sub-item of each principal division of work listed in the breakdown.
 - d. **Column 4.** Enter the appropriate unit of measure for each sub-item of work opposite the quantities described in column 3, such as "sq. ft.," "cu. yd.," "tons," "lb.," "lumber per M/BM," "brickwork per M," etc., applicable to the particular sub-item. Items shown on "lump sum" or equivalent basis will be paid for only on completion of the whole item and not on a percentage of completion basis.
 - e. **Column 5.** Enter the unit price, in place, of each sub-item of work.
 - f. **Column 6.** Enter the amount of each sub-item obtained by multiplying the quantities in column 3 by the corresponding unit prices in column 5.
 - g. **Column 7.** Enter the amount of principal item only, obtained by adding the amounts of all sub-items of each principal division of work listed in column 6. Continue with the breakdown on form HUD-51000.
 - h. The "Schedule of Amounts for Contract Payments" shall be signed and dated in the space provided at the bottom of each sheet of the form by the individual who prepared the breakdown for the Contractor.
2. The minimum number of copies required for each submission for approval is an original and two copies. When approved, one fully approved copy will be returned to the Contractor.

Master List of Items

Item No.	Division of Work	Item No.	Division of Work	Item No.	Division of Work
1	Bond	20	Rough Carpentry		Site Improvements
2	General Conditions \1	21	Metal Bucks	44	Retaining Walls
3	Demolition & Clearing	22	Caulking	45	Storm Sewers
	Structures	23	Weatherstripping	46	Sanitary Sewers
4	General Excavation	24	Lath & Plastering-Drywall	47	Water Distribution System
5	Footing Excavation	25	Stucco	48	Gas Distribution System
6	Backfill	26	Finish Carpentry	49	Electrical Distribution System
7	Foundation Piles & Caissons	27	Finish Hardware	50	Street & Yard Lighting
8	Concrete Foundations	28	Glass & Glazing	51	Fire & Police Alarm System
9	Concrete Superstructures	29	Metal Doors	52	Fire Protection System
10	Reinforcing Steel	30	Metal Base & Trim	53	Street Work
11	Waterproofing & Dampproofing	31	Toilet Partitions	54	Yard Work
12	Spandrel Waterproofing	32	Floors	55	(Other)
13	Structural Steel	33	Painting & Decorating	56	(Other)
14	Masonry	34	Screens		Equipment
15	Stonework	35	Plumbing	57	Shades & Drapery Rods
16	Miscellaneous & Ornamental Metal	36	Heating	58	Ranges
17	Metal Windows	37	Ventilating System	59	Refrigerators
18	Roofing	38	Electrical	60	Kitchen Cabinets & Work Tables
19	Sheet Metal	39	Elevators	61	Laundry Equipment
		40	Elevator Enclosures—Metal	62	(Other)
		41	Incinerators—Masonry & Parts		Punch List \2
		42	(Other)	63	Lawns & Planting
		43	(Other)	64	

1 General Conditions should be 3% to 5% of contract amount.

2 Punch List should be approximately 1/2 of 1% or \$30 per dwelling unit, whichever is greater.

Periodic Estimate for Partial Payment

**U.S. Department of Housing
and Urban Development**
Office of Public and Indian Housing

OMB Approval No. 2577-0025
(exp. 4/30/2001)

Submit original and one copy to the Public Housing Agency.
Complete instructions are on the back of this form.

Public reporting burden for this collection of information is estimated to average 3.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

This information is collected under the authority of Section 6(c) of the U.S Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

Name of Public Housing Agency	Periodic Estimate Number	Period From (mm/dd/yyyy) To (mm/dd/yyyy)
-------------------------------	--------------------------	---------------------------------------------

Location of Project	Project Number
---------------------	----------------

Name of Contractor	Contract Number
--------------------	-----------------

Item Number (1)	Description of Item (2)	Completed to Date (3)
		\$

Value of Contract Work Completed to Date (Transfer this total to line 5 on back of this sheet)	\$
------------------------------------------------------------------------------------------------	----

Instructions

Headings. Enter all identifying data required. Periodic estimates must be numbered in sequence beginning with the number 1.

Columns 1 and 2. The "Item Number" and "Description of Item" must correspond to the number and descriptive title assigned to each principal division of work in the "Schedule of Amounts for Contract Payments", form HUD-51000.

Column 3. Enter the accumulated value of each principal division of work completed as of the closing date of the periodic estimate. Enter the total in the space provided.

Certifications. The certification of the contractor includes the analysis of amounts used to determine the net balance due. In the first paragraph, enter the name of the Public Housing Agency, the contractor, and the date of the contract. Enter the calculations used in arriving at the "Balance Due This Payment" on lines 1 through 16.

Enter the contractor's name and signature in the certification following line 16.

The latter portion of this certification relating to payment of legal rates of wages, is required by the contract before any payment may be made. However, if the contractor does not choose to certify on behalf of his/her subcontractors to wage payments made by them, he/she may modify the language to cover only himself /herself and attach a list of all subcontractors who employed labor on the site during the period covered by the Periodic Estimate, together with the individual certifications of each.

Certification of the Contractor or Duly Authorized Representative

According to the best of my knowledge and belief, I certify that all items and amounts shown on the other side of this form are correct; that all work has been performed and material supplied in full accordance with the items and conditions of the contract between the (name of owner) _____ and (contractor) _____

dated (mm/dd/yyyy) _____, and duly authorized deviations, substitutions, alterations, and additions; that the following is a true and correct statement of the Contract Account up to and including the last day of the period covered by this estimate, and that no part of the "Balance Due This Payment" has been received.

1. Original Contract Amount \$ _____

Approved Change Orders:

2. Additions (Total from Col. 3, form HUD-51002) \$ _____

3. Deductions (Total from Col. 5, form HUD-51002) \$ _____ (net) \$ _____

4. Current Adjusted Contract Amount (line 1 plus or minus net) \$ _____

Computation of Balance Due this Payment

5. Value of Original Contract work completed to date (from other side of this form) \$ _____

Completed Under Approved Change Orders

6. Additions (from Col. 4, form HUD-51002) \$ _____

7. Deductions (from Col. 5, form HUD-51002) \$ _____ (net) \$ _____

8. Total Value of Work in Place (line 5 plus or minus net line 7) \$ _____

9. **Less:** Retainage, _____ % \$ _____

10. Net amount earned to date (line 8 less line 9) \$ _____

11. **Less:** Previously earned (line 10, last Periodic Estimate) \$ _____

12. Net amount due, work in place (line 10 less line 11) \$ _____

Value of Materials Properly Stored

13. At close of this period (from form HUD-51004) \$ _____

14. **Less:** Allowed last period \$ _____

15. Increase (decrease) from amount allowed last period \$ _____

16. **Balance Due This Payment** \$ _____

I further certify that all just and lawful bills against the undersigned and his/her subcontractors for labor, material, and equipment employed in the performance of this contract have been paid in full in accordance with the terms and conditions of this contract, and that the undersigned and his/her subcontractors have complied with, or that there is an honest dispute with respect to, the labor provisions of this contract.

Name of Contractor	Signature of Authorized Representative	Title	Date (mm/dd/yyyy)

Certificate of Authorized Project Representative and of Contracting Officer

Each of us certifies that he/she has checked and verified this Periodic Estimate No. _____; that to the best of his/her knowledge and belief it is a true statement of the value of work performed and material supplied by the contractor; that all work and material included in this estimate has been inspected by him/her or by his/her authorized assistants; and that such work has been performed or supplied in full accordance with the drawings and specifications, the terms and conditions of the contract, and duly authorized deviations, substitutions, alterations, and additions, all of which have been duly approved.

We, therefore, approve as the "Balance Due this Payment" the amount of \$ _____.

Authorized Project Representative	Date (mm/dd/yyyy)	Contracting Officer	Date (mm/dd/yyyy)

Warning: HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

form **HUD-51003** (3/92)
ref. Handbooks 7417.1 & 7450.1

Summary of Materials Stored

U.S. Department of Housing
and Urban Development
Office of Public and Indian Housing

OMB Approval No. 2577-0157
(exp. 12/31/2011)

Public reporting burden for this collection of information is estimated to average 2.5 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless that collection displays a valid OMB control number.

This information is collected under the authority of Section 6(c) of the U.S Housing Act of 1937 and HUD regulations. HAs are responsible for contract administration to ensure that the work for project development is done in accordance with State laws and HUD requirements. The contractor/subcontractor reports provide details and summaries on payments, change orders, and schedule of materials stored for the project. The information will be used to ensure that the total development costs, identified in the ACC, are kept as low as possible and consistent with HUD construction requirements. Responses to the collection are necessary to obtain a benefit. The information requested does not lend itself to confidentiality.

Instructions: This form is for the Contractor to summarize the value of materials stored at the site (as shown on the schedule, form HUD-51003). Use a separate line for the contractor and each of his/her subcontractors. Prepare an original and one copy, attach form HUD-51003, and send to the Public Housing Agency with the Periodic Estimate for Partial Payment, form HUD-51001. **Payment Value.** No more than 90 percent of the estimated value of the stored materials will be allowed, and only the net amount will be carried to line 13 on the back of the Periodic Estimate for Partial Payment, form HUD-51001. **Signatures.** This form must be signed by those employees of the contractor and of the Public Housing Agency who prepare and check the Schedule of Materials Stored, form HUD-51003.

Name of Public Housing Agency	Supporting Periodic Estimate for Partial Payment Number	Period From (mm/dd/yyyy)	To (mm/dd/yyyy)
Location of Project			Project Number
Name of General Contractor			Contract Number
Name of General Contractor or Subcontractor			Amounts
General Contractor			\$
Subcontractors			\$
Total			\$
Less 10%			\$
Net			\$

Prepared by	Date (mm/dd/yyyy)	Checked by	Date (mm/dd/yyyy)
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I certify that I or my authorized representatives have examined and checked in detail the invoices representing the cost of materials set forth in appended "Schedule of Materials Stored", form HUD-51003, dated (mm/dd/yyyy) _____ submitted by _____ consisting of _____ sheets with an indicated cost of \$ _____, and find that the net unit prices set forth in the schedule are the same or less than the invoices examined, and that such materials were suitably stored at the site of the development as of (date)(mm/dd/yyyy) _____.

Name of Owner	By (Authorized Representative)	Title	Date (mm/dd/yyyy)
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Warning: HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1010, 1012; 31 U.S.C. 3729, 3802)

RESERVED FOR FUTURE USE

General Conditions for Construction Contracts - Public Housing Programs

U.S. Department of Housing and Urban Development

Office of Public and Indian Housing
OMB Approval No. 2577-0157 (exp. 01/31/2014)

Applicability. This form is applicable to any construction/development contract greater than \$100,000.

This form includes those clauses required by OMB's common rule on grantee procurement, implemented at HUD in 24 CFR 85.36, and those requirements set forth in Section 3 of the Housing and Urban Development Act of 1968 and its amendment by the Housing and Community Development Act of 1992, implemented by HUD at 24 CFR Part 135. The form is required for construction contracts awarded by Public Housing Agencies (PHAs).

The form is used by Housing Authorities in solicitations to provide necessary contract clauses. If the form were not used, HAs would be unable to enforce their contracts.

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Responses to the collection of information are required to obtain a benefit or to retain a benefit.

The information requested does not lend itself to confidentiality.

HUD may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB number.

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1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Contract (ACC), to provide financial assistance to the PHA, which includes assistance in financing the work to be performed under this contract. As defined elsewhere in these General Conditions or the contract documents, the determination of HUD may be required to authorize changes in the work or for release of funds to the PHA for payment to the Contractor. Notwithstanding HUD's role, nothing in this contract shall be construed to create any contractual relationship between the Contractor and HUD.
- (g) "Project" means the entire project, whether construction or rehabilitation, the work for which is provided for in whole or in part under this contract.
- (h) "PHA" means the Public Housing Agency organized under applicable state laws which is a party to this contract.
- (j) "Specifications" means the written description of the technical requirements for construction and includes the criteria and tests for determining whether the requirements are met.
- (l) "Work" means materials, workmanship, and manufacture and fabrication of components.
- (a) The Contractor shall furnish all necessary labor, materials, tools, equipment, and transportation necessary for performance of the work. The Contractor shall also furnish all necessary water, heat, light, and power not made available to the Contractor by the PHA pursuant to the clause entitled Availability and Use of Utility Services herein.
- (b) The Contractor shall perform on the site, and with its own organization, work equivalent to at least [] (12 percent unless otherwise indicated) of the total amount of work to be performed under the order. This percentage may be reduced by a supplemental agreement to this order if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the PHA.
- (c) At all times during performance of this contract and until the work is completed and accepted, the Contractor shall directly superintend the work or assign and have on the work site a competent superintendent who is satisfactory to the Contracting Officer and has authority to act for the Contractor.
- (d) The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall hold and save the PHA, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.
- (e) The Contractor shall lay out the work from base lines and bench marks indicated on the drawings and be responsible for all lines, levels, and measurements of all work executed under the contract. The Contractor shall verify the figures before laying out the work and will be held responsible for any error resulting from its failure to do so.
- (f) The Contractor shall confine all operations (including storage of materials) on PHA premises to areas authorized or approved by the Contracting Officer.
- (g) The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. After completing the work and before final inspection, the Contractor shall (1) remove from the premises all scaffolding, equipment, tools, and materials (including rejected materials) that are not the property of the PHA and all rubbish caused by its work; (2) leave the work area in a clean, neat, and orderly condition satisfactory to the Contracting Officer; (3) perform all specified tests; and, (4) deliver the installation in complete and operating condition.
- (h) The Contractor's responsibility will terminate when all work has been completed, the final inspection made, and the work accepted by the Contracting Officer. The Contractor will then be released from further obligation except as required by the warranties specified elsewhere in the contract.

3. Architect's Duties, Responsibilities, and Authority

- (a) The Architect for this contract, and any successor, shall be designated in writing by the Contracting Officer.

- (b) The Architect shall serve as the Contracting Officer's technical representative with respect to architectural, engineering, and design matters related to the work performed under the contract. The Architect may provide direction on contract performance. Such direction shall be within the scope of the contract and may not be of a nature which: (1) institutes additional work outside the scope of the contract; (2) constitutes a change as defined in the Changes clause herein; (3) causes an increase or decrease in the cost of the contract; (4) alters the Construction Progress Schedule; or (5) changes any of the other express terms or conditions of the contract.
- (c) The Architect's duties and responsibilities may include but shall not be limited to:
- (1) Making periodic visits to the work site, and on the basis of his/her on-site inspections, issuing written reports to the PHA which shall include all observed deficiencies. The Architect shall file a copy of the report with the Contractor's designated representative at the site;
 - (2) Making modifications in drawings and technical specifications and assisting the Contracting Officer in the preparation of change orders and other contract modifications for issuance by the Contracting Officer;
 - (3) Reviewing and making recommendations with respect to - (i) the Contractor's construction progress schedules; (ii) the Contractor's shop and detailed drawings; (iii) the machinery, mechanical and other equipment and materials or other articles proposed for use by the Contractor; and, (iv) the Contractor's price breakdown and progress payment estimates; and,
 - (4) Assisting in inspections, signing Certificates of Completion, and making recommendations with respect to acceptance of work completed under the contract.

4. Other Contracts

The PHA may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with PHA employees and shall carefully adapt scheduling and performing the work under this contract to accommodate the additional work, heeding any direction that may be provided by the Contracting Officer. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by PHA employees

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

- (a) Within ten calendar days of contract execution, and prior to the commencement of work, the Contractor shall attend a preconstruction conference with representatives of the PHA, its Architect, and other interested parties convened by the PHA. The conference will serve to acquaint the participants with the general plan of the construction operation and all other requirements of the contract. The PHA will provide the Contractor with the date, time, and place of the conference.
- (b) The contractor shall begin work upon receipt of a written Notice to Proceed from the Contracting Officer or designee. The Contractor shall not begin work prior to receiving such notice.

6. Construction Progress Schedule

- (a) The Contractor shall, within five days after the work commences on the contract or another period of time determined by the Contracting Officer, prepare and submit to the Contracting Officer for approval three copies of a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the several salient features of the work (including acquiring labor, materials, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. If the Contractor fails to submit a schedule within the time prescribed, the Contracting Officer may withhold approval of progress payments or take other remedies under the contract until the Contractor submits the required schedule.
- (b) The Contractor shall enter the actual progress on the chart as required by the Contracting Officer, and immediately deliver three copies of the annotated schedule to the Contracting Officer. If the Contracting Officer determines, upon the basis of inspection conducted pursuant to the clause entitled Inspection and Acceptance of Construction, herein that the Contractor is not meeting the approved schedule, the Contractor shall take steps necessary to improve its progress, including those that may be required by the Contracting Officer, without additional cost to the PHA. In this circumstance, the Contracting Officer may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Contracting Officer deems necessary to demonstrate how the approved rate of progress will be regained.
- (c) Failure of the Contractor to comply with the requirements of the Contracting Officer under this clause shall be grounds for a determination by the Contracting Officer that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part of it, in accordance with the Default clause of this contract.

7. Site Investigation and Conditions Affecting the Work

- (a) The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its cost, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the conformation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

reasonably ascertainable from an inspection of the site, including all exploratory work done by the PHA, as well as from the drawings and specifications made a part of this contract. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the PHA.

- (b) The PHA assumes no responsibility for any conclusions or interpretations made by the Contractor based on the information made available by the PHA. Nor does the PHA assume responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.

8. Differing Site Conditions

- (a) The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Contracting Officer of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site(s), of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
- (b) The Contracting Officer shall investigate the site conditions promptly after receiving the notice. Work shall not proceed at the affected site, except at the Contractor's risk, until the Contracting Officer has provided written instructions to the Contractor. If the conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions, the Contractor shall file a claim in writing to the PHA within ten days after receipt of such instructions and, in any event, before proceeding with the work. An equitable adjustment in the contract price, the delivery schedule, or both shall be made under this clause and the contract modified in writing accordingly.
- (c) No request by the Contractor for an equitable adjustment to the contract under this clause shall be allowed, unless the Contractor has given the written notice required; provided, that the time prescribed in (a) above for giving written notice may be extended by the Contracting Officer.
- (d) No request by the Contractor for an equitable adjustment to the contract for differing site conditions shall be allowed if made after final payment under this contract.

9. Specifications and Drawings for Construction

- (a) The Contractor shall keep on the work site a copy of the drawings and specifications and shall at all times give the Contracting Officer access thereto. 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, the specifications shall govern. In case of discrepancy in the figures, in the drawings, or in the specifications, the matter shall be required in the planning and production of the work. Such

promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The Contracting Officer shall furnish from time to time such detailed drawings and other information as considered necessary, unless otherwise provided.

- (b) Wherever in the specifications or upon the drawings the words 'directed', 'required', 'ordered', 'designated', 'prescribed', or words of like import are used, it shall be understood that the 'direction', 'requirement', 'order', 'designation', or 'prescription', of the Contracting Officer is intended and similarly the words 'approved', 'acceptable', 'satisfactory', or words of like import shall mean 'approved by', or 'acceptable to', or 'satisfactory to' the Contracting Officer, unless otherwise expressly stated.
- (c) Where 'as shown', 'as indicated', 'as detailed', or words of similar import are used, it shall be understood that the reference is made to the drawings accompanying this contract unless stated otherwise. The word 'provided' as used herein shall be understood to mean 'provide complete in place' that is 'furnished and installed'.
- (d) 'Shop drawings' means drawings, submitted to the PHA by the Contractor, subcontractor, or any lower tier subcontractor, showing in detail (1) the proposed fabrication and assembly of structural elements and (2) the installation (i.e., form, fit, and attachment details) of materials of equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract. The PHA may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this contract.
- (e) If this contract requires shop drawings, the Contractor shall coordinate all such drawings, and review them for accuracy, completeness, and compliance with other contract requirements and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the Contracting Officer without evidence of the Contractor's approval may be returned for resubmission. The Contracting Officer will indicate an approval or disapproval of the shop drawings and if not approved as submitted shall indicate the PHA's reasons therefore. Any work done before such approval shall be at the Contractor's risk. Approval by the Contracting Officer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this contract, except with respect to variations described and approved in accordance with (f) below.
- (f) If shop drawings show variations from the contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation and the Contracting Officer concurs, the Contracting Officer shall issue an appropriate modification to the contract, except that, if the variation is minor or does not involve a change in price or in time of performance, a modification need not be issued.
- (g) It shall be the responsibility of the Contractor to make timely requests of the PHA for such large scale and full size drawings, color schemes, and other additional information, not already in his possession, which shall be requests may be submitted as the need arises, but each

such request shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay.

- (h) The Contractor shall submit to the Contracting Officer for approval four copies (unless otherwise indicated) of all shop drawings as called for under the various headings of these specifications. Three sets (unless otherwise indicated) of all shop drawings, will be retained by the PHA and one set will be returned to the Contractor. As required by the Contracting Officer, the Contractor, upon completing the work under this contract, shall furnish a complete set of all shop drawings as finally approved. These drawings shall show all changes and revisions made up to the time the work is completed and accepted.
- (i) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all shop drawings prepared by subcontractors are submitted to the Contracting Officer.

10. As-Built Drawings

- (a) 'As-built drawings,' as used in this clause, means drawings submitted by the Contractor or subcontractor at any tier to show the construction of a particular structure or work as actually completed under the contract. 'As-built drawings' shall be synonymous with 'Record drawings.'
- (b) As required by the Contracting Officer, the Contractor shall provide the Contracting Officer accurate information to be used in the preparation of permanent as-built drawings. For this purpose, the Contractor shall record on one set of contract drawings all changes from the installations originally indicated, and record final locations of underground lines by depth from finish grade and by accurate horizontal offset distances to permanent surface improvements such as buildings, curbs, or edges of walks.
- (c) This clause shall be included in all subcontracts at any tier. It shall be the responsibility of the Contractor to ensure that all as-built drawings prepared by subcontractors are submitted to the Contracting Officer.

11. Material and Workmanship

- (a) All equipment, material, and articles furnished under this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. References in the contract to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of, and as approved by the Contracting Officer, is equal to that named in the specifications, unless otherwise specifically provided in this contract.
- (b) Approval of equipment and materials.
- (1) The Contractor shall obtain the Contracting Officer's approval of the machinery and mechanical and other equipment to be incorporated into the work. When requesting approval, the Contractor shall furnish to the Contracting Officer the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the machinery and mechanical and other equipment.
- waivers. Before installing the work, the Contractor shall

When required by this contract or by the Contracting Officer, the Contractor shall also obtain the Contracting Officer's approval of the material or articles which the Contractor contemplates incorporating into the work. When requesting approval, the Contractor shall provide full information concerning the material or articles. Machinery, equipment, material, and articles that do not have the required approval shall be installed or used at the risk of subsequent rejection.

- (2) When required by the specifications or the Contracting Officer, the Contractor shall submit appropriately marked samples (and certificates related to them) for approval at the Contractor's expense, with all shipping charges prepaid. The Contractor shall label, or otherwise properly mark on the container, the material or product represented, its place of origin, the name of the producer, the Contractor's name, and the identification of the construction project for which the material or product is intended to be used.
- (3) Certificates shall be submitted in triplicate, describing each sample submitted for approval and certifying that the material, equipment or accessory complies with contract requirements. The certificates shall include the name and brand of the product, name of manufacturer, and the location where produced.
- (4) Approval of a sample shall not constitute a waiver of the PHA right to demand full compliance with contract requirements. Materials, equipment and accessories may be rejected for cause even though samples have been approved.
- (5) Wherever materials are required to comply with recognized standards or specifications, such specifications shall be accepted as establishing the technical qualities and testing methods, but shall not govern the number of tests required to be made nor modify other contract requirements. The Contracting Officer may require laboratory test reports on items submitted for approval or may approve materials on the basis of data submitted in certificates with samples. Check tests will be made on materials delivered for use only as frequently as the Contracting Officer determines necessary to insure compliance of materials with the specifications. The Contractor will assume all costs of retesting materials which fail to meet contract requirements and/or testing materials offered in substitution for those found deficient.
- (6) After approval, samples will be kept in the Project office until completion of work. They may be built into the work after a substantial quantity of the materials they represent has been built in and accepted.
- (c) Requirements concerning lead-based paint. The Contractor shall comply with the requirements concerning lead-based paint contained in the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. 4821-4846) as implemented by 24 CFR Part 35.

12. Permits and Codes

- (a) The Contractor shall give all notices and comply with all applicable laws, ordinances, codes, rules and regulations. Notwithstanding the requirement of the Contractor to comply with the drawings and specifications in the contract, all work installed shall comply with all applicable codes and regulations as amended by any

examine the drawings and the specifications for

compliance with applicable codes and regulations bearing on the work and shall immediately report any discrepancy it may discover to the Contracting Officer. Where the requirements of the drawings and specifications fail to comply with the applicable code or regulation, the Contracting Officer shall modify the contract by change order pursuant to the clause entitled Changes herein to conform to the code or regulation.

- (b) The Contractor shall secure and pay for all permits, fees, and licenses necessary for the proper execution and completion of the work. Where the PHA can arrange for the issuance of all or part of these permits, fees and licenses, without cost to the Contractor, the contract amount shall be reduced accordingly.

13. Health, Safety, and Accident Prevention

- (a) In performing this contract, the Contractor shall:
 - (1) Ensure that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his/her health and/or safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation;
 - (2) Protect the lives, health, and safety of other persons;
 - (3) Prevent damage to property, materials, supplies, and equipment; and,
 - (4) Avoid work interruptions.
- (b) For these purposes, the Contractor shall:
 - (1) Comply with regulations and standards issued by the Secretary of Labor at 29 CFR Part 1926. Failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96), 40 U.S.C. 3701 et seq.; and
 - (2) Include the terms of this clause in every subcontract so that such terms will be binding on each subcontractor.
- (c) The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment, and shall report this data in the manner prescribed by 29 CFR Part 1904.
- (d) The Contracting Officer shall notify the Contractor of any noncompliance with these requirements and of the corrective action required. This notice, when delivered to the Contractor or the Contractor's representative at the site of the work, shall be deemed sufficient notice of the noncompliance and corrective action required. After receiving the notice, the Contractor shall immediately take corrective action. If the Contractor fails or refuses to take corrective action promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall not base any claim or request for equitable adjustment for additional time or money on any stop order issued under these circumstances.
- (e) The Contractor shall be responsible for its subcontractors' compliance with the provisions of this clause. The Contractor shall take such action with respect to any subcontract as the PHA, the Secretary of Housing and Urban Development, or the Secretary of Labor shall direct as a means of enforcing such provisions.

- (f) New work which connects to existing work

14. Temporary Heating

The Contractor shall provide and pay for temporary heating, covering, and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work, and to facilitate the completion of the work. Any permanent heating equipment used shall be turned over to the PHA in the condition and at the time required by the specifications.

15. Availability and Use of Utility Services

- (a) The PHA shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed shall be charged to or paid for by the Contractor at prevailing rates charged to the PHA or, where the utility is produced by the PHA, at reasonable rates determined by the Contracting Officer. The Contractor shall carefully conserve any utilities furnished without charge.
- (b) The Contractor, at its expense and in a manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of each utility used for the purpose of determining charges. Before final acceptance of the work by the PHA, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

16. Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements

- (a) The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work site, which are not to be removed under this contract, and which do not unreasonably interfere with the work required under this contract.
- (b) The Contractor shall only remove trees when specifically authorized to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during performance of this contract, or by the careless operation of equipment, or by workmen, the Contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the Contracting Officer.
- (c) The Contractor shall protect from damage all existing improvements and utilities (1) at or near the work site and (2) on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Prior to disturbing the ground at the construction site, the Contractor shall ensure that all underground utility lines are clearly marked.
- (d) The Contractor shall shore up, brace, underpin, secure, and protect as necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected by the excavations or other operations connected with the construction of the project.
- (e) Any equipment temporarily removed as a result of work under this contract shall be protected, cleaned, and replaced in the same condition as at the time of award of this contract.

shall correspond in all respects with that to which it

connects and/or be similar to existing work unless otherwise required by the specifications.

- (g) No structural members shall be altered or in any way weakened without the written authorization of the Contracting Officer, unless such work is clearly specified in the plans or specifications.
- (h) If the removal of the existing work exposes discolored or unfinished surfaces, or work out of alignment, such surfaces shall be refinished, or the material replaced as necessary to make the continuous work uniform and harmonious. This, however, shall not be construed to require the refinishing or reconstruction of dissimilar finishes previously exposed, or finished surfaces in good condition, but in different planes or on different levels when brought together by the removal of intervening work, unless such refinishing or reconstruction is specified in the plans or specifications.
- (i) The Contractor shall give all required notices to any adjoining or adjacent property owner or other party before the commencement of any work.
- (j) The Contractor shall indemnify and save harmless the PHA from any damages on account of settlement or the loss of lateral support of adjoining property, any damages from changes in topography affecting drainage, and from all loss or expense and all damages for which the PHA may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.
- (k) The Contractor shall repair any damage to vegetation, structures, equipment, utilities, or improvements, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

17. Temporary Buildings and Transportation of Materials

- (a) Temporary buildings (e.g., storage sheds, shops, offices, sanitary facilities) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the PHA. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.
- (b) The Contractor shall, as directed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any federal, state, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

18. Clean Air and Water

The contractor shall comply with the Clean Air Act, as

- (f) The PHA may conduct routine inspections of the construction site on a daily basis.

amended, 42 USC 7401 et seq., the Federal Water Pollution Control Water Act, as amended, 33 U.S.C. 1251 et seq., and standards issued pursuant thereto in the facilities in which this contract is to be performed.

19. Energy Efficiency

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub.L. 94-163) for the State in which the work under the contract is performed.

20. Inspection and Acceptance of Construction

- (a) Definitions. As used in this clause -
 - (1) "Acceptance" means the act of an authorized representative of the PHA by which the PHA approves and assumes ownership of the work performed under this contract. Acceptance may be partial or complete.
 - (2) "Inspection" means examining and testing the work performed under the contract (including, when appropriate, raw materials, equipment, components, and intermediate assemblies) to determine whether it conforms to contract requirements.
 - (3) "Testing" means that element of inspection that determines the properties or elements, including functional operation of materials, equipment, or their components, by the application of established scientific principles and procedures.
- (b) The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. All work is subject to PHA inspection and test at all places and at all reasonable times before acceptance to ensure strict compliance with the terms of the contract.
- (c) PHA inspections and tests are for the sole benefit of the PHA and do not: (1) relieve the Contractor of responsibility for providing adequate quality control measures; (2) relieve the Contractor of responsibility for loss or damage of the material before acceptance; (3) constitute or imply acceptance; or, (4) affect the continuing rights of the PHA after acceptance of the completed work under paragraph (j) below.
- (d) The presence or absence of the PHA inspector does not relieve the Contractor from any contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the Contracting Officer's written authorization. All instructions and approvals with respect to the work shall be given to the Contractor by the Contracting Officer.
- (e) The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the Contracting Officer. The PHA may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. The PHA shall perform all inspections and tests in a manner that will not unnecessarily delay the work. Special, full size, and performance tests shall be performed as described in the contract.
- (g) The Contractor shall, without charge, replace or correct work found by the PHA not to conform to

contract requirements, unless the PHA decides that it is in its interest to accept the work with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

- (h) If the Contractor does not promptly replace or correct rejected work, the PHA may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.
- (i) If any work requiring inspection is covered up without approval of the PHA, it must, if requested by the Contracting Officer, be uncovered at the expense of the Contractor. If at any time before final acceptance of the entire work, the PHA considers it necessary or advisable, to examine work already completed by removing or tearing it out, the Contractor, shall on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray all the expenses of the examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the Contracting Officer shall make an equitable adjustment to cover the cost of the examination and reconstruction, including, if completion of the work was thereby delayed, an extension of time.
- (j) The Contractor shall notify the Contracting Officer, in writing, as to the date when in its opinion all or a designated portion of the work will be substantially completed and ready for inspection. If the Architect determines that the state of preparedness is as represented, the PHA will promptly arrange for the inspection. Unless otherwise specified in the contract, the PHA shall accept, as soon as practicable after completion and inspection, all work required by the contract or that portion of the work the Contracting Officer determines and designates can be accepted separately. Acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the PHA's right under any warranty or guarantee.

21. Use and Possession Prior to Completion

- (a) The PHA shall have the right to take possession of or use any completed or partially completed part of the work. Before taking possession of or using any work, the Contracting Officer shall furnish the Contractor a list of items of work remaining to be performed or corrected on those portions of the work that the PHA intends to take possession of or use. However, failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The PHA's possession or use shall not be deemed an acceptance of any work under the contract.
- (b) While the PHA has such possession or use, the Contractor shall be relieved of the responsibility for (1) the loss of or damage to the work resulting from the PHA's possession or use, notwithstanding the terms of the clause entitled Permits and Codes herein; (2) all maintenance costs on the areas occupied; and, (3) furnishing heat, light, power, and water used in the areas occupied without proper remuneration therefore. If prior possession or use by the PHA delays the progress of the
- (h) Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the

work or causes additional expense to the Contractor, an equitable adjustment shall be made in the contract price or the time of completion, and the contract shall be modified in writing accordingly.

22. Warranty of Title

The Contractor warrants good title to all materials, supplies, and equipment incorporated in the work and agrees to deliver the premises together with all improvements thereon free from any claims, liens or charges, and agrees further that neither it nor any other person, firm or corporation shall have any right to a lien upon the premises or anything appurtenant thereto.

23. Warranty of Construction

- (a) In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph (j) of this clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or workmanship performed by the Contractor or any subcontractor or supplier at any tier. This warranty shall continue for a period of _____ (one year unless otherwise indicated) from the date of final acceptance of the work. If the PHA takes possession of any part of the work before final acceptance, this warranty shall continue for a period of (one year unless otherwise indicated) from the date that the PHA takes possession.
- (b) The Contractor shall remedy, at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to PHA-owned or controlled real or personal property when the damage is the result of—
 - (1) The Contractor's failure to conform to contract requirements; or
 - (2) Any defects of equipment, material, workmanship or design furnished by the Contractor.
- (c) The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for (one year unless otherwise indicated) from the date of repair or replacement.
- (d) The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect or damage.
- (e) If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after receipt of notice, the PHA shall have the right to replace, repair or otherwise remedy the failure, defect, or damage at the Contractor's expense.
- (f) With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:
 - (1) Obtain all warranties that would be given in normal commercial practice;
 - (2) Require all warranties to be executed in writing, for the benefit of the PHA; and,
 - (3) Enforce all warranties for the benefit of the PHA.
- (g) In the event the Contractor's warranty under paragraph (a) of this clause has expired, the PHA may bring suit at its own expense to enforce a subcontractor's, manufacturer's or supplier's warranty.

Contractor shall not be liable for the repair of any defect of material or design furnished by the PHA nor for the

repair of any damage that results from any defect in PHA furnished material or design.

- (i) Notwithstanding any provisions herein to the contrary, the establishment of the time periods in paragraphs (a) and (c) above relate only to the specific obligation of the Contractor to correct the work, and have no relationship to the time within which its obligation to comply with the contract may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to its obligation other than specifically to correct the work.
- (j) This warranty shall not limit the PHA's rights under the Inspection and Acceptance of Construction clause of this contract with respect to latent defects, gross mistakes or fraud.

24. Prohibition Against Liens

The Contractor is prohibited from placing a lien on the PHA's property. This prohibition shall apply to all subcontractors at any tier and all materials suppliers.

Administrative Requirements

25. Contract Period

The Contractor shall complete all work required under this contract within 90 calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

26. Order of Provisions

In the event of a conflict between these General Conditions and the Specifications, the General Conditions shall prevail. In the event of a conflict between the contract and any applicable state or local law or regulation, the state or local law or regulation shall prevail; provided that such state or local law or regulation does not conflict with, or is less restrictive than applicable federal law, regulation, or Executive Order. In the event of such a conflict, applicable federal law, regulation, and Executive Order shall prevail.

27. Payments

- (a) The PHA shall pay the Contractor the price as provided in this contract.
- (b) The PHA shall make progress payments approximately every 30 days as the work proceeds, on estimates of work accomplished which meets the standards of quality established under the contract, as approved by the Contracting Officer. The PHA may, subject to written determination and approval of the Contracting Officer, make more frequent payments to contractors which are qualified small businesses.
- (c) Before the first progress payment under this contract, the Contractor shall furnish, in such detail as requested by the Contracting Officer, a breakdown of the total contract price showing the amount included therein for each principal category of the work, which shall substantiate the payment amount requested in order to provide a basis for determining progress payments. The breakdown shall be approved by the Contracting Officer and must be Material delivered to the Contractor at locations other than the site may also be taken into consideration if the Contractor furnishes satisfactory evidence that (1) it has

acceptable to HUD. If the contract covers more than one project, the Contractor shall furnish a separate breakdown for each. The values and quantities employed in making up this breakdown are for determining the amount of progress payments and shall not be construed as a basis for additions to or deductions from the contract price. The Contractor shall prorate its overhead and profit over the construction period of the contract.

- (d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved breakdown of the contract price. Such estimates shall be submitted not later than _____ days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.
- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that:
 - (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
 - (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
 - (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

Name: _____

Title: _____

Date: _____

- (f) Except as otherwise provided in State law, the PHA shall retain ten (10) percent of the amount of progress payments until completion and acceptance of all work under the contract; except, that if upon completion of 50 percent of the work, the Contracting Officer, after consulting with the Architect, determines that the Contractor's performance and progress are satisfactory, the PHA may make the remaining payments in full for the work subsequently completed. If the Contracting Officer subsequently determines that the Contractor's performance and progress are unsatisfactory, the PHA shall reinstate the ten (10) percent (or other percentage as provided in State law) retainage until such time as the Contracting Officer determines that performance and progress are satisfactory.
- (g) The Contracting Officer may authorize material delivered on the site and preparatory work done to be taken into consideration when computing progress payments.

acquired title to such material; (2) the material is properly stored in a bonded warehouse, storage yard, or similar suitable place as may be approved by the Contracting

Officer; (3) the material is insured to cover its full value; and (4) the material will be used to perform this contract. Before any progress payment which includes delivered material is made, the Contractor shall furnish such documentation as the Contracting Officer may require to assure the protection of the PHA's interest in such materials. The Contractor shall remain responsible for such stored material notwithstanding the transfer of title to the PHA.

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in nowise impair the obligations of any surety or sureties under any bonds furnished under this contract.

28. Contract Modifications

- (a) Only the Contracting Officer has authority to modify any term or condition of this contract. Any contract modification shall be authorized in writing.
- (b) The Contracting Officer may modify the contract unilaterally (1) pursuant to a specific authorization stated in a contract clause (e.g., Changes); or (2) for administrative matters which do not change the rights or responsibilities of the parties (e.g., change in the PHA address). All other contract modifications shall be in the form of supplemental agreements signed by the
 - (1) Direct Costs. Materials (list individual items, the quantity and unit cost of each, and the aggregate cost); Transportation and delivery costs associated with materials; Labor breakdowns by hours or unit

Contractor and the Contracting Officer.

- (c) When a proposed modification requires the approval of HUD prior to its issuance (e.g., a change order that exceeds the PHA's approved threshold), such modification shall not be effective until the required approval is received by the PHA.

29. Changes

- (a) The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make changes in the work within the general scope of the contract including changes:
 - (1) In the specifications (including drawings and designs);
 - (2) In the method or manner of performance of the work;
 - (3) PHA-furnished facilities, equipment, materials, services, or site; or,
 - (4) Directing the acceleration in the performance of the work.
- (b) Any other written order or oral order (which, as used in this paragraph (b), includes direction, instruction, interpretation, or determination) from the Contracting Officer that causes a change shall be treated as a change order under this clause; provided, that the Contractor gives the Contracting Officer written notice stating (1) the date, circumstances and source of the order and (2) that the Contractor regards the order as a change order.
- (c) Except as provided in this clause, no order, statement or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment.
- (d) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for the performance of any part of the work under this contract, whether or not changed by any such order, the Contracting Officer shall make an equitable adjustment and modify the contract in writing. However, except for a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:
 - costs (identified with specific work to be performed);
 - Construction equipment exclusively necessary for the change;
 - Costs of preparation and/ or revision to shop drawings resulting from the change;
 - Worker's

Compensation and Public Liability Insurance;
Employment taxes under FICA and FUTA; and, Bond
Costs when size of change warrants revision.

- (2) Indirect Costs. Indirect costs may include overhead, general and administrative expenses, and fringe benefits not normally treated as direct costs.
- (3) Profit. The amount of profit shall be negotiated and may vary according to the nature, extent, and complexity of the work required by the change.

The allowability of the direct and indirect costs shall be determined in accordance with the Contract Cost Principles and Procedures for Commercial Firms in Part 31 of the Federal Acquisition Regulation (48 CFR 1-31), as implemented by HUD Handbook 2210.18, in effect on the date of this contract. The Contractor shall not be allowed a profit on the profit received by any subcontractor. Equitable adjustments for deleted work shall include a credit for profit and may include a credit for indirect costs. On proposals covering both increases and decreases in the amount of the contract, the application of indirect costs and profit shall be on the net-change in direct costs for the Contractor or subcontractor performing the work.

- (g) The Contractor shall include in the proposal its request for time extension (if any), and shall include sufficient information and dates to demonstrate whether and to what extent the change will delay the completion of the contract in its entirety.
- (h) The Contracting Officer shall act on proposals within 30 days after their receipt, or notify the Contractor of the date when such action will be taken.
- (i) Failure to reach an agreement on any proposal shall be a dispute under the clause entitled Disputes herein. Nothing in this clause, however, shall excuse the Contractor from proceeding with the contract as changed.
- (j) Except in an emergency endangering life or property, no change shall be made by the Contractor without a prior order from the Contracting Officer.

30. Suspension of Work

- (a) The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work of this contract for the period of time that the Contracting Officer determines appropriate for the convenience of the PHA.
- (b) If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Contracting Officer in the administration of this contract, or (2) by the Contracting Officer's failure to act within the time specified (or within a reasonable time if not specified) in this contract an adjustment shall be made for any increase in the cost of performance of the contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have

been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

- (c) A claim under this clause shall not be allowed (1) for any proceed with the work (or separable part of the work) that has been delayed. In this event, the PHA may take over the work and complete it, by contract or otherwise, and

costs incurred more than 20 days before the Contractor shall have notified the Contracting Officer in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order); and, (2) unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the contract.

31. Disputes

- (a) "Claim," as used in this clause, means a written demand or written assertion by one of the contracting parties seeking, as a matter of right, the payment of money in a sum certain, the adjustment or interpretation of contract terms, or other relief arising under or relating to the contract. A claim arising under the contract, unlike a claim relating to the contract, is a claim that can be resolved under a contract clause that provides for the relief sought by the claimant. A voucher, invoice, or other routine request for payment that is not in dispute when submitted is not a claim. The submission may be converted to a claim by complying with the requirements of this clause, if it is disputed either as to liability or amount or is not acted upon in a reasonable time.
- (b) Except for disputes arising under the clauses entitled Labor Standards - Davis Bacon and Related Acts, herein, all disputes arising under or relating to this contract, including any claims for damages for the alleged breach thereof which are not disposed of by agreement, shall be resolved under this clause.
- (c) All claims by the Contractor shall be made in writing and submitted to the Contracting Officer for a written decision. A claim by the PHA against the Contractor shall be subject to a written decision by the Contracting Officer.
- (d) The Contracting Officer shall, within 60 (unless otherwise indicated) days after receipt of the request, decide the claim or notify the Contractor of the date by which the decision will be made.
- (e) The Contracting Officer's decision shall be final unless the Contractor (1) appeals in writing to a higher level in the PHA in accordance with the PHA's policy and procedures, (2) refers the appeal to an independent mediator or arbitrator, or (3) files suit in a court of competent jurisdiction. Such appeal must be made within (30 unless otherwise indicated) days after receipt of the Contracting Officer's decision.
- (f) The Contractor shall proceed diligently with performance of this contract, pending final resolution of any request for relief, claim, appeal, or action arising under or relating to the contract, and comply with any decision of the Contracting Officer.

32. Default

- (a) If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with the diligence that will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within this time, the Contracting Officer may, by written notice to the Contractor, terminate the right to

may take possession of and use any materials, equipment, and plant on the work site necessary for completing the work. The Contractor and its sureties shall

be liable for any damage to the PHA resulting from the Contractor's refusal or failure to complete the work within the specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the PHA in completing the work.

- (b) The Contractor's right to proceed shall not be terminated or the Contractor charged with damages under this clause if—
- (1) The delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include (i) acts of God, or of the public enemy, (ii) acts of the PHA or other governmental entity in either its sovereign or contractual capacity, (iii) acts of another contractor in the performance of a contract with the PHA, (iv) fires, (v) floods, (vi) epidemics, (vii) quarantine restrictions, (viii) strikes, (ix) freight embargoes, (x) unusually severe weather, or (xi) delays of subcontractors or suppliers at any tier arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the subcontractors or suppliers; and
 - (2) The Contractor, within days (10 days unless otherwise indicated) from the beginning of such delay (unless extended by the Contracting Officer) notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay. If, in the judgment of the Contracting Officer, the findings of fact warrant such action, time for completing the work shall be extended by written modification to the contract. The findings of the Contracting Officer shall be reduced to a written decision which shall be subject to the provisions of the Disputes clause of this contract.
- (c) If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been for convenience of the PHA.

33. Liquidated Damages

- (a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of \$ _____ [Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

completion of the work together with any increased costs occasioned the PHA in completing the work.

- (c) If the PHA does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

34. Termination for Convenience

- (a) The Contracting Officer may terminate this contract in whole, or in part, whenever the Contracting Officer determines that such termination is in the best interest of the PHA. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which the performance of the work under the contract is terminated, and the date upon which such termination becomes effective.
- (b) If the performance of the work is terminated, either in whole or in part, the PHA shall be liable to the Contractor for reasonable and proper costs resulting from such termination upon the receipt by the PHA of a properly presented claim setting out in detail: (1) the total cost of the work performed to date of termination less the total amount of contract payments made to the Contractor; (2) the cost (including reasonable profit) of settling and paying claims under subcontracts and material orders for work performed and materials and supplies delivered to the site, payment for which has not been made by the PHA to the Contractor or by the Contractor to the subcontractor or supplier; (3) the cost of preserving and protecting the work already performed until the PHA or assignee takes possession thereof or assumes responsibility therefore; (4) the actual or estimated cost of legal and accounting services reasonably necessary to prepare and present the termination claim to the PHA; and (5) an amount constituting a reasonable profit on the value of the work performed by the Contractor.
- (c) The Contracting Officer will act on the Contractor's claim within days (60 days unless otherwise indicated) of receipt of the Contractor's claim.
- (d) Any disputes with regard to this clause are expressly made subject to the provisions of the Disputes clause of this contract.

35. Assignment of Contract

The Contractor shall not assign or transfer any interest in this contract; except that claims for monies due or to become due from the PHA under the contract may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer. If the Contractor is a partnership, this contract shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.

36. Insurance

- (a) Before commencing work, the Contractor and each subcontractor shall furnish the PHA with certificates of insurance showing the following insurance is in force and will insure all operations under the Contract:
- (1) Workers' Compensation, in accordance with state or Territorial Workers' Compensation laws.
 - (2) Commercial General Liability with a combined single limit for bodily injury and property damage of not less than \$ _____ [Contracting Officer insert amount]

per occurrence to protect the Contractor and each subcontractor against claims for bodily injury or death and damage to the property of others. This shall cover the use of all equipment, hoists, and vehicles on the site(s) not covered by Automobile Liability under (3) below. If the Contractor has a "claims-made" policy, then the following additional requirements apply: the policy must provide a "retroactive date" which must be on or before the execution date of the Contract; and the extended reporting period may not be less than five years following the completion date of the Contract.

- (3) Automobile Liability on owned and non-owned motor vehicles used on the site(s) or in connection therewith for a combined single limit for bodily injury and property damage of not less than \$_____ [Contracting Officer insert amount] per occurrence.
- (b) Before commencing work, the Contractor shall furnish the PHA with a certificate of insurance evidencing that Builder's Risk (fire and extended coverage) Insurance on all work in place and/or materials stored at the building site(s), including foundations and building equipment, is in force. The Builder's Risk Insurance shall be for the benefit of the Contractor and the PHA as their interests may appear and each shall be named in the policy or policies as an insured. The Contractor in installing equipment supplied by the PHA shall carry insurance on such equipment from the time the Contractor takes possession thereof until the Contract work is accepted by the PHA. The Builder's Risk Insurance need not be carried on excavations, piers, footings, or foundations until such time as work on the superstructure is started. It need not be carried on landscape work. Policies shall furnish coverage at all times for the full cash value of all completed construction, as well as materials in place and/or stored at the site(s), whether or not partial payment has been made by the PHA. The Contractor may terminate this insurance on buildings as of the date taken over for occupancy by the PHA. The Contractor is not required to carry Builder's Risk Insurance for modernization work which does not involve structural alterations or additions and where the PHA's existing fire and extended coverage policy can be endorsed to include such work.
- (c) All insurance shall be carried with companies which are financially responsible and admitted to do business in the State in which the project is located. If any such insurance is due to expire during the construction period, the Contractor (including subcontractors, as applicable) shall not permit the coverage to lapse and shall furnish evidence of coverage to the Contracting Officer. All certificates of insurance, as evidence of coverage, shall provide that no coverage may be canceled or non-renewed by the insurance company until at least 30 days prior written notice has been given to the Contracting Officer.

37. Subcontracts

- (a) Definitions. As used in this contract -
- (1) "Subcontract" means any contract, purchase order, or other purchase agreement, including modifications and change orders to the foregoing, entered into by a subcontractor to furnish supplies, materials, equipment, and services for the performance of the prime contract or a subcontract.

- (2) "Subcontractor" means any supplier, vendor, or firm that furnishes supplies, materials, equipment, or services to or for the Contractor or another subcontractor.
- (b) The Contractor shall not enter into any subcontract with any subcontractor who has been temporarily denied participation in a HUD program or who has been suspended or debarred from participating in contracting programs by any agency of the United States Government or of the state in which the work under this contract is to be performed.
- (c) The Contractor shall be as fully responsible for the acts or omissions of its subcontractors, and of persons either directly or indirectly employed by them as for the acts or omissions of persons directly employed by the Contractor.
- (d) The Contractor shall insert appropriate clauses in all subcontracts to bind subcontractors to the terms and conditions of this contract insofar as they are applicable to the work of subcontractors.
- (e) Nothing contained in this contract shall create any contractual relationship between any subcontractor and the PHA or between the subcontractor and HUD.

38. Subcontracting with Small and Minority Firms, Women's Business Enterprise, and Labor Surplus Area Firms

The Contractor shall take the following steps to ensure that, whenever possible, subcontracts are awarded to small business firms, minority firms, women's business enterprises, and labor surplus area firms:

- (a) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- (b) Ensuring that small and minority businesses and women's business enterprises are solicited whenever they are potential sources;
- (c) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses and women's business enterprises;
- (d) Establishing delivery schedules, where the requirements of the contract permit, which encourage participation by small and minority businesses and women's business enterprises; and
- (e) Using the services and assistance of the U.S. Small Business Administration, the Minority Business Development Agency of the U.S. Department of Commerce, and State and local governmental small business agencies.

39. Equal Employment Opportunity

During the performance of this contract, the Contractor agrees as follows:

- (a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.
- (b) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) demotion, (4) transfer, (5) recruitment or recruitment advertising, (6) layoff or termination, (7) rates of pay or other forms of compensation, and (8) selection for training, including apprenticeship.

- (c) The Contractor shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.
- (d) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
- (e) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, the notice to be provided by the Contracting Officer advising the labor union or workers' representative of the Contractor's commitments under this clause, and post copies of the notice in conspicuous places available to employees and applicants for employment.
- (f) The Contractor shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
- (g) The Contractor shall furnish all information and reports required by Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto. The Contractor shall permit access to its books, records, and accounts by the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (h) In the event of a determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.
- (i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.
- (j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

40. Employment, Training, and Contracting Opportunities for Low-Income Persons, Section 3 of the Housing and Urban Development Act of 1968.

- (a) The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- (b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 135 regulations.
- (c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- (d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.
- (e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.
- (f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- (g) With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

41. Interest of Members of Congress

No member of or delegate to the Congress of the United States of America shall be admitted to any share or part of this contract or to any benefit that may arise therefrom.

42. Interest of Members, Officers, or Employees and Former Members, Officers, or Employees

No member, officer, or employee of the PHA, no member of the governing body of the locality in which the project is situated, no member of the governing body of the locality in which the PHA was activated, and no other public official of such locality or localities who exercises any functions or responsibilities with respect to the project, shall, during his or her tenure, or for one year thereafter, have any interest, direct or indirect, in this contract or the proceeds thereof.

43. Limitations on Payments made to Influence Certain Federal Financial Transactions

- (a) The Contractor agrees to comply with Section 1352 of Title 31, United States Code which prohibits the use of Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

44. Royalties and Patents

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringement of any patent rights and shall save the PHA harmless from loss on account thereof; except that the PHA shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified and the Contractor has no reason to believe that the specified design, process, or product is an infringement. If, however, the Contractor has reason to believe that any design, process or product specified is an infringement of a patent, the Contractor shall promptly notify the Contracting Officer. Failure to give such notice shall make the Contractor responsible for resultant loss.

45. Examination and Retention of Contractor's Records

be posted at all times by the Contractor and its

- (a) The PHA, HUD, or Comptroller General of the United States, or any of their duly authorized representatives shall, until 3 years after final payment under this contract, have access to and the right to examine any of the Contractor's directly pertinent books, documents, papers, or other records involving transactions related to this contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (b) The Contractor agrees to include in first-tier subcontracts under this contract a clause substantially the same as paragraph (a) above. "Subcontract," as used in this clause, excludes purchase orders not exceeding \$10,000.
- (c) The periods of access and examination in paragraphs (a) and (b) above for records relating to (1) appeals under the Disputes clause of this contract, (2) litigation or settlement of claims arising from the performance of this contract, or (3) costs and expenses of this contract to which the PHA, HUD, or Comptroller General or any of their duly authorized representatives has taken exception shall continue until disposition of such appeals, litigation, claims, or exceptions.

46. Labor Standards - Davis-Bacon and Related Acts

If the total amount of this contract exceeds \$2,000, the Federal labor standards set forth in the clause below shall apply to the development or construction work to be performed under the contract.

- (a) Minimum Wages.
 - (1) All laborers and mechanics employed under this contract in the development or construction of the project(s) involved will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the regular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits in the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein; provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall subcontractors at the site of the work in a prominent and

accessible place where it can be easily seen by the workers.

(2) (i) Any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when all the following criteria have been met: (A) The work to be performed by the classification requested is not performed by a classification in the wage determination; and (B) The classification is utilized in the area by the construction industry; and (C) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(ii) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employee Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized

representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iii) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator of the Wage and Hour Division for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary.

(iv) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (a)(2)(ii) or (iii) of this clause shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in classification.

(3) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(4) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the

amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or

program; provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(b) Withholding of funds. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the Contractor under this contract or any other Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working in the construction or development of the project, all or part of the wages required by the contract, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the Contractor, disburse such amounts withheld for and on account of the Contractor or subcontractor to the respective employees to whom they are due.

(c) Payrolls and basic records.

(1) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working in the construction or development of the project. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

- (2) (i) The Contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the Contracting Officer for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under subparagraph (c)(1) of this clause. This information may be submitted in any form desired. Optional Form WH-347 (Federal Stock Number 029-005-00014-1) is available for this purpose and may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1214-0149.)
- (ii) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
- (A) That the payroll for the payroll period contains the information required to be maintained under paragraph (c) (1) of this clause and that such information is correct and complete;
- (B) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3; and
- (C) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (iii) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirements for submission of the "Statement of Compliance" required by subparagraph (c)(2)(ii) of this clause.
- (iv) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.
- (3) The Contractor or subcontractor shall make the records required under subparagraph (c)(1) available for inspection, copying, or transcription by authorized representatives of HUD or its designee, the Contracting Officer, or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the Contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to

make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

- (d) (1) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship and Training, Employer and Labor Services (OATELS), or with a State Apprenticeship Agency recognized by OATELS, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by OATELS or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated in this paragraph, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event OATELS, or a State Apprenticeship Agency recognized by OATELS, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (2) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under

- the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed in the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate in the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate in the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate in the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (3) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this clause shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.
- (e) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR Part 3, which are hereby incorporated by reference in this contract.
- (f) Contract termination; debarment. A breach of this contract clause may be grounds for termination of the contract and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.
- (g) Compliance with Davis-Bacon and related Act requirements. All rulings and interpretations of the Davis-Bacon and related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (h) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this clause shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Contractor (or any of its subcontractors) and the PHA, HUD, the U.S. Department of Labor, or the employees or their representatives.
- (i) Certification of eligibility.
- (1) By entering into this contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (2) No part of this contract shall be subcontracted to any person or firm ineligible for award of a United States Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (3) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.
- (j) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.
- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions set forth in subparagraph (j)(1) of this clause, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic (including watchmen and guards) employed in violation of the provisions set forth in subparagraph (j)(1) of this clause, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by provisions set forth in subparagraph (j)(1) of this clause.
- (3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any Federal contract with the same prime Contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions set forth in subparagraph (j)(2) of this clause.
- (k) Subcontracts. The Contractor or subcontractor shall insert in any subcontracts all the provisions contained in this clause, and such other clauses as HUD or its designee may by appropriate instructions require, and also a clause requiring the subcontractors to include these provisions in any lower tier subcontracts. The prime Contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all these provisions.

47. Non-Federal Prevailing Wage Rates

- (a) Any prevailing wage rate (including basic hourly rate and any fringe benefits), determined under State or tribal law to be prevailing, with respect to any employee in any trade or position employed under the contract, is inapplicable to the contract and shall not be enforced against the Contractor or any subcontractor, with respect to employees engaged under the contract whenever such non-Federal prevailing wage rate exceeds: (1) The applicable wage rate determined by the Secretary of Labor pursuant to the Davis-Bacon Act (40 U.S.C. 3141 et seq.) to be prevailing in the locality with respect to such trade;
- (b) An applicable apprentice wage rate based thereon specified in an apprenticeship program registered with the U.S. Department of Labor (DOL) or a DOL-recognized State Apprenticeship Agency; or
- (c) An applicable trainee wage rate based thereon specified in a DOL-certified trainee program.

48. Procurement of Recovered Materials.

- (a) In accordance with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, the Contractor shall procure items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. The Contractor shall procure items designated in the EPA guidelines that contain the highest percentage of recovered materials practicable unless the Contractor determines that such items: (1) are not reasonably available in a reasonable period of time; (2) fail to meet reasonable performance standards, which shall be determined on the basis of the guidelines of the National Institute of Standards and Technology, if applicable to the item; or (3) are only available at an unreasonable price.
- (b) Paragraph (a) of this clause shall apply to items purchased under this contract where: (1) the Contractor purchases in excess of \$10,000 of the item under this contract; or (2) during the preceding Federal fiscal year, the Contractor: (i) purchased any amount of the items for use under a contract that was funded with Federal appropriations and was with a Federal agency or a State agency or agency of a political subdivision of a State; and (ii) purchased a total of in excess of \$10,000 of the item both under and outside that contract.

RESERVED FOR FUTURE USE

Scope of Work

See technical specifications.

SECTION H:
Technical Specifications

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SECTION 000000
SCOPE OF WORK

PART 1 – GENERAL

1.01 SITE LOCATION

- A. The project site is located in the City of Chester, Delaware County, Pennsylvania.

1.02 PROJECT DESCRIPTION

- A. The Chester Housing Authority is performing renovations at three units within the William Penn Homes housing development. The work includes but is not limited to: Demolition and replacement of existing drywall, plumbing improvements, electrical work, installing new furnishings including doors, installing new kitchen equipment and painting. The scope of work is more fully described in the project specifications herein and on the project plans.
- B. The Contractor will be expected to begin work within two (2) weeks of an authorization to proceed and continue working continuously until the project is completed. All units within this project are unoccupied and construction may be concurrent between the units.

1.03 WORK INCLUDED

- A. The contractor shall perform the following work for three (3) units as listed on the overall quantity breakdown.
1. The Base Bid includes the following units:
 - i. 412 Franklin Street, Chester, PA 19013
 - ii. 412 Aaron's Way, Chester, PA 19013
 2. The Add Alternate No. 1 work includes the following unit:
 - i. 404 Franklin Street, Chester, PA 19013
 3. The Contractor shall be responsible for performing, overseeing, and coordinating all the work for this project.
 4. Mobilization is required to comply with local and state laws and regulations. This includes contractor's offices, storage areas, and sanitary or other facilities. This work includes obtaining the required permits, insurance, bonds, and any other initial items required for the start of the work.

5. Perform selective demolition and removal of specific items as proposed in the plan set. The contractor shall dispose of all demolished or removed materials and debris in a proper and legal manner.
6. Replace Exterior Walls, including any temporary waterproofing materials as required.
7. Replace Gypsum Drywall.
8. Identify and assess damage to the sprinkler system in the affected units (412 Franklin Street & 412 Aaron's Way).
9. Remove and replace damaged sprinkler pipes and fittings as required by Engineer.
10. Conduct pressure testing to ensure system integrity and compliance with fire safety codes.
11. Restore any affected areas including ceiling, walls, or flooring impacted by repairs.
12. Furnish and Install Vinyl Sheet Flooring including Cove Bases.
13. Install Interior Doors, Exterior Doors, Screen Doors, and Closet Doors. Installation includes Doorstops, Closet Rods, and Wire Shelving.
14. Repair Existing Windowsills.
15. Install Kitchen Equipment including Cabinets, Stainless Steel Sinks, Range Hoods, HVAC Room Doors, and Overhead and Over-sink LED lighting with accompanying miscellaneous plumbing work.
16. Replacement of Existing Electrical Outlets, Phone Jacks, Smoke and CO detectors, Thermostats, and Outlet Cover Plates.
17. Install Bathroom Furnishings such as Bathroom Tubs, Sinks, and Shower Rods with accompanying miscellaneous plumbing work.
18. Paint Walls, Ceilings, Closets, Exterior Doors, Windowsills and Existing Railings as directed.
19. Replace existing hot water heater and furnace in units, if and where directed.

1.04 ADDITIONAL REQUIREMENTS

- A. All Base Bid work by the Contractor must be 100% complete within the contract time limit of ninety (90) calendar days. The contract time limit shall begin once the written Notice to Proceed order has been issued to the Contractor.
- B. The Contractor must submit pricing for the Base Bid contract work.
- C. The Contractor shall attend a pre-construction meeting held at the project site.
- D. All Base Bid work by the Contractor must be 100% complete within the contract time limit. The contract time shall begin once the written Notice to Proceed order has been issued to the Contractor. Construction completed before the issuance of a written Notice to Proceed will be at the Contractor's risk and subject to nonpayment. Contract time will start, by default, on the first day of physical work.
- E. The Contractor shall be responsible for relocating any items, stored materials or equipment, as necessary, to facilitate the work. The contract shall cover and otherwise provide necessary protection for all furniture or equipment left in the work area during the project. All equipment that was moved to facilitate the work shall be put back into place by the Contractor upon completion of each workday.
- F. The Contractor shall provide a complete project schedule with the Owner and Engineer at least two (2) weeks prior to beginning work. The schedule shall provide information regarding the dates when work will occur at each dwelling unit. The Contractor shall accommodate reasonable requests by the Owner or Engineer to make adjustments to the schedule, as may be necessary.
- G. The specific items of work described within the "Work Included" section are intended to be all-inclusive. The Contractor shall provide all necessary tools, materials and labor necessary to perform the work, including any items or tasks which are not specifically mentioned, but which are necessary to complete the work in accordance with the standard practice of the profession.
- H. The Contractor must submit product submittals for select equipment and materials to the Engineer for approval prior to commencing work.
- I. The Chester Housing Authority will pay for and provide a building permit.
- J. The Contractor shall comply with all current local, state and federal codes, as applicable.
- K. The Contractor shall, at the completion of the work, provide a one (1) year maintenance bond, in the amount of one hundred percent (100%) of the final contract

price, by a surety company licensed to transact such business in the Commonwealth of Pennsylvania.

- L. It is preferred that the Contractor utilize Section 3 of the Housing and Development Act of 1968 which requires recipients of HUD financial assistance, to the greatest extent possible, provide training, employment, contracting and other economic opportunities to low- and very low-income persons, especially recipients of government assistance for housing, and to businesses that provide economic opportunities to low- and very low-income persons.**

END OF SECTION

SECTION 010000
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 GENERAL

- A. Only major items of work are given in the Bid Form, but it is the intent of the specifications to secure a completely interconnected and functional system, and should any workmanship or materials be required which are necessary to carry out the full intent and meaning of the plans and specifications or to be reasonably inferred therefrom, the cost of such workmanship or materials shall be included in the items in the bid form.
- B. Where construction is being performed in traveled roadways or rights-of-way, the Contractor is to provide all necessary traffic controls and devices in accordance with the current Pennsylvania Department of Transportation standards.
- C. The Contractor, in the construction of the project, shall not stockpile materials or store equipment on any private property; except areas designated by the plans or as directed by the Engineer. If so required, the Engineer may direct the Contractor to have equipment removed from any project during weekend hours.
- D. The Contractor shall apply and pay for all permits that may be required by the City of Chester for any of the work involved with this project.
- E. The Contractor is to notify residents by door-hangers, at least forty-eight (48) hours in advance, before starting construction work that will directly affect their property frontage, driveway(s) and/or on-street parking.
- F. The Contractor shall notify the Engineer at least forty-eight (48) hours in advance of any work scheduled for Saturdays. There will be no work permitted on Sundays or holidays. This project will receive part-time inspection and the normal working hours for the Inspector are from 7:00 AM to 5:00 PM, Monday through Friday. Any overtime inspection costs which are avoidable will be reimbursed by the Contractor.
- G. The Contractor shall, at the completion of the work, provide a one (1) year maintenance bond, in the amount of one hundred percent (100%) of the final contract price, by a surety company licensed to transact such business in the Commonwealth of Pennsylvania.
- H. Separate payment will not be made for construction layout. The costs for construction layout for all site work shall be included in the various items of the proposal.

- I. Location of any disposal container and/or dumpster, shall be coordinated with the owner and engineer prior to placement.

1.02 PUBLIC UTILITIES

- A. Not Used

1.03 PRECONSTRUCTION VIDEO

- A. The Contractor shall take digital photographs of all planned work areas/surfaces prior to the commencement of construction in each location. Each photograph shall be clearly labeled or otherwise organized to allow identification of the photograph location. Upon request, the Contractor shall furnish a digital copy of all photographs on a DVD to the Engineer to resolve any disputes arising over the restoration of interior walls, doors, windows, finishes, furniture, appliances or any other items during the construction.

1.04 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. The Contractor shall erect or place and maintain in good condition, barricades, warning signs, lights, and other warning and danger signals and devices, appropriate and adequate for the specific needs and subject to the Engineer's approval, at working sites, locations of material storage, standing equipment and other obstructions, at points where the usable vehicular or pedestrian traffic width of the road or sidewalk is reduced, at points where traffic is deflected from its normal courses or lanes, and at other places of danger to vehicular or pedestrian traffic.
- B. The Contractor shall provide sufficient watchmen and traffic directors and shall take all other precautions, including any that may be ordered by the Engineer, which are necessary for the safety of the public and protection of the work.
- C. The Contractor shall obtain the approval of the Engineer and consent of all appropriate authorities having jurisdiction, for any detours which may be required. The Contractor shall make all necessary arrangements with such authorities regarding the establishment, maintenance and repair of such detours, the regulations and direction of traffic thereon, and the installation and maintenance of signs and traffic devices.
- D. Before beginning work on any phase of the project, the Contractor shall furnish and install warning signals, barricades, and other devices necessary, in the opinion of the Engineer, to protect the public during that phase of his operations.

- E. Additional devices shall be provided by the Contractor as required or directed prior to the commencement of any operation or phase of an operation requiring such devices.
- F. The Contractor is advised that there may be heavy commuter traffic during the morning from 7:30 AM to 9:00 AM and the afternoon from 3:00 PM to 5:30 PM.
- G. Construction shall be so staged to maintain at least one lane for traffic in each direction throughout each separate work area during the morning 7:30 AM to 9:00 AM and the afternoon 3:00 PM to 5:30 PM weekday periods of peak traffic.
- H. Any restriction of traffic at any time shall be subject to the approval of the Engineer, and the City Police Department. Any restriction of traffic on a Pennsylvania State Highway shall be subject to regulations and permitting prescribed by The Pennsylvania Department of Transportation. The Contractor shall submit a schedule of staged construction to the Engineer for approval prior to any restriction of traffic.
- I. Construction of proposed utility pipes or storm pipes across existing roadways shall be so staged to maintain one lane in each direction. Trenches shall not remain open overnight.
- J. The Contractor shall provide adequate means of access for fire, police and emergency vehicles throughout the length of the project. Contractor shall also provide for safe and adequate means of access to adjacent properties, both private and public.

1.05 REFERENCE TO THE STANDARD SPECIFICATIONS

- A. Portions of the work performed under this contract shall comply with the requirements of the Commonwealth of Pennsylvania Department of Transportation Publication 408, latest edition and supplements and the Pennsylvania Department of Transportation Standard Construction Details as applicable and all requirements modified, as amended or supplemented and whose specifications are made part of these specifications.
- B. The Standard Specifications are made part of these specifications by this reference as if they were set forth in full. It is the responsibility of the prospective bidder to be familiar with these Standard Specifications.

1.06 DUST CONTROL

- A. The Contractor will be required to maintain all stockpiles, waste areas, and all other work areas within or outside the project boundaries free from dust which would cause a hazard or nuisance to others. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the

Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. If any dust control is not done within twenty-four (24) hours after written notice is given by the Engineer, the work may be done by the Owner and charged to the Contractor. Costs for dust control shall be included in the prices bid for the various items in the bid form.

1.07 TESTING MATERIALS

- A. Except as may be provided elsewhere, test or analysis of materials which are usually tested after delivery to the site, such as windows, doors, sealers, caulks, and similar materials; will be performed by a test laboratory which will be approved by the Engineer and selected and paid for by the Contractor. The preliminary testing of other materials, samples of which are to be submitted prior to delivery, will also be performed by the laboratory and paid for by the Contractor.
- B. If the Engineer orders sampling and analysis or tests of materials which are usually accepted on certification of the manufacturer but which appear defective or not conforming to the requirements of the Specifications, the Contractor will bear the reasonable costs of sampling, transportation, test and analysis.

PART 2 - PRODUCTS

(Not used)

PART 3 - EXECUTION

(Not used)

PART 4 - QUANTITY AND PAYMENT

4.01 MOBILIZATION (MAX. \$15,000)

- A. Quantity of "Mobilization (Max. \$15,000)" will not be measured for this project.
- B. Payment for "Mobilization (Max. \$15,000)" will be made as a lump sum (LS) upon commencement of the physical construction. Payment shall include all insurance, performance and payment bond required for the project.

4.02 GENERAL ALLOWANCE

- A. Quantity of “General Allowance (\$25,000)” will not be measured for this project. An allowance has been included with this contract. The use of the allowance shall be only as directed by the engineer for the owner’s purposes and only by change order that indicates amounts to be changed by allowance. At the end of the project, any unused portion of the allowance shall be returned to the owner.
- B. Quantity of Alternate Bid No. 1 “General Allowance (\$5,000)” will not be measured for this project. An allowance has been included with this contract. The use of the allowance shall be only as directed by the engineer for the owner’s purposes and only by change order that indicates amounts to be changed by allowance. At the end of the project, any unused portion of the allowance shall be returned to the owner.

4.03 GENERAL REQUIREMENTS

- A. Quantity of all other items covered in the General Requirements will not be measured for this project, but the work shall be performed incidental to the proposed work.
- B. Payment for all other items covered in the General Requirements will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 017400
CLEANING AND RESTORATIONS

PART 1 - GENERAL

1.01 LOCATION

- A. Contractor shall provide all equipment, labor & materials required to clean and restore the site to at least the existing condition.
- B. Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by work operations.
- C. At the completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials; clean all visually exposed surfaces; leave project clean and ready for occupancy.
- D. At the completion of work, restore or replace, where and as directed by the Chester Housing Authority or their representative, any public or private property disturbed or damaged by Contractor's work operations to a condition at least equal to that existing prior to beginning work, or as otherwise specified. Materials, equipment and methods shall be approved by the Chester Housing Authority.
- E. Where directed to use a multi-surface cleaner for anti-bacterial / anti-mold and anti-fungal cleaning, the contractor shall clean all surfaces with liquid Lysol cleaner or approved commercial equivalent.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. For restorations, all materials shall comply with the applicable specification and as approved by the Chester Housing Authority.

PART 3 - EXECUTION

3.01 METHODS OF CONDUCTING WORK - CLEANING

- A. Requirements of regulatory agencies:
 - 1. All excess material shall be removed from the site and disposed of by the Contractor at his expense. Cost to be included in the individual bid items for

the Project. The disposal site shall be in permanently established licensed landfills.

B. Cleaning during construction:

1. Provide periodic cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations. This includes dust, dirt and mud.
2. Provide on-site containers for the collection of waste materials, debris and rubbish. Maintain containers as required. Containers shall be covered as required to prevent unauthorized use.
3. Where directed to use an anti-mold / anti-fungal / anti-bacterial cleaner the contractor shall use pourable liquid Lysol as directed by the manufacturer.

C. The Contractor will be required to maintain all work areas within or without the project boundaries free from dust which would cause a hazard or nuisance to others. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. If any dust control is not done within twenty-four (24) hours after written notice is given by the Engineer, the work may be done by the Chester Housing Authority and charged to the Contractor.

3.02 METHODS OF CONSTRUCTION

- A. General: All areas disturbed or damaged during the work under this contract shall be restored or replaced to a condition at least equal to that existing prior to beginning work, or as otherwise specified. The methods of conducting this work shall, as a minimum, conform to the following Articles of the Commonwealth of Pennsylvania Department of Transportation Specifications.
- B. All Other Restorations: Restore in accordance with applicable Specification, or as approved by the Chester Housing Authority or authorities having jurisdiction.

PART 4 - QUANTITY AND PAYMENT

4.01 CLEAN EXISTING VINYL FLOORING AND VINYL COVE BASE

- A. Quantity of "Clean Existing Vinyl Flooring and Vinyl Cove Base" will be measured for each square foot (SF) where the floor is cleaned.
- B. Payment for "Clean Existing Vinyl Flooring and Vinyl Cove Base" will be made for each square foot (SF) where plank flooring shall be cleaned including all material, labor and equipment to complete the work, and any incidental materials as needed.

4.02 FINAL CLEANING

- A. Quantity of “Final Cleaning” will be measured for each unit (UNIT) that shall be cleaned and includes all work performed as necessary to restore all disturbed areas to a condition for a livable residential unit capable of obtaining a certificate of occupancy.
- B. Payment for “Final Cleaning” will be made for each unit (UNIT) that shall be cleaned including all material, labor and equipment to complete the work, and any incidental materials as needed.

END OF SECTION

SECTION 024119
SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Demolition and removal of selected portions of building or structure.
 - 2. Demolition and removal of selected site elements.
 - 3. Salvage of existing items to be reused or recycled.
- B. Related Requirements:
 - 1. Section 000000 "Scope of Work" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
 - 2. Applicable Specification Sections for demolishing, cutting, patching, or relocating mechanical items.
 - 3. Applicable Specification Sections for demolishing, cutting, patching, or relocating electrical items.

1.03 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 deliver to Owner ready for reuse.
- 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.

1.04 MATERIAL OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site. Owner shall have first right of refusal for all salvaged/demolished items.
- 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. Coordinate with Owner and the Engineer who will establish special procedures for removal and salvage. Owner shall have first right of refusal for all salvaged/demolished items.

1.05 SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
- C. Engineering Survey: Submit engineering survey of condition of building.
- D. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for dust and noise control. Indicate proposed locations and construction of barriers (if none, provide a written statement indicating as much).
- E. 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. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

- F. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- H. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.06 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.07 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.08 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- D. Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- E. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- F. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- G. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, of 12 inches or more.
- H. Storage or sale of removed items or materials on-site is not permitted.
- I. 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.

1.09 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
1. If possible, retain original Installer or fabricator to patch the exposed Work listed below that is damaged during selective demolition. If it is impossible to engage original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Processed concrete finishes.
 - b. Stonework and stone masonry.
 - c. Roofing.
 - d. Firestopping.
 - e. Stucco and ornamental plaster.
 - f. Terrazzo.
 - g. Wall covering.
 - h. HVAC enclosures, cabinets, or covers.
- B. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 – PRODUCTS

2.01 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 - 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 - 2. Use materials whose installed performance equals or surpasses that of existing materials.
- B. Comply with material and installation requirements specified in individual Specification Sections

2.02 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 ASSE A10.6 and NFPA 241.

PART 3 – EXECUTION

3.01 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. Engage a professional engineer to survey the condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- D. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer

- F. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- H. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.02 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.03 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
 - 1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- C. 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. Arrange to shut off utilities with utility companies.
 - 3. 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.
 - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

- a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.04 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during the progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.05 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. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 5. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- 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. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. 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 reinstalled in their original locations after selective demolition operations are complete.

3.06 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. 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.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings If needed, insert requirements for other types of finishes.
- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing so that building interior remains watertight and weathertight.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.

3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site.
 - 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.
 - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.08 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.

PART 4 – QUANTITY AND PAYMENT

4.01 SELECTIVE DEMOLITION

- A. Quantity “Selective Demolition” will not be measured for this project but the work shall be performed as necessary and shall include all labor, materials, and equipment necessary for the demolition, removal, temporary storage, and disposal of all materials necessary to complete the units renovations for all units as per the project plans and specification including all incidental work.
- B. Payment for “Selective Demolition” will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 061000
CARPENTRY

PART 1 - GENERAL

1.01 GENERAL

- A. The specifications section "General Requirements" forms a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.
- B. Drawings, general provisions of the Contract, and other Specification Sections, apply to this Section.

1.02 DESCRIPTION

- A. Provide all rough and finish carpentry, complete at the locations shown on the plans or as directed by the Chester Housing Authority as specified in Section 000000, Scope of Work.

1.03 QUALITY ASSURANCE

- A. Rejection of Work: In the acceptance or rejection of rough carpentry, the Engineering Inspector will make no allowance for lack of skill on the part of workmen.
- B. Requirements of regulatory agencies: All construction shall be in compliance with IBC Basic Building Code and Local Ordinances.

1.04 SUBMITTALS

- A. Samples, shop drawings and manufacturer's product literature.
- B. Samples include all factory-made items.
- C. Shop drawings shall show thickness, sizes and construction of all members as well as the manner of assembling the various members that make up the different items. Provide color selection charts for all exposed finish items. Show true profiles, connections and relationship to adjoining work, methods of anchoring, and all other pertinent information. Submit six (6) copies of all shop drawings.
- D. Submittals shall include the following items:
 - 1. Construction Lumber

2. Exterior and Interior Trim
3. Gypsum Wallboard
4. Insulation
5. Caulking
6. Galvanized Studs

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Store all materials in such manner as to ensure proper ventilation and drainage, and to protect against damage and the weather.
- B. Use all means necessary to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineering Inspector and at no additional cost to the Authority

1.06 JOB CONDITIONS

- A. Protection: Provide temporary partitions, struts, braces, A-frames and other protection required for safety and support of building during construction.
- B. Sequencing, scheduling: Exercise care in framing so that important wooden members will not require cutting for the passing and attaching of the work of other trades and contractors. Consult with other trades in regard to the installation of their materials that require special framing. Do not notch, bore, or cut members for pipes, ducts, conduits, or other reasons except as shown on the drawings or as specifically approved in advance by the Engineer.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. All construction lumber shall be air dried to a moisture content not to exceed 19% for 90% of each shipment and not to exceed 22% for the remaining 10%. Kiln-dried lumber meeting the moisture content requirements for air-dried lumber may be used in lieu of the air-dried lumber.
- B. Surface lumber 4 sides to conform to Simplified Practice Recommendation SR-16, current. Sizes stated in these specifications are nominal sizes unless otherwise noted.

- C. Wood supporting or contracting all millwork, finish carpentry custom woodwork shall be of type and dryness that will not affect the finish.
- D. Treat all woodwork including grounds, blocking, plates, curbs and exterior woodwork that is subject to dampness or in contact with masonry or concrete with an approved non-staining preservative complying with Federal Specification TT-W-570, latest issue.

2.02 MATERIALS

- A. Construction lumber: Western Hemlock or Douglas Fir, surfaced four sides, having minimum fiber stress value in bending of 1,200 PSI, and a modulus of elasticity of 1.7 million.
- B. Subfloor / Underlayment: APA Trademarked Plywood rated as suitable underlayment for resilient floor coverings, 19/32" or thicker, or approved equal.
- C. Exterior Sheathing: APA Trademarked Plywood rated as suitable for exterior wall structural sheathing, 19/32" or thicker, to meet the wind loads for Philadelphia, PA, and to provide a complete water tight building envelope or approved equal.
- D. Interior wood trim: Cove molding - white pine.
- E. Rough Hardware
 - 1. Provide and install all rough hardware, metal fastenings and anchors as shown on plans, specified herein, or required for proper installation of carpentry and millwork. Nails, spikes, screws, bolts and similar items shall be of sizes and types to rigidly secure members in place.
 - 2. Rough hardware exposed to weather, and nails used where rust stains may appear, shall be galvanized.
- F. Insulation: Furnish and install Kraft Paper faced fiberglass insulation with an R-value of at least 30, in the ceiling areas or as indicated on the drawings. The insulation shall be as manufactured by Owens-Corning Fiberglass or equal. This is intended for outside wall replacement of existing.
- G. Caulking: All caulking and sealant work shall comply with International Building Code standards. Caulk all joints; wood to masonry, wood to metal, wood to wood, wood to glass, etc. Exterior caulking shall be acrylic type, Tremco "Mono-Lastic-

Metric" or approved equal. All interior caulking shall be butyl rubber similar to Tremco #400 Butyl 4 or equal.

- H. Galvanized Studs: All galvanized studs shall be approved equal to those manufactured by Marino Industries Corporation, South Plainsfield, New Jersey; being 20 gauge or heavier. All galvanized studs shall be formed from steel that conforms to ASTM A446 with a yield of 37 ksi.
- I. Other materials: All other materials, not specifically described but required for a complete and proper installation as indicated on the drawings, shall be new, suitable for intended use, and subject to the approval of the Engineer.
- J. Wire Shelving: Rubbermaid Tightmesh, 20 inches, White, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Protect all construction liable to damage during work, including edges of copings, sills, concrete steps, platforms, and similar items and remove such protective covering when directed. Take special precautions at masonry openings and corners of the building.
- B. Wood centering or other necessary supports for openings in masonry walls shall be accurately and strongly made, properly braced and secured into position until masonry has thoroughly set.
- C. Provide all bracing, supports and shoring required to support construction during the formative stages.
- D. Layout, cut, fit and erect framing for rough and finished work, blocking nailers, furring and all other rough carpentry. Do cutting work in connection with carpentry and finish for other trades. Brace, plumb and level all members in true alignment and rigidly secure in place with sufficient nails, spikes, screws, and bolts as necessary. Defects which render any piece or part unable to serve its intended purpose shall be discarded or, if in place, cut out and replaced.
- E. Frame as required for installation and support of plumbing, heating, ventilating, air conditioning and electrical work.
- F. Provide and set all rough hardware, such as shoes, dogs, spikes, bolts, stirrups, nails, lag screws, lagging bolts, anchors, etc., as called for or required to hold woodwork together or to anchor or secure it to other materials and construction. Fastenings to

masonry and concrete shall be metal and of a type and design best suited to the conditions.

- G. Provide wood furring and suspension necessary to receive and support finishes such as plywood, insulation, wall surfacing, millwork, finish carpentry and custom woodwork. Members shall be of size necessary to provide adequate bracing, support and fastening. Soffit areas shall be tied together and to adjoining and supporting construction as required.
- H. Typical wood wall furring shall be 1" x 3" furring strips in single long lengths, set 16" o/c. vertically with intermediate furring introduced as required by the condition of support and fastening. Special furring members of other than typical size are shown on the drawings.
- I. Provide wood grounds, nailing strips and similar items wherever necessary or required throughout the project for the support, proper erection or installation of the work. Thoroughly secure in place by approved means.
- J. Secure wood grounds to metal plugs set in masonry or with toggle or expansion bolts.
- K. Grounds generally shall be continuous and set back 1/2" from exposed edge of overlapping finish. They shall be straight and plumb, in true alignment and fastened 16" o/c.
- L. Install suitable blocking for finish carpentry and similar work wherever necessary to provide proper nailing and fastening at the required lines or levels.
- M. Form blocking inserts cast into concrete as required to accommodate the fastening for which it is placed.
- N. Install plywood in accordance with recommendations of the American Plywood Association. Lay panels with face grain across supports with end occurring directly over framing members. Stagger panels and apply glue and nailing according to manufacturer's recommendations to achieve a roofing system capable of acting as a structural diaphragm.
- O. Layout, cut, fit and erect floor, wall and roof framing, blocking, nailers, furring and all other rough carpentry. Do cutting work in connection with carpentry and finish for other trades. Brace, plumb and level all members in true alignment and rigidly secure in place with sufficient nails, spikes, screws, and bolts as necessary. Defects which render any piece or part unable to serve its intended purpose shall be discarded or, if in place, cut out and replaced.

- P. Furnish and install rough framing for door openings, furring and framing for installation of cabinets and counters and miscellaneous rough framework for support and attachment. Provide all framing required to complete the work.
- Q. Drywall shall be installed continuous over at least two (2) supports with ends occurring directly over framing members. Joints to be taped and finished with three (3) coats of joint compound and sanded smooth. Nail holes to receive two (2) coats of joint compound and sanded smooth.
- R. Laying sheathing and subfloor panels with face grain or long dimension perpendicular to run of bearing members, with butt and joints occurring directly over bearing. Nail panels to bearing members as per DFPA recommendations.
- S. Edge support of plywood sheathing shall be provided by use tongue-and-groove panels with lumber blocking between framing members as required.
- T. Provide all double framing members as required to accommodate concentrated loads from mechanical equipment.

PART 4 - QUANTITY AND PAYMENT

4.01 SUB-FLOOR REPAIR, IF AND WHERE DIRECTED

- A. Quantity of "Sub-Floor Repair, If and Where Directed" will be measured in square feet (SF) for this project if and where directed by the Engineer.
- B. Payment of "Sub-Floor Repair, If and Where Directed" and all related work will be made in square feet (SF) for the actual dimension of installed sub floor, and shall include all necessary materials, labor and equipment to perform the work herein. No additional payment will be made for material waste.

4.02 FURNISH AND INSTALL WIRE SHELVING IN CLOSETS

- A. Quantity of "Furnish and Install Wire Shelving in Closets" will be measured per linear foot (LF) of shelving installed. The Authority will note in writing if more than one shelf per closet will be required.
- B. Payment for "Furnish and Install Wire Shelving in Closets" will be made based on linear foot (LF) of shelving installed and shall include all labor and materials to install the shelving.

4.03 REPAIR WINDOWSILL

- A. Quantity of "Repair Windowsill" will be measured in each windowsill (EA) for this project.

- B. Payment of “Repair Windowsill” will be measured for each windowsill (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing, cleaning, painting, and all incidental work.

4.04 FURNISH AND INSTALL NEW RAILING

- A. Quantity of “Furnish and Install New Railing” will be measured per each (EA) building unit and shall include all new railing in each unit for this project.
- B. Payment of “Furnish and Install New Railing” will be measured per each (EA) building unit, and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.05 REMOVE AND REPLACE EXTERIOR WALL FRAMING, 16” OC

- A. Quantity of “Remove and Replace Exterior Wall Framing, 16” OC” will be measured per square foot (SF) unit and shall include removal of existing wood framing, furnishing and installing new framing as per the IBC, and additional framing for exterior doors and windows for this project.
- B. Payment of “Remove and Replace Exterior Wall Framing, 16” OC” will be measured per square foot (SF), and shall include all materials, labor and equipment necessary to perform construction layout, removal and disposal of existing framing, furnishing and installation, framing and all incidental work.

4.06 REMOVE AND REPLACE EXTERIOR WALL SHEATHING

- A. Quantity of “Remove and Replace Exterior Wall Sheathing” will be measured per square foot (SF) unit and shall include removal of existing wood sheathing, furnishing and installing new sheathing as per the IBC for this project.
- B. Payment of “Remove and Replace Exterior Wall Sheathing” will be measured per square foot (SF), and shall include all materials, labor and equipment necessary to perform construction layout, removal and disposal of existing sheathing, furnishing and installation, and all incidental work.

4.07 GENERAL CARPENTRY ALLOWANCE

- A. Quantity of “General Carpentry Allowance (\$25,000)” will not be measured for this project. An allowance has been included with this contract for general carpentry. The use of the allowance shall be only as directed by the engineer for the owner’s purposes and only by change order that indicates amounts to be changed by allowance. At the end of the project, any unused portion of the allowance for general carpentry shall be returned to the owner.

- B. Quantity of Alternate Bid No. 1 “General Carpentry Allowance (\$5,000)” will not be measured for this project. An allowance has been included with this contract for general carpentry. The use of the allowance shall be only as directed by the engineer for the owner’s purposes and only by change order that indicates amounts to be changed by allowance. At the end of the project, any unused portion of the allowance for general carpentry shall be returned to the owner.

END OF SECTION

SECTION 072500
WEATHER BARRIERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Building wrap.

1.02 SUBMITTALS

- A. Product data.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, certified, or licensed by the weather barrier system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

PART 2 - PRODUCTS

2.01 WEATHER BARRIERS

- A. Building Wrap: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.
 - 1. Building Wrap Types:
 - a. Type I, ASTM E1677.
 - 2. Composition Type:
 - a. Perforated woven polyolefin
 - 3. Water-Vapor Permeance: Minimum 50 perms in accordance with ASTM E96, Desiccant Method (Procedure B).
 - 4. Air Permeance: Not more than 0.004 cfm/sq. ft. at 1.57 lbf/sq. ft. when tested in accordance with ASTM E2178.
 - 5. Flame Propagation Test: Materials and construction to be tested in accordance with NFPA 285.

2.02 ACCESSORY MATERIALS

- A. Requirement: Provide primers, fasteners, seam tapes, flashing, transition strips, termination 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 weather barrier manufacturer to produce a complete weather barrier assembly and that are compatible with primary weather barrier material and adjacent construction to which they may seal.

PART 3 - EXECUTION

3.01 INSTALLATION OF WEATHER BARRIERS

- A. Weather Barriers:
 - 1. Building Paper: Comply with manufacturer's written instructions and warranty requirements.
 - 2. Building Wrap or Drainage Wrap: Comply with manufacturer's written instructions and warranty requirements.
 - 3. Drainage Material: Comply with manufacturer's written instructions.
- B. Install weather barrier accessories for a complete installation with weather barriers in accordance with manufacturers written instructions.

PART 4 - QUANTITY AND PAYMENT

4.01 WEATHER BARRIERS

- A. Quantity of all items covered in the Weather Barriers specification will not be measured for this project but will be incidental to the exterior wall construction costs.
- B. Payment of all items covered in the Weather Barriers specification will not be made for this project but the cost shall be included in the exterior wall construction costs.

4.02 INSTALL EXTERIOR WALL INSULATION

- A. Quantity of "Install Exterior Wall Siding" will be measured in square feet (SF), for this project.
- B. Payment for "Install Exterior Wall Siding" work shall be paid per square foot (SF) and shall include all materials and labor required for the complete replacement of all exterior vinyl siding.

END OF SECTION

SECTION 074633
VINYL SIDING, FASCIA AND SOFFIT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preformed vinyl siding, trim, and accessories for facing exterior walls.

1.02 RELATED SECTIONS

- A. Section 061000 - Rough Carpentry: Wood stud framing, furring, and sheathing for support of vinyl siding.

1.03 REFERENCES

- A. American Society for Testing and Materials (ASTM) D635 - Rate of Burning and/or Extent and Time of Burning of Self-Supported Plastics in a Horizontal Position.
- B. American Society for Testing and Materials (ASTM) D638 - Tensile Properties of Plastics.
- C. American Society for Testing and Materials (ASTM) D3679 - Rigid Polyvinyl Chloride (PVC) Siding.
- D. Underwriters Laboratories (UL) 94 - Test for Flammability of Plastic Materials.
- E. Vinyl Siding Institute (VSI): Vinyl Siding Installation, a How-To Guide.

1.04 SUBMITTALS

- A. Product Data : Manufacturer's data sheets on each product to be used, including:
 - 1. Material descriptions, dimensions, and profiles.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- B. Shop Drawings: Layout, dimensions, weatherproofing, penetrations, terminations, trim, and installation methods.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Verification Samples: For each finish product specified, two samples, 4 inches (102 mm) long minimum samples of siding and trim in selected finish and color.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with a minimum of 10 years' successful

experience manufacturing aluminum, steel and/or vinyl siding.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver siding in manufacturer's protective cartons and clearly labeled as to specific products contained.
- B. During delivery and storage keep siding cartons flat and supported along entire length.
- C. Store materials off ground, out of weather, in dry place. Provide ventilation. Protect from falling objects and construction activities.

1.07 WARRANTY

- A. Upon Completion, provide a Lifetime limited, transferable warranty. In the case of siding purchased by, or installed upon property owned by or in part by corporations, government entities or agencies, religious organizations, trusts, condominium or corporate housing arrangements, intangible legal entities or any other entity or organization capable of an infinite life, the warranty period will be fifty (50) years following the installation of the siding, which shall include fade and hail protection.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Gentek Building Products, Inc.,
- B. Substitutions: Or Equal

2.02 MATERIALS

- A. PVC: Fabricate siding and trim from polyvinyl chloride (PVC) meeting ASTM D3679 requirements for compound class number 2 with the following properties:
 - 1. Tensile strength tested in accordance with ASTM D638: 6,700 PSI.
 - 2. Flexural strength tested in accordance with ASTM D790: 14,000 PSI.
 - 3. Modulus of elasticity tested in accordance with ASTM D638: 410,000 PSI.
 - 4. Impact resistance tested in accordance with ASTM D256:
 - a. At 32 degrees F: 2.0 foot pounds per inch of notch.
 - b. At 70 degrees F: 3.6 foot pounds per inch of notch.
 - 5. Coefficient of linear thermal expansion tested in accordance with ASTM D696: 2.9×10^{-5} inch/inch/degree F.
 - 6. Deflection temperature when tested in accordance with ASTM D648 with 264 PSI load: 163 degrees F.
 - 7. Windload: Withstand a minimum of 100 mph windload.
 - 8. Average maximum burn distance tested in accordance with ASTM D635: 0.8 inch.
 - 9. Average maximum burn time tested in accordance with ASTM D635: 5 seconds.
 - 10. Maximum ignition temperature tested in accordance with ASTM D1929:

- a. Flash ignition: 752 degrees F.
- b. Self ignition: 860 degrees F.
- 11. Flame spread tested in accordance with ASTM E84: 15 maximum.
- 12. Smoke development tested in accordance with ASTM E84: 500 maximum.
- 13. Color: As selected from manufacturer's standard colors.

2.03 VINYL SIDING PANELS

- A. Aurora: Double 4 inch Clapboard.
 - 1. Dimensions: 8 inches (203 mm) exposed width by 150 inches (3810 mm) long with 1/2 inch (13 mm) butt and rolled edge nail hem.
 - 2. Thickness: 0.042 inch (1.02 mm)
 - 3. Surface finish: Embossed brushed texture.
 - 4. Color: As selected from manufacturer's standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Confirm that all critical dimensions are as specified on the drawings
- B. Beginning installation indicates Installer's acceptance of substrate as suitable to accept siding and soffits.

3.02 PREPARATION

- A. Repair substrate flaws or defects before applying siding or soffits.
- B. Where necessary, fur surfaces to an even plane and free from obstructions before application.

3.03 INSTALLATION

- A. Install vinyl siding and vinyl soffits in accordance with the latest edition of "Vinyl Siding Installation Manual," published by the Vinyl Siding Institute (VSI) and special details from the drawings.
- B. Install siding, soffits, and accessories in accordance with PEPA installation standards.

3.04 FIELD QUALITY CONTROL

- A. After installation of siding and soffits, check entire surface for obvious flaws or defects.
- B. Replace and repair any problem areas, paying close attention to the substrate for causes of the problem.

3.05 CLEANING AND PROTECTION

- A. After application of siding and soffits, clean as necessary to remove all fingerprints

and soiled areas.

- B. Upon completion of siding application, clean entire area, removing all scrap, packaging, and unused materials related to this work.

PART 4 – QUANTITY AND PAYMENT

4.01 Install Exterior Wall Siding

- A. Quantity of “Install Exterior Wall Siding” will be measured in square feet (SF), for this project.
- B. Payment for “Install Exterior Wall Siding” work shall be paid per square foot (SF) and shall include all materials and labor required for the complete replacement of all exterior vinyl siding.

END OF SECTION

SECTION 079000
JOINT SEALERS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This specification describes the sealing of joints and cracks with a one-component, gun-grade, elastomeric polyurethane sealant.

1.02 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of window installation repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 SUBMITTALS

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheet, and appropriate Material Safety Data Sheets (MSDS).

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.05 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone.

1.06 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Polyurethane sealant:
 - 1. The joint sealant shall be a one-component, gun grade, polyurethane-base material. It shall be applicable in vertical, overhead, and recess horizontal joints. The sealant shall cure under the influence of atmospheric moisture to form an elastomeric substance.
- B. Any primers, as required, recommended by the manufacturer of the specified product, approved by the Engineer.
- C. Backer rod or bond breaker tape, as approved by the Engineer.

2.02 PERFORMANCE CRITERIA

- A. Properties of the uncured polyurethane sealant:
 - 1. Initial Cure Tack-Free Time: (TT-S-00230C) 6 - 8 hours Final Cure: 7 – 10 days
 - 2. Consistency: non-sag.
 - 3. Color: 7 architectural standard colors
- B. Properties of the cured polyurethane sealant:
 - 4. Tensile Properties (ASTM D-412) at 21 days
 - a. Tensile Stress: 125-psi min. (.86 MPa)
 - b. Elongation at Break: 700%

- | | | |
|--------------------------|------|-------------------|
| c. Modulus of Elasticity | 25% | 20 psi (0.24 MPa) |
| | 50% | 35 psi (0.41 MPa) |
| | 100% | 50 psi (0.59 MPa) |
5. Shore A Hardness (ASTM D-2240) at 21 days: 20 +/-5
 6. Tear Strength (ASTM D-624) at 21 days: 50 lb./in.
 7. Adhesion in Peel (TT-S-00230C, ASTM C 794)
 - a. Concrete: 30-lb. Min. - 0% Adhesion Loss
 - b. Aluminum: 25-lb. Min. - 0% Adhesion Loss
 - c. Glass: 25-lb. Min. - 0% Adhesion Loss
 8. Service Range: -40PoP to 170PoPF (-40P0P to 77P0PC)
 9. The sealant shall conform to Federal Specification TT-S-00230C, Type II, Class A and Federal Specification for Silicones TT-S-001543A, Type non-sag.
 10. The sealant shall conform to ASTM C-920, Type S, Grade NS, Class 25.
 11. The sealant shall be non-staining.
 12. The sealant shall be capable of +100% / -50% joint movement

Note: Tests were performed with material and curing conditions at 71P°p-75P°pF and 45-55% relative humidity.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. The joint and adjacent substrate must be clean, dry, sound, and free of surface contaminants. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the engineer. Blow joint free of dust using compressed air line equipped with an oil trap.
- B. Cracks
 1. For best performance sealant should be gunned into crack to a minimum of a 1/4" in depth. Place the nozzle of the gun, either hand, air or electric powered, into the bottom of the crack and fill entire crack. Keep the tip of the nozzle in the sealant. Continue with a steady flow of sealant preceding the nozzle to avoid air entrapment. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the crack.
 2. Adhere to all limitations and cautions for the polyurethane sealant as stated in the manufacturer's printed literature.

3.02 CLEANING

- A. The uncured polyurethane sealant can be cleaned with an approved solvent. The cured polyurethane sealant can only be removed mechanically.

- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

PART 4 - QUANTITY AND PAYMENT

4.01 JOINT SEALERS

- A. Quantity of Joint Sealers will not be measured and will be considered incidental to other installations as described herein.
- B. Payment for Joint Sealers will be made as a part of payment for the related use item.

END OF SECTION

SECTION 081400
WOOD DOORS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This specification includes wood doors and panels; fire rated and non-rated. Hardware shall be provided as described in the specific line item.

1.02 SUBMITTALS

- A. Shop Drawings: Indicate door elevations, cutouts for glazing.
- B. Submittals
 - 1. Certificates for chain-of-custody certifying that wood used for stile and rail wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain-of-custody by an FSD-accredited certification body.
 - 2. Product Data for adhesives and composite wood materials, documentation indicating that products contain no urea formaldehyde.
- C. Samples: Submit two of door veneer, illustrating wood grain, color, and finish.

1.03 QUALITY ASSURANCE

- A. Perform work in accordance with the following:
 - 1. NWWDA I.S.1.
 - 2. Fire Door and Panel Construction: Conform to UL 10B.
- B. The use of polystyrene frames or trim is not acceptable (MSHDA STANDARD.)

PART 2 - PRODUCTS

2.01 INTERIOR SWING DOORS (HOLLOW CORE)

- A. Manufacturers:
 - 1. Masonite Corporation. Style: Legacy flush panel.
 - 2. Other manufacturers acceptable with Architect's approval.

- B. Doors shall be 36" Wide, or as indicated on drawings, hollow core, flush; pre-finished and pre-hung, with pre-finished white frame.
- C. Hardware shall be brass with round knobs.

2.02 INTERIOR SWING DOORS (SOLID CORE)

- A. Doors shall be 36" Wide, or as indicated on drawings, solid core, flush; pre-finished and pre-hung, with pre-finished frame. Color to be selected by the owner.
- B. Submittals
 - 1. Certificates for chain-of-custody certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
 - 2. Product Data for adhesives and composite wood products, documentation indicating that product contains no urea formaldehyde.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install doors and hardware in accordance with manufacturer's instruction requirements.
- B. Adjust doors for smooth and balanced door movement.

3.02 INSTALLATION TOLERANCES

- A. Conform to ANSI/NWWDA requirements for fit and clearance tolerances and maximum diagonal distortion.

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL INTERIOR DOORS WITH NON-KEY LOCKING HANDLE HARDWARE, COLOR PRE-PAINTED WHITE

- A. Quantity of "Furnish and Install Interior Doors with Non-Key Locking Handle Hardware, Color Pre-Painted White" will be measured for each door (EA) installed.
- B. Payment for "Furnish and Install Interior Doors with Non-Key Locking Handle Hardware, Color Pre-Painted White" will be measured for each door (EA) installed and shall include all materials, labor and equipment necessary to perform

construction layout, installation, hardware, locking mechanisms, door jams, framing and all incidental work.

4.02 CLEAN, PAINT, AND RESET EXISTING INTERIOR DOORS, INCLUDING REPLACEMENT OF HARDWARE AND DOOR HANDLES

- A. Quantity of “Clean, Paint, and Reset Existing Interior Doors, Including Replacement of Hardware and Door Handles” will be measured for each door (EA) refurbished and reset.
- B. Payment for “Clean, Paint, and Reset Existing Interior Doors, Including Replacement of Hardware and Door Handles” will be measured for each door (EA) refurbished and reset, and shall include all materials, labor and equipment necessary to perform construction layout, installation, hardware, locking mechanisms, door jams, framing and all incidental work.

4.03 FURNISH AND INSTALL INTERIOR CLOSET DOORS WITH MAGNETIC CATCH – SINGLE

- A. Quantity of “Furnish and Install Interior Closet Doors with Magnetic Catch – Single” will be measured for each door (EA) installed.
- B. Payment for “Furnish and Install Interior Closet Doors with Magnetic Catch – Single” will be measured for each door (EA) installed and shall include all materials, labor, and equipment necessary to perform construction layout, installation, hardware, locking mechanisms, door jams, framing and all incidental work.

4.04 FURNISH AND INSTALL INTERIOR CLOSET DOORS WITH MAGNETIC CATCH – DOUBLE

- A. Quantity of “Furnish and Install Interior Closet Doors with Magnetic Catch – Double” will be measured for each door (EA) installed.
- B. Payment for “Furnish and Install Interior Closet Doors with Magnetic Catch – Double” will be measured for each door (EA) installed and shall include all materials, labor, and equipment necessary to perform construction layout, installation, hardware, locking mechanisms, door jams, framing and all incidental work.

4.05 CLEAN, PAINT & RESET EXISTING CLOSET DOOR, INCLUDING REPLACEMENT OF HARDWARE AND NEW DOOR HANDLES

- A. Quantity of “Clean, Paint & Reset Existing Closet Door, Including Replacement of Hardware and New Door Handles” will be measured for each double closet door (EA) refurbished and reset.

- B. Payment for “Clean, Paint & Reset Existing Closet Door, Including Replacement of Hardware and New Door Handles” will be measured for each double closet door (EA) refurbished and reset, and shall include all materials, labor and equipment necessary to perform construction layout, installation, hardware, locking mechanisms, door jams, framing and all incidental work.

4.06 FURNISH AND INSTALL NEW CLOSET ROD

- A. Quantity of “Furnish and Install New Closet Rod” will be measured for each closet rod (EA) installed.
- B. Payment for “Furnish and Install New Closet Rod” will be measured for each rod installed (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.07 FURNISH AND INSTALL DOOR STOPPER

- A. Quantity of “Furnish and Install Door Stopper” will be measured for each door stopper (EA) installed.
- B. Payment for “Furnish and Install Door Stopper” will be measured for each door stopper installed (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.08 FURNISH AND INSTALL NEW EXTERIOR DOOR

- A. Quantity of “Furnish and Install New Exterior Door” will be measured for each door (EA) installed.
- B. Payment for “Furnish and Install New Exterior Door” will be measured for each door (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.09 FURNISH AND INSTALL NEW SCREEN DOOR

- A. Quantity of “Furnish and Install New Screen Door” will be measured for each door (EA) installed.
- B. Payment for “Furnish and Install New Screen Door” will be measured for each door (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

END OF SECTION

SECTION 085620
VINYL DOUBLE HUNG WINDOWS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Installation of vinyl double-hung windows.
- B. As manufactured by:
 - 1. Thermolite Inc., 950 North South Road, Scranton, Pa 18904. Toll Free: (800) 422-2427. Phone: (570) 969-1957

1.02 SUBMITTALS

- A. Comply with Division 1 requirements.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Submittals of windows other than the window specified shall be received not later than 10 days after notice to proceed.
- D. Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.
- E. Warranty: Submit manufacturer's standard warranty, warranty shall be a minimum of 10 years against manufacturer's defects, and installation.

1.03 RELATED SECTIONS

- A. Section 079000 (07 90 00) – Joint Sealants: Sealants and caulking.

1.04 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
 - 1. AAMA 303 - Voluntary Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions; American Architectural Manufacturers Association.
 - 2. AAMA 502 – Voluntary Specification for Field Testing of Windows and Sliding Doors.

- B. ASTM International:
 - 1. ASTM C 1036 – Flat Glass.
 - 2. ASTM C 1048 – Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. ASTM D 3656 – Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
 - 4. ASTM E 283 – Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
 - 5. ASTM E 547 – Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential.
 - 6. ASTM E 1105 – Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- C. Screen Manufacturers Association (SMA):
 - 1. SMA 1201 – Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
- D. Window and Door Manufacturers Association (WDMA):
 - 1. ANSI/AAMA/NWDA 101/I.S.2 – Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.

1.05 PERFORMANCE REQUIREMENTS

- A. Windows shall meet Rating HS-R 30 specifications in accordance with ANSI/AAMA/NWDA 101/I.S.2.
- B. Window Air Leakage, ASTM E 283: Window air leakage when tested at 1.57 psf (25 mph) shall be 0.25 cfm/ft² of frame or less.
- C. Window Water Penetration, ASTM E 547: No water penetration through window when tested under static pressure of 4.5 psf (42 mph) after 4 cycles of 5 minutes each, with water being applied at a rate of 5 gallons per hour per square foot.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site undamaged in manufacturers or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name. Include installation instructions.
- B. Storage:
 - 1. Store materials in accordance with manufacturer's instructions.
 - 2. Store materials off ground and under cover.
 - 3. Protect materials from weather, direct sunlight, and construction activities.

- C. Handling: Protect materials and finish during handling and installation to prevent damage.

PART 2 - PRODUCTS

2.01 VINYL DOUBLE-HUNG WINDOWS

- A. Vinyl Double-hung Windows: Encompass by Pella.
 - 1. Factory-assembled windows with sash installed in frame.
 - 2. Frame and Sash Material: Extruded, rigid polyvinylchloride (PVC).
- B. Frame:
 - 1. Type:
 - a.Replacement Frame: 20 Series.
 - 2. Overall Frame Depth:
 - a.Replacement Frame: 3-1/4 inches.
 - 3. Nominal Wall Thickness, Vinyl Members: 0.065 inch to 0.075 inch.
 - 4. Frame Corners:
 - a.Mitered.
 - b.Heat-fused, fully welded corners.
 - 5. Sill: Fitted with weeps
 - 6. Jambs: Factory-drilled, counter-bored, installation screw holes.
- C. Sash:
 - 1. Vent Sash: Removable for cleaning exterior glass.
 - 2. Sash Corners:
 - a.Mitered.
 - b.Heat-fused, fully welded corners.
- D. Glazing:
 - 1. Float Glass: ASTM C 1036, Quality 1.
 - 2. Type: Exterior face-glazed, 3/4-inch, sealed insulating glass.
 - a.Multi-layer, low-E coated, glass.
 - b.Obscure glass
- E. Weather Stripping:
 - 1. Vent Sash: Fin-type, pile around perimeter.

2.02 INSECT SCREENS

- A. Compliance:
 - 1. ASTM D 3656.

2. SMA 1201.

- B. Screen Cloth: Full-size with black, vinyl-coated, 18/14 mesh, fiberglass screen cloth set in aluminum frame fitted to window exterior.
- C. Full-size screens for windows with frame height $\leq 51\text{-}1/2''$ have one plunger per side, screens for windows with frame height $> 51\text{-}1/2''$ have two plungers per side.
- D. Full-size screens for windows with frame width $> 39''$ or frame height $> 53\text{-}1/2''$ have a screen spreader bar.
- E. Complete with necessary hardware.
- F. Screen Frame Finish: Baked enamel.
 - 1. Color: Match window exterior.

2.03 HARDWARE

- A. Balances:
 - 1. Galvanized steel block-and-tackle balances concealed with frame jamb.
 - 2. Polyester Cords: Connect balance to sash.
- B. Lock:
 - 1. Type: Factory-installed, zinc-die-cast, self-aligning, cam-action lock on meeting rail.
 - 2. Units with Frame Width $29\text{-}1/2$ Inches or Greater: 2 locks.
 - 3. Color: Match window interior.
- C. Tilt Latches:
 - 1. Type: Factory install zinc-die-cast, self-aligning tilt latches.
 - 2. Located on check rail of lower sash and top rail of upper sash.
 - 3. Color: Match window interior.

2.04 TOLERANCES

- A. Windows shall accommodate the following opening tolerances:
 - 1. Horizontal Dimensions Between High and Low Points: Plus $1/4$ inch, minus 0 inch.
 - 2. Width Dimensions: Plus $1/4$ inch, minus 0 inch.
 - 3. Building Columns or Masonry Openings: Plus or minus $1/4$ inch from plumb.

2.05 FINISH

- A. Window Frame and Sash Vinyl Extrusions: Integral color throughout profile.

- B. Exposed Surfaces: Smooth, glossy, and uniform in appearance.
- C. Color: Almond/ White.

PART 3 - EXECUTION

3.01 INSTALLATION ACCESSORIES

- A. Insulating-Foam Sealant: Dow Chemical Great Stuff Window and Door Insulating Foam Sealant39T.
 - 1. Low-pressure, polyurethane window and door insulating-foam sealant.
 - 2. Caulk, color of window exterior, and white color caulk for interior of window.
- B. Flashing/Sealant Tape: Pella SmartFlash, or approved equal.
 - 1. Aluminum-foil-backed butyl window and door flashing tape.
 - 2. Maximum Total Thickness: 0.013 inch.
 - 3. UV resistant.
 - 4. Verify sealant compatibility with sealant manufacturer.

3.02 EXAMINATION

- A. Examine areas to receive vinyl double-hung windows. Notify Engineer of conditions that would adversely affect installation or subsequent use. Do not proceed with installation until unsatisfactory conditions are corrected.

3.03 INSTALLATION

- A. Install vinyl double-hung windows in accordance with manufacturer's instructions.
- B. Install vinyl double-hung windows to be weather-tight and freely operating.
- C. Maintain alignment with adjacent work.
- D. Secure assembly to framed openings, plumb and square, without distortion.
- E. Seal vinyl double-hung windows to exterior wall cladding with sealant and related backing materials at perimeter of assembly.
- F. Place interior seal around vinyl double-hung window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.
- G. Leave vinyl double-hung windows closed and locked.

- H. Contractor will be responsible to verify actual size of windows in field prior to ordering.
- I. Contractor will be responsible to supply pressure-treated frame in existing opening.
- J. Contractor will complete interior installation with “quarter round” molding.
- K. If exterior wood frame is exposed, it shall be “capped” with coil stock matching window color.
- L. Contractor will be responsible for any drywall repair related to window installation if needed.

3.04 FIELD QUALITY CONTROL

- A. Field Testing: Field test vinyl double-hung windows in accordance with AAMA 502, Test Method A.

3.05 CLEANING

- A. Clean vinyl double-hung windows in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage finish or glass.
- C. Remove labels and visible markings.
- D. Keep window tracks clear of dirt and debris.
- E. Keep weep holes open and clear of obstructions.

3.06 PROTECTION

- A. Protect installed vinyl double-hung windows to ensure that, except for normal weathering, windows will be without damage or deterioration at time of substantial completion.

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL EXTERIOR WINDOW

- A. Quantity of “Furnish and Install Exterior Window” will be measured in units (EA) for each individual window installed, in accordance with the bid tabulation.

- B. Payment for “Furnish and Install Exterior Window” will be made per individual window installed (EA), and shall include all materials, labor, and equipment necessary to complete the work specified herein, as well as all restorations and incidental work.

4.02 CLEAN AND RESET EXTERIOR WINDOW

- A. Quantity of “Furnish and Install Exterior Window” will be measured in units (EA) for each individual window cleaned and reset, in accordance with the bid tabulation.
- B. Payment for “Furnish and Install Exterior Window” will be made per for each individual window cleaned and reset (EA), and shall include all materials, labor, and equipment necessary to complete the work specified herein, as well as all restorations and incidental work.

END OF SECTION

SECTION 092900
GYPSUM DRYWALL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Extent of each type of gypsum drywall construction required is indicated on Contract documents. This section includes the following types of gypsum board construction:
1. Light-gauge and heavy-gauge non-load bearing steel framing members
 2. Gypsum board screw-attached to steel framing and furring members.
 3. Exterior gypsum board panels for ceilings and soffits.
 4. Tile backing panels.

1.02 SUBMITTALS

- A. General: Submit the following in accordance with conditions of Contract.
- B. Product Data:
1. Submit product information from manufacturers for each type of product specified.
 2. Submit gypsum manufacturer's documentation of recycled content for gypsum board.
 3. Submit gypsum manufacturer's documentation of buyback and/or recycling program.
 4. Submit steel framing manufacturer's documentation of U.S. manufactured steel.
- C. Asbestos-Free Certification: Submit manufacturer's written certification that all materials are free of asbestos.

1.03 REFERENCES

- A. American Society of Testing and Materials (ASTM)
1. A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 2. A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 3. C 36 Standard Specification for Gypsum Wallboard
 4. C 79 Standard Specification for Treated Core and Nontreated Core Gypsum Sheathing Board
 5. C 442 Standard Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board

6. C 475 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
7. C 630 Standard Specification for Water-Resistant Gypsum Backing Board
8. C 645 Standard Specification for Nonstructural Steel Framing Members
9. C 754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
10. C 840 Standard Specification for Application and Finishing of Gypsum Board
11. C 931 Standard Specification for Exterior Gypsum Soffitt Board
12. C 1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
13. C 1047 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
14. C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
15. C 1178 Standard Specification for Glass Mat Water-Resistant Gypsum Backing Panel
16. E 90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
17. E 119 Standard Test Methods for Fire Tests of Building Construction and Materials
18. E413 Standard Classification for Rating Sound Insulation

B. American National Standards Institute (ANSI)

1. A118.9 Specifications for Cementitious Backer Units

C. Gypsum Association (GA)

1. GA-216 Application and Finishing of Gypsum Board
2. GA-600 Fire Resistance Design Manual

1.04 QUALITY ASSURANCE

- A. Fire Test Response Characteristic: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing and inspection agency.

1. Fire-Resistance-Rated Assemblies: Indicated by design designation from Factory Mutual's "Approved Guide Building Products," Underwriter Laboratory's "Fire Resistance Directory."

- B. Sound Transmission Characteristics (STC): For gypsum board assemblies with STC Ratings, provide materials and construction identical to those tested in assembly

indicated according to ASTM E 90 and classified according to ASTM E413 by qualified testing agency.

1. STC Rated Assemblies: Indicated by design designation from GA-600 fire resistance design manual.
- C. Gypsum Board Finish Mockups: Before finishing gypsum board assemblies, install mockups as required by SDR of at least 100 square feet in surface area to demonstrate aesthetic effects and qualities of materials and execution.
 1. Install mockups for the following applications:
 - a. Surfaces with textured finishes.
 - b. Surfaces indicated to receive non-textured paint surfaces.
 - c. Surfaces indicated to receive textured paint finishes.
 - d. Surfaces with a change in textured material.
 2. Simulate finished lighting conditions for review of mockups.
 3. Approval mockups may become part of the completed work if undisturbed at time of construction complete.
- D. Level of Finish: Levels of gypsum board finish will be as per the "recommended specification LEVELS OF GYPSUM BOARD FINISH" as published by the Association of the wall and ceiling Industries-International (AWCI), Ceilings and interior systems Construction Association (CISCA), Gypsum Association (GA), and Painting and Decorating Contractors of America (PDCA), or as indicated on the contract documents.
 1. Level 1 Finish above ceilings.
 2. Level 2 Finish where water resistive gypsum backer board is used as substrate for tile.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original unopened packages clearly marked with identifying information. Protect materials as recommended by the manufacturer.
- B. Store materials, keep dry, and protect against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels on level surface to prevent sagging.

1.06 PROJECT CONDITIONS

- A. Environmental Conditions: Establish and maintain environmental conditions for application and finishing of gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.

- B. Minimum Room Temperatures: For attachment of gypsum board to framing, maintain not less than 40 degrees F. For finishing of gypsum board, maintain not less than 50 degrees F for 48 hours prior to application, and continuously thereafter until drying is complete.
- C. Ventilation: Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Products made by the following manufacturers, provided they comply with requirements of Contract documents, will be among those considered acceptable. However, it is the Contractor's responsibility to provide only products compatible with adjacent materials in the assembly.
 - 1. Steel Framing and Furring:
 - a. Dale Industries, Inc.
 - b. Dietrich Industries, Inc.
 - c. National Gypsum Co.; Gold Bond Building Products Division
 - d. Unimast, Inc.
 - e. United States Gypsum Co.
 - 2. Grid Suspension System:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corp.
 - c. United States Gypsum Co.
 - d. Worthington Steel Company (formerly National Rolling Mills Co.)
 - 3. Gypsum Boards and Related Products: Only products produced in the USA are allowed under this contract.
 - a. Centex American Gypsum
 - b. Georgia Pacific Corp.
 - c. National Gypsum Co.; Gold Bond Building Products Division
 - d. United States Gypsum Co.

2.02 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

- A. General: Provide components, which comply with ASTM C 754 for materials and sizes, unless otherwise indicated. Provide U.S. manufactured steel components.
- B. Main Runners: Hot or cold-rolled steel channels with rust inhibitive paint finish.
- C. Wire Ties: ASTM A641, Class 1 zinc coating, soft temper, 0.062 inch (16 gage).
- D. Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, 0.162 inch (8 gage).
- E. Hanger Anchorage Devices: Screws, clips, bolts, cast-in-place concrete inserts or other devices applicable to the indicated method of structural anchorage for ceiling hangers. Size devices for 3 times the calculated load supported, except size direct pullout concrete inserts for 5 times the calculated loads.
- F. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8 inch; minimum 25 gauge thickness, unless otherwise indicated.
- G. Grid Suspension System: ASTM C 645, manufacturer's standard grid suspension system composed of main beams and cross furring members which interlock to form a modular supporting network.

2.03 STEEL FRAMING FOR WALLS AND PARTITIONS

- A. General: Provide U.S. manufactured steel components.
- B. Steel Studs and Runners: ASTM C 645, galvanized, unless otherwise indicated. For doorjambs and support of restroom fixtures use 20 gauge steel framing members. For walls at or below 8 ft in height use Light-gauge, (minimum 25 gauge) steel framing members. For walls above 8 ft in height use Heavy-gauge (minimum 20 gauge), steel framing members. A transverse load test shall be required for non-load bearing walls based upon the finishes that the particular wall is to receive and the height of the wall.
 - 1. Depth of Section: 3-5/8 inch unless otherwise shown on drawings.
 - 2. Runners: Match studs; type recommended by stud manufacturer for floor and ceiling support of studs, and for vertical abutment of drywall work at other work.
- C. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, galvanized; minimum depth of 7/8 inch and minimum 25 gauge thickness, unless otherwise indicated.
- D. Z-Furring Members: Manufacturer's standard Z-shaped furring members fabricated from hot-dip galvanized steel sheet complying with ASTM A 653, Coating Designation G60; minimum 25 gauge thickness, face flange of 1-1/4 inch, wall-

attachment flange of 7/8 inch, and of depth required to fit insulation thickness indicated.

- E. Fasteners: Type and size recommended by gypsum drywall manufacturer for the substrate and application indicated.

2.04 GYPSUM BOARD

- A. General: Provide gypsum board of type, edge configuration, and thickness indicated, in maximum lengths available to minimize end-to-end butt joints.
- B. Recycled Content: Gypsum recycled content to be the greatest amount available, up to 28% postindustrial content. Subject to compliance with requirements, synthetic (flue-gas) gypsum shall be used when available. Paper facing to be 100% post consumer recycled content. Fiber gypsum board shall consist of recycled newspaper and gypsum over recycled newspaper, gypsum and perlite core.
- C. Gypsum Board: ASTM C 36, and unless otherwise indicated:
 - 1. Type: Regular.
 - 2. Edges: Tapered.
 - 3. Thickness: 1/2 inch at ceilings.
 - 4. Thickness: 5/8 inch at walls.
- D. Fiber Gypsum Board (Abuse-Resistant): ASTM C 36, and unless otherwise indicated:
 - 1. Type: Type 'X'.
 - 2. Edges: Tapered.
 - 3. Thickness: 1/2 inch at ceilings.
 - 4. Thickness: 5/8 inch at walls.
- E. Fire-Resistive Board: ASTM C 36, and unless otherwise indicated:
 - 1. Type: Type 'X.'
 - 2. Edges: Tapered.
 - 3. Thickness: 5/8 inch at ceilings and walls.
- F. Gypsum Backing Board: ASTM C 442 where indicated on Contract documents as base layer for multi-layer application. Unless otherwise indicated:
 - 1. Type: Regular or Type 'X' for fire-resistance-rated assemblies.
 - 2. Edge: Tapered.
 - 3. Thickness: 1/2-inch non-fire rated or 5/8 inch at fire rated applications.

- G. Water-Resistant Backing Board: ASTM C 630 and ASTM C 1396, and use where indicated on drawings. Unless otherwise indicated:
1. Type: Regular or Type "X" for fire-resistance-rated assemblies.
 2. Edge: Tapered.
 3. Thickness: 5/8 inch.
- H. Tile Backing Panels:
1. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
 2. Water-Resistant Gypsum Backing Board: ASTM C 630. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M.
 - a. Core: As indicated 1/2 inch, regular type or 5/8 inch, Type X.
 3. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178.
 - a. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, "Dens-Shield Tile Backer" manufactured by G-P Gypsum Corp.
 - b. Product: Subject to compliance with requirements, provide "Dens-Shield Tile Backer" manufactured by G-P Gypsum Corp.
 - c. Core: As indicated 1/2 inch, regular type or 5/8 inch, Type X.
 4. Cementitious Backer Units: ANSI A118.9.
 - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Products: Subject to compliance with requirements, provide one of the following:
 - a. Custom Building Products; Wonderboard.
 - b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
 - c. United States Gypsum Co.; DUROCK Cement Board.
 - c. Thickness: As indicated 1/2 inch, regular type or 5/8 inch Type X.
- I. Gypsum Sheathing Board: ASTM C 79, and unless otherwise indicated:
1. Type: Regular or Type 'X.'
 2. Edges: Square.

3. Thickness: 1/2 inch at regular, 5/8 inch at fire rated applications.

J. Exterior Gypsum Panels for Ceilings and Soffitts:

1. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
2. Exterior Gypsum Soffitt Board: ASTM C 931, with manufacturer's standard edges.
 - a. Core: As indicated 1/2 inch, regular type or 5/8 inch, Type X.
3. Glass-Mat Gypsum Sheathing Board: ASTM C 1177.
 - a. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "Dens-Glass Gold" by G-P Gypsum Corp.
 - b. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corp.
 - c. Core: As indicated 1/2 inch, regular type or 5/8 inch, Type X.

2.05 TRIM ACCESSORIES

- A. Cornerbead and Edge Trim: Provide cornerbeads, edge trim, and control joints, which comply with ASTM C 1047 and requirements indicated below:
1. Material: Unless otherwise indicated, galvanized steel with either knurled and perforated or expanded flanges, and beaded for concealment of flanges in joint compound.
 2. Edge trim shapes indicated below by reference to designations of Figure 1 in ASTM C 1047:
 - a. "L" Bead
 - b. "U" Bead
 - c. "LK" Bead
 - d. "J" Bead
- B. Control Joint: Provide one piece control joint formed with V-shaped slot, per Figure 1 in ASTM C 1047, with slot opening covered with removable strip. Control joint to be 30ft on center maximum.

2.06 GYPSUM BOARD JOINT TREATMENT MATERIALS

- A. General: Provide materials complying with ASTM C 475, ASTM C 840 and type recommended by the manufacturer for the application indicated, except as otherwise indicated.

- B. Joint Tape: Paper reinforcing.
 - C. Ready-Mixed Taping Joint Compound: Pre-mixed, non-asbestos, vinyl-based compound formulated for tape application, fastener spotting, first fill coat on metal beads and trim and filling.
 - D. Ready-Mixed Topping Joint Compound: Pre-mixed, non-asbestos, vinyl-based compound for second and third coats over taped joints, fastener spottings and the finish coat over metal beads and trim.
 - E. Drywall Primer: A flat latex-based primer coat to equalize the texture and porosity differences between joint compound and drywall, as recommended by textured finish manufacturer.
1. Comply with Section 099000, "Painting"

2.07 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall construction, which comply with referenced standards and the recommendations of the gypsum board manufacturer.
- B. Gypsum Board Screws: ASTM C 1002.
- C. Acoustical Sealant: Water base, non-drying, non-bleeding, non-staining type and permanently elastic. Comply with requirements specified in Section 07900, "Joint Sealants", and as recommended by the gypsum board manufacturer for application indicated.
- D. Powder Texturing Product: Non-asbestos powder product, mixed with water for producing a satisfactory "spatter" spray texture. Provide other textures as indicated in Contract documents.
- E. Corner Guards: Provide surface-mounted or recessed s on all corridor walls and other high impact areas as indicated on drawings. Where corner guards are required on fire-resistive walls, provide surface or flush-mounted types that are UL listed.
 1. Corner guards shall consist of a continuous extruded aluminum retainer, top and bottom high impact nylon closer caps, and a vinyl/acrylic guard.
 2. Guard length shall be a minimum of 4'-0" from finished floor
 3. Wall thickness of .110 inch and angle-shaped with 3-inch legs and ¼-inch radius at corners and ends.
 4. Furnish guard in matte finish from manufacturer's standard color line. Closure caps shall be of the same color as the guards. Color to be selected from color selection charts provided by the manufacturer.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION OF STEEL FRAMING

- A. Examination: Examine areas and substrates, with installer present, and including hollow-metal frames, anchors, and structural and non structural framing, for compliance with other requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have corrected.

- B. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- C. Install supplementary framing, blocking and bracing at terminations in the gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if not available, with United States Gypsum's "Gypsum Construction Handbook."
- D. Isolate steel framing from building structure at locations to prevent transfer of loading imposed by structural movement.
 - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
 - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
 - a. Use deep-leg deflection track where indicated.
 - b. Use proprietary deflection track where indicated.
 - c. Use proprietary firestop track where indicated.
- E. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.02 INSTALLATION OF STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

- A. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners as indicated on drawings.
- B. Space main runners 4'-0" and hangers 4'-0" O.C. along runners, unless otherwise indicated.
- C. Installation Tolerances: Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within 1/8 inch in 12'-0", measured lengthwise on each member and transversely between parallel members.
- D. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross furring members to each other and butt-cut to fit into wall track.
- E. Attach perimeter wall track or angle wherever support system meets vertical surfaces.

3.03 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings and structural walls, and columns where gypsum drywall stud system abuts other work.

- B. Installation Tolerances: Install steel framing & furring members so that fastening surfaces do not vary more than 1/8 inch from plane of faces of adjacent framing.
- C. Extend Partition Framing: For fire-resistance rated and STC rated partitions, extend to underside of floor/roof slabs and decks or other continuous solid-steel surfaces to obtain ratings. Install framing around structural and other members existing below floor/roof slabs and decks, as needed, to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.
 - 1. Terminate partition framing at or above suspended ceilings where indicated.
 - 2. Cut ½ inch short of full height to provide perimeter relief.
- D. Space studs and wall furring at 16 inches o.c., except as otherwise indicated. Attach studs to top and bottom tracks by button punch or screws, except that studs located adjacent to doors, windows, partition intersections or ends, and at corners shall be screwed to tracks.
- E. Frame door openings with double 20 ga vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on doorframe; install runner track sections (for jack studs) at head and secure to jamb studs. Shot anchors are not allowed in any case.
- F. Frame openings other than door openings in same manner as required for door openings, and install framing below sills of openings to match framing required above door heads.

3.04 APPLICATION AND FINISHING OF GYPSUM BOARD

- A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840 and GA 216.
- B. Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 12 inches.
- C. Install wall/partition boards vertically to avoid end-butt joints wherever possible.
- D. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16-inch open space between boards. Do not force into place.
- E. Locate either edge or end joints over supports. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Stagger vertical joints over different studs on opposite sides of partitions.
- F. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.
- G. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

- H. Isolate perimeter of non-load bearing drywall partitions at structural abutments. Provide 1/4 to 1/2 inch wide spaces and trim edges with “U”-bead trim where edges of drywall panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.
- I. Where sound attenuation drywall construction is indicated, seal the work at perimeters, control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with manufacturer's recommendations for location of beads and close off sound-flanking paths around or through the work.
- J. Space fasteners in each layer of gypsum board in accordance with manufacturer's recommendations, Uniform Building Code, and published U.L. or other published assemblies.

3.05 METHODS OF GYPSUM DRYWALL APPLICATION

- A. Single-Layer Application: Install gypsum wallboard as follows:
 - 1. On ceilings, apply gypsum board prior to wall/partition board application to the greatest extent possible.
 - 2. On partitions/walls, apply gypsum board vertically (parallel to framing), unless otherwise indicated and provide sheet lengths, which will minimize end joints.
 - 3. On Z-furring members, apply gypsum board vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Wall Tile Base: Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install gypsum-backing board.
 - 1. At showers, tubs and similar "wet" areas, install water-resistant gypsum or cementitious backing board. Apply with un-cut long edge at bottom of work, and space 1/4 inch above fixture lips. Seal ends, cut-edges, and penetrations of each piece with water-resistant compound before installation.
- C. Acoustical Tile Base: Where drywall is base for adhesively applied acoustical tile, install gypsum backing board.
 - 1. Provide either V-joint type backing board, or tape and finish joints (2 coats unsanded).
- D. Double-Layer Application: Install gypsum backing board for base layer and gypsum board for face layer.
 - 1. On ceilings, apply base layer prior to application of face layer on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10 inches. Ensure all joints run in the same direction.
 - 2. On partitions/walls apply base layer and face layers vertically (parallel to framing) with joints of base layer over supports, and with face layer joints offset at least 10 inches with base layer joints. Ensure all joints run in the same direction.
 - 3. On Z-furring members apply base layer and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with joints offset at least

one furring member. Locate edge joints of base layer over furring members. Ensure all joints run in the same direction.

- E. Single-Layer Fastening Methods: Apply gypsum boards to supports with screws.
- F. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer by fastening the two layers separately to supports with screws. On fire-rated wall installations, each layer shall have sufficient screws as though it was the only layer.

3.06 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports.
- B. Install metal corner beads at external corners of drywall work.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing) type is indicated.
 - 1. Install "L" bead where work is tightly abutted to other construction.
 - 2. Install special "LK" bead where other work is kerfed to receive long leg of "L" bead trim.
 - 3. Install "U" bead where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).
- D. Install "U" bead trim where indicated, and where applied moldings do not cover exterior gypsum board edges.
- E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard as recommended by GA-216.

3.07 INSTALLATION OF MISCELLANEOUS MATERIALS

- A. Install each item in accordance with the manufacturer's directions and recommendations. Use anchors and other fasteners supplied by the manufacturer, which match the finish of the items. Install all items plumb or level.
- B. Mount chair rails at 2'-6 1/2" above finished floor level.

3.08 FINISHING OF DRYWALL

- A. General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects, and elsewhere as required to prepare work for decoration.
 - 1. Prefill any open joints and rounded or beveled edges using type of compound recommended by the manufacturer.
 - 2. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape. Do not apply joint tape or joint compound to

the base layer in a double layer application, unless otherwise noted on the Contract documents.

3. Finish interior gypsum board by applying joint compound in three coats (not including prefill of openings in base), and sand between coats and after last coat.
- B. Base for Acoustical Tile: Where gypsum board is indicated as a base for adhesively applied acoustical tile, install tape and 2-coat compound treatment, without sanding.
 - C. Water-Resistant Gypsum Board Base for Ceramic Tile: Treat joints and fasteners to comply with directions of water-resistant joint compound manufacturer.
 1. In areas to be tiled, treat fastener heads with water-resistant joint compound.
 - a. Fill tapered edges in gypsum panels with water-resistant joint compound, embed joint tape firmly, and wipe off excess compound.
 - b. Follow immediately with a second coat of water-resistant joint compound over taping coat, being careful not to crown the joint.
 - c. Fold and embed tape in all interior angles to form true angle.
 2. In areas not to be tiled, treat fastener heads and embed tape as indicated above, using water-resistant joint compound. Finish with two coats of joint compound used for regular gypsum board work.
 - D. Fire-rated Gypsum Board: Tape and bed all surface joints and caulk all perimeter edges. The base layer joints need not be taped. Insure all joints are staggered and run in the same direction.
 - E. Surface Texturing: All gypsum board surfaces exposed in finish areas shall be textured. Finish areas are those specified to be painted and as scheduled on the drawings.
 1. Texture shall be a "spatter" spray application unless otherwise approved.
 2. Spray shall be applied to produce a uniform texture without starved spots or other evidence of thin application.

3.09 SURFACE PREPARATION AND PRIMER

- A. Prepare and apply primer to gypsum board and other surfaces prior to receiving texture finishes according to texture finish manufacturer's instructions. Apply primer only to surfaces that are clean, dry and smooth.

3.10 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces not indicated to receive texture.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of construction complete.

PART 4 - QUANTITY AND PAYMENT

4.01 GYPSUM DRYWALL REPLACEMENT

- A. Quantity of "Gypsum Drywall Replacement" will be measured for each square foot (SF) where drywall is installed.
- B. Payment for "Gypsum Drywall Replacement" will be made for each square foot (SF) where drywall is installed, and shall include layout, all material, labor and equipment to complete the work, including any incidental materials as needed. The contractor shall be responsible for surveying the existing layout to provide the proper amount of gypsum drywall.

END OF SECTION

SECTION 096900
VINYL FLOORING

PART 1 - GENERAL

1.01 STIPULATIONS

- A. The specifications section "General Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.
- B. Drawings and general provisions of the Contract apply to this Section.

1.02 DESCRIPTION

- A. Generally, this section includes installing commercial and residential grade materials and installation products and accessories manufactured by the Vinyl sheet flooring materials manufacturer or recommended by the Vinyl sheet flooring materials manufacturer for use with the intended Vinyl sheet flooring materials.
- B. The extent of Vinyl sheet flooring (Linoleum) work is indicated in the contract documents, and as required in this specification section.
- C. Commercial and residential grade Vinyl sheet flooring installation contractor-supplied accessories may be installed with edge stable only, glue and in accordance with the manufacturer's recommendations.

1.03 REFERENCES

- A. Scoping and technical requirements as illustrated in Armstrong installation instructions.
- B. ASTM F 1303, Type I, Grade 3, Class A backing
- C. International Building Code, latest edition
- D. International Fire Code, latest edition

1.04 DEFINITIONS

- A. Vinyl sheet flooring materials, intended for use in residential or commercial and public spaces, with construction, accessibility, fire/life safety ratings, and appearance appropriate for this use.

1.05 SUBMITTALS

- A. Submit all requested items according to Conditions of the Contract, and administrative procedures and instructions for submittals.
- B. Submit the manufacturer's written installation recommendations for each type of substrate.
- C. Provide contract shop drawing submittals that indicate the following:
 - 1. Extent, condition and types of substrate over which products will be installed
 - 2. Extent of existing flooring materials to be removed, and existing flooring materials to remain.
 - 3. Type/method of installation intended
 - 4. Type of seams, patterns, repeat size, location, direction and starting point
 - 5. Special notes on required cutouts, and other special installation conditions or methods
 - 6. Vinyl sheet flooring joint details at columns, doorways, walls and partitions, built-in cabinets and furniture, access doors, expansion joints and similar conditions, and unique edges.
 - 7. When specifically requested by the Engineer or the Authority submit samples for verification of proposed Vinyl sheet flooring materials in 2.25 square foot or larger sizes.

1.06 QUALITY ASSURANCE

- A. Contractor's Qualifications
 - 1. The Vinyl sheet flooring installation contractor must have a physically established local office within the Philadelphia metro area of the Authority's facility.
 - 2. The Vinyl sheet flooring installation contractor's local office shall have a knowledgeable individual specifically assigned to service the general contractor and the Authority. This individual shall be qualified and authorized to represent the installation contractor in all aspects of the Conditions of the Contract.
- B. Single Source Responsibility: Provide materials produced or approved by a single manufacturer, Armstrong or approved equal.
- C. When requested by the Engineer or the Authority, perform testing using Underwriters Laboratories or other testing authority pre-approved and accepted by the code authorities having jurisdiction for this work.
- D. Product Options: Products and manufacturers named in Part 2 establish

requirements for product quality in terms of appearance, construction and performance. Other manufacturers' products comparable in quality to named products and complying with requirements may be considered.

- E. Mock-ups: When requested by the Engineer or the Authority, provide and install mock-ups as directed for each type of Vinyl sheet flooring installation to demonstrate aesthetic effects and qualities of materials and execution. Obtain written approval from the Engineer of mock-ups before starting work. Maintain mock-ups during construction and approved mock-ups may become part of the completed work subject to approval of the Engineer.

1.07 WARRANTY

- A. Provide the installation contractor's non-prorated written warranty, signed by an authorized representative of the corporation. The warranty shall state that the contractor agree to repair or replace all Vinyl sheet flooring materials that do not meet specified installation requirements, or that are found to be otherwise defective.
- B. The contractor shall do so at no charge for materials, freight and labor, including all reasonable costs for moving equipment and furnishings, and with minimal disruption to the Authority.
- C. Where the installation contractor is responsible for providing Vinyl sheet flooring materials, or otherwise required by Conditions of the Contract, provide the Vinyl sheet flooring manufacturer's published non-prorated written warranty, signed by an authorized representative of the corporation.
- D. The installation contractor's non-prorated warranty shall be in addition to, and shall not in any way diminish, all legal express and implied warranty rights available to the Authority, including implied warranty of merchantability or fitness for a particular purpose.
- E. Obligation of Warrantor: The installation contractor shall, within five working days of receipt of claim, designate a representative to inspect the suspected product and evaluate the warranty claim. Any portion of the Vinyl sheet flooring materials or installation not performing as specified shall be repaired or replaced using products from the manufacturer's current running line where possible, or with a comparable custom product, at the Authority's sole discretion.

1.08 EXISTING CONDITIONS AND VINYL SHEET FLOORING DEMOLITION

- A. Where required, the installation contractor shall demolish/remove all existing floor coverings.
- B. Vacuum the floor immediately after the old flooring have been removed.

- C. Open windows and doors, if possible, for an adequate supply of fresh air. Use window fans, exhaust fans, room air conditioning units or other means for fresh air ventilation during the removal of old Vinyl sheet flooring and the installation of the new Vinyl sheet flooring.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the manufactures requirements for storage and handling.
- B. Allow for timely acclimation and aeration (minimum of 48 hours aeration), prior inspections and cutting/seaming in the Vinyl sheet flooring installation contractor's workroom. Do not deliver directly from point of manufacture to the work site.

PART 2 - PRODUCTS

2.01 VINYL SHEET FLOORING

- A. Where required by the Contract, provide Vinyl sheet flooring as indicated in the contract documents, drawings and finish schedules. Match samples approved by the Engineer and the Authority.
- B. To provide a quality standard, subject to compliance with requirements of this section, products manufactured by the following company may be incorporated into the work: Armstrong Deep Creek Timbers, Rustic Hearth B3012, or approved equal.
- C. Adhesives shall use Armstrong S-295, or approved equal.
- D. Seal Coating Kit: Armstrong S-761 shall be used, or approved equal.

2.02 EXTRA MATERIALS

- A. Generally, the Authority does not require extra Vinyl sheet flooring materials to be provided unless it is specifically designated on the individual purchase order, and pre-approved by the Authority owner's representative for accommodating specific project goals/needs. The Authority shall retain all scraps larger than 3 ft by 3 ft.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. After acclimation and before cutting/seaming, the installation contractor's local representative shall thoroughly examine the materials after delivery to the work site.

3.02 PREPARATION

- A. In rehabilitation and remodeling projects, all general floor leveling may be by either the general contractor or the installation contractor at the request of the general contractor following the same tolerances and standards as for new construction.
- B. Minor leveling and other floor preparation for installation shall be by the Vinyl sheet flooring installation contractor in conformance with the specified Vinyl sheet flooring manufacturer's preparation recommendations.

3.03 INSTALLATION

- A. Comply with Armstrong applicable installation method.
- B. Use environmentally responsible, low VOC installation materials.
- C. Installation shall be performed by individuals trained in the installation of Vinyl sheet flooring for installation of proposed products.

3.04 MAINTENANCE/CLEANING

- A. After installation and protect completed work. Promptly remove protective coverings as directed by the Engineer of record or Authority owner's representative.
- B. Provide initial and ongoing programmed instruction and training of Authority maintenance staff on the proper maintenance materials and techniques required for long-term appearance retention and product durability.

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL VINYL FLOORING, INCLUDING VINYL COVE BASE

- A. Quantity of "Furnish and Install Vinyl Flooring, Including Vinyl Cove Base" will be measured in square feet (SF), for the finished area of Vinyl sheet flooring installed. Excess or unused material will not be measured.
- B. Payment for "Furnish and Install Vinyl Flooring, Including Vinyl Cove Base" will be made per square foot (SF) and shall include all materials, labor and equipment necessary to perform the work described herein, including vinyl cove base.

END OF SECTION

SECTION 099000
PAINTING

PART 1 - GENERAL

1.01 STIPULATIONS

- A. The specifications sections "General Conditions", "Special Requirements" and "General Requirements" form a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.
- B. Drawings and general provisions of the Contract apply to this Section.

1.02 SUMMARY

- A. Description of Work in this section:
 - 1. Proposed Facilities:
 - a.Painting and finishing of exposed interior wall and ceiling surfaces.
 - b.Painting and finishing of interior doors.
 - 2. Existing Facilities:
 - a.Restoration of areas damaged or modified during construction.
 - b.Painting and finishing areas of exposed interior wall and ceiling surfaces.

1.03 DEFINITIONS

- A. DFM (dry film mils): Thickness, measured in mils, of a coat of paint in the cured state.

1.04 SUBMITTALS

- A. Product Data: Six (6) sets of manufacturer's technical data sheets for each paint product used.
- B. Color and Texture Samples:
 - 1. Provide for each coating system, color, and texture and applied to representative substrate samples.
 - a.Prepare samples to show bare, prepared surface and each successive coat.
 - b.Label each sample with coating name and color.
 - 2. Miscellaneous substrates: 12 x 12 inch hardboard or sheet rock.

1.05 QUALITY ASSURANCE

A. Materials:

1. All coating materials required by this section shall be provided by a single manufacturer, unless otherwise required or approved.

B. Applicator: Firm with not less than 5 years of successful experience in painting work similar in scope of work of this project.

1. Maintain throughout duration of the work of a crew of painters who are fully qualified to satisfy requirements of the specifications.

C. Mock-up: Before proceeding with work of this section, finish one complete wall and one ceiling space of each color scheme required, showing selected colors, finish texture, materials, and workmanship for approval by the engineer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers bearing coating name and color, material composition data, date of manufacture, legal notices if applicable, and mixing, thinning, and application instructions.

1.07 PROJECT CONDITIONS

A. Apply coatings only under the following environmental conditions:

1. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures above 50 degrees F for 24 hours before, during and for 48 hours after application of finishes, or longer if required to obtain full cure as indicated by manufacturer's instructions.

B. Do not apply paint when surface temperature is below dew point; or when relative humidity is above 85 percent; unless approved by Engineer.

1.08 COORDINATION

A. Coordinate all work with other trades and contractors.

1.09 MAINTENANCE STOCK

A. At time of completing application, deliver stock of maintenance material to the Authority. Furnish not less than one properly labeled and sealed 1 gallon can of each type of finish coat of each color, taken from lots furnished for the work.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Paint: Manufactured for purpose specified as recommended and certified by paint manufacturer. Use manufacturer's standard colors as selected by Authority and approved by Engineer.
- B. Paint Schedule:
 - 1. Interior Wood Trim and Doors.
 - a.Prime: 1 coat MAB, Prime Fast, 037-138 Line or 1 coat Sherwin Williams Prep Rite Wood & Wall (2.0-3.0 mils dft/coat), or approved equal.
 - b.Finish: 2 coats MAB, Fresh Kote, White Semi-Gloss, Latex Finish (3-4 mils dft/coat) Latex Semi-Gloss, or approved equal.
 - c.Gypsum Wallboard or Sheet Rock.
 - d.Prime: 1 coat MAB, Prime Fast, 037-138 Line or 1 coat Sherwin Williams B28 Series Prep Rite 200 Latex Primer (2-3 mils dft/coat) Base White, or approved equal.
 - e.Finish: 2 coats MAB, Fresh Kote, White Semi-Gloss, Latex Finish (3-4 mils dft/coat), or approved equal.

2.02 PRODUCTS

- A. Colors:
 - 1. MAB, Fresh Kote, White Semi-Gloss, Latex Finish (3-4 mils dft/coat).

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that surfaces and conditions are ready for work in accordance with coating manufacturer's recommendations.

3.02 SURFACE PREPARATION

- A. Apply coatings to surfaces that are clean properly prepared in accordance with manufacturer's instructions. Remove dirt, dust, grease, oils, and foreign matter. Prepare surface for proper texture necessary to optimum coating adhesion and intended finished appearance. Plan cleaning, preparation, and coating operations to avoid contamination of freshly coated surfaces.
 - 1. Do not apply coatings to labels that identify equipment, fire-resistance ratings, etc.
 - 2. Remove hardware, cover plates, and similar items before applying coatings.
 - 3. Use only skilled workmen for removal and replacement of such items.

4. Protect surfaces not scheduled for coating. Clean, repair, or replace to the satisfaction of the Engineer any surfaces inadvertently spattered or coated.
5. Allow substrate to dry thoroughly. Test for moisture in accordance with coating manufacturer's recommendations before applying coatings.
6. Before hand or power tool cleaning, remove visible oil, grease, soluble welding residue, and salts by solvent cleaning. After hand or power tool cleaning, re-clean surfaces if necessary.
7. Before touching up coatings damaged by handling, re-prepare damaged surfaces.

3.03 MIXING AND THINNING

- A. Remove and discard any skin formed on surface of coatings in containers. Discard any containers where skin comprises 2 percent or more of the remaining material. Do not add thinner except as specifically recommended (not merely permitted) by the coating manufacturer for proper coating application under the circumstances prevailing at the project site when application equipment recommended by the coating manufacturer is employed. Use only the quantities and the types of thinner recommended.

3.04 APPLICATION

A. General:

1. Apply coatings in accordance with coating manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.
2. Apply each coat to achieve the dry film thickness per coat recommended by the coating manufacturer. Application rates in excess of those recommended and fewer numbers of coats than specified will not be accepted.
3. Completed coatings shall be free of defects such as runs, sags, variations in color, lap or brush marks, holidays, and skips.
4. Apply coatings according to the schedule at the end of this section and as otherwise indicated. Coat all similar surfaces not specifically mentioned unless specifically exempted.
5. Coat front and back of miscellaneous items such as covers, access panels, and grilles. Apply fully finish coats behind movable items of furniture and equipment before installation. Apply prime coat only behind non-movable items of furniture and equipment before installation.
6. Sand gloss coats before applying subsequent coatings.

B. Apply coatings to match approved mock-ups.

- C. Remove coatings not in compliance with this specification, reclean and re-prepare surfaces as specified, and apply coatings to comply with the contract documents.

D. Scheduling:

1. Applying first coat of material to properly prepared surfaces without delay.
 - a. Apply successive coats within the time limits recommended by the manufacturer.

E. Mechanical and Electrical Items:

1. Paint electrical items exposed in view in finished spaces and in equipment rooms.
2. Paint mechanical items exposed in view in finished spaces and in equipment rooms.
3. Color-code items in accordance with color schedules.
4. Paint the following electrical items:
 - a. Conduit and fittings.
 - b. Others as indicated on drawings.

3.05 PRIME COATS

A. General:

1. Field apply bottom coats scheduled
2. Repair and retouch damaged prime coats using approved, compatible primer.

B. Primers for Wood and Wood Products:

1. Apply first coat to wood upon receipt at the site and before wood is exposed to sun or rain.
2. Backprime concealed surfaces and cut edges of exterior wood trim prior to installation.
3. Backprime concealed surfaces and cut edges of exterior wood door frames prior to installation.

3.06 FINISH COATS

A. Number of Coats and Minimum Coating Thickness:

1. Apply not less than the number of coats indicated.
2. Apply each coat to achieve not less than the dry film thicknesses indicated per coat.
3. Apply additional coats at no additional cost to the Authority when necessary to achieve complete hiding, uniform texture, or uniform sheen and appearance.

3.07 CLEANING AND PROTECTION

A. Cleaning:

1. Clean work area on a daily basis; dispose of spent materials and empty containers. If requested, turn over the Engineer all empty coatings containers used during the course of each day.
2. Remove all trace of coatings from adjacent surfaces not scheduled to be coated. Remove by appropriate methods that do not damage surfaces.

B. Protection:

1. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.
2. Shortly before final completion of the project, examine surfaces for damage to coatings and restore coatings to new, undamaged condition.
3. Touch-up of minor damage will be acceptable where result is not visibly different from surrounding surfaces. Where result is different either in color, sheen, or texture, recoat entire surface.

PART 4 – QUANTITY AND PAYMENT

4.01 PAINT WALLS AND CEILINGS, INCLUDING ALL PREPARATION WORK

- A. Quantity of “Paint Walls and Ceilings, Including All Preparation Work” will be measured for each (EA) complete housing unit for this project.
- B. Payment for “Paint Walls and Ceilings, Including All Preparation Work” will be made for each (EA) complete housing unit, including all coats, preparation and clean up, and shall include all material, labor and equipment required to paint the areas designated for this project. Preparation shall include the repair of holes in gypsum drywall less than 2 inches in diameter.
- C. Quantity of Interior wood trim Paint will not be measured for this project.
- D. Payment for Interior wood trim Paint will not be made but shall be included in payment for each wall or ceiling completed including all coats, preparation and clean up, and shall include all material, labor and equipment required to paint the areas designated for this project.

4.02 CLEAN AND PAINT WINDOWSILL

- A. Quantity of “Clean and Paint Windowsill” will be measured for each windowsill (EA) cleaned and painted.
- B. Payment for “Clean and Paint Windowsill” will be measured for each windowsill (EA) cleaned and painted, and shall include all materials, labor and equipment necessary to perform cleaning and painting, and all incidental work.

4.03 PAINT AND REINSTALL EXTERIOR DOOR

- A. Quantity of “Paint and Reinstall Exterior Door” will be measured for each door (EA) painted and reinstalled.
- B. Payment for “Paint and Reinstall Exterior Door” will be measured for each door (EA) painted and reinstalled. Front and rear exterior doors for each unit have been detached and have been placed within the unit. Each door to be reinstalled and painted. Color to be approved by the Chester Housing Authority, to match adjacent units’ exterior doors. Installation shall include all materials, labor and equipment necessary to perform reinstalling and painting, hardware, locking mechanisms, door jams, framing and all incidental work.

4.04 CLEAN, PAINT AND REINSTALL ALL CLOSET SHELVING WITHIN UNIT

- A. Quantity of “Clean, Paint and Reinstall All Closet Shelving within Unit” will be measured for each unit (Unit) cleaned, painted, and reinstalled.
- B. Payment for “Clean, Paint and Reinstall All Closet Shelving within Unit” will be measured for each unit (Unit), and shall include all materials, labor and equipment necessary to perform cleaning, painting, reinstalling and all incidental work.

4.05 CLEAN, SAND, AND PAINT EXISTING STEPS

- A. Quantity of “Clean, Sand and Paint Existing Steps” will be measured for each unit (Unit) cleaned, sanded, and painted and includes all steps within the unit.
- B. Payment for “Clean, Sand, and Paint Existing Steps” will be measured for each unit (Unit), and shall include all materials, labor and equipment necessary to perform cleaning, sanding, painting, and all incidental work for all steps within the unit.

END OF SECTION

SECTION 102800
BATHROOM ACCESSORIES

PART 1 - GENERAL

1.01 STIPULATIONS

- A. The specifications section "General Requirements" forms a part of this section by this reference thereto and shall have the same force and effect as if printed herewith in full.

1.02 PRODUCT DESCRIPTION

- A. Provide bathroom accessories as manufactured by American Specialties Inc., Basco Inc or Bradley Inc. or approved equal.
- B. Provide Bathroom Sink as manufactured by Glacier Bay, Model Number # GB24P2-WH, 25 inch wide in White, or approved equal.
- C. Provide Bathroom Vanity Cabinet as manufactured by Zenith, Model Number # 65379, 24 inch wide in White, or approved equal.
- D. Provide Bathroom Tub as manufactured by Sterling, Model Number # 71121110-0 LH, and # 71121120-0 RH, 60 inch wide in White, or approved equal.
- E. Provide Bathroom Faucet as manufactured by Moen, Model Number # L64620 Series, 4 inch wide, or approved equal.
- F. Provide Tub & Shower Faucet as manufactured by Moen, Model Number # TL183 Series, or approved equal.
- G. Provide Tub & Shower enclosure as manufactured by Sterling, Model Number # 71224100, in White, or approved equal.
- H. Provide Towel Bar, 18 inch by Seton Model Number # D2418PC or approved equal.
- I. Provide Toilet as manufactured by Gerber, Model #VP-21-528 for Elongated ADA Toiler or approved equal.
- J. Provide Toilet Paper Holder, recessed by Seton Model Number # D2497PC or approved equal.
- K. Provide Shower Rod, curved, brushed nickel.

- L. Provide Medicine Cabinet, Zenith 22" W x 27" H x 8", Recessed, White, or Approved Equal
- M. Provide 1.5 GPM Low Flow Shower Head, Niagara Conservation Model #N2915CH
- N. Provide Exhaust Fan, Panasonic FV-08VQC5 WhisperSense 80 CFM Ceiling Mounted Ventilation Fan with Dual Sensor Motion and Humidity Technology, or approved equal

PART 2 - PRODUCTS

2.01 FURNISH AND INSTALL ACCESSORIES AS INDICATED.

2.02 ALL MATERIAL SHALL BE NEW, CONTRACTOR GRADE, RESIDENTIAL OR COMMERCIAL.

PART 3 - EXECUTION

3.01 METHOD OF CONSTRUCTION

- A. Follow standard manufacturers mounting instructions. Provide standard fasteners as required to adequately fasten to walls and floor.
- B. All plumbing connections shall be water-tight with mechanical joints and all shut off valves provided.

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL BATHROOM SINK, FAUCET, TOILET PAPER HOLDER, MEDICINE CABINET, AND EXHAUST FAN

- A. Quantity of "Furnish and Install Bathroom Sink, Faucet, Toilet Paper Holder, Medicine Cabinet, and Exhaust Fan" will be measured for each unit (EA) where the listed materials are installed.
- A. Payment for "Furnish and Install Bathroom Sink, Faucet, Toilet Paper Holder, Medicine Cabinet, and Exhaust Fan" and all related work shall be made for each unit (EA) where the listed materials are installed, and shall include all necessary materials, labor and equipment to perform the work described herein.

4.02 FURNISH AND INSTALL BATHROOM TUB, TUB CONTROL VALVE, TUB ENCLOSURE, SHOWER ROD, LOW FLOW SHOWER HEAD, AND TOWEL BAR

- A. Quantity of "Furnish and Install Bathroom Tub, Tub Control Valve, Tub Enclosure, Shower Rod, Low Flow Shower Head, and Towel Bar" will be measured for each unit (EA) where the listed materials are installed.

- B. Payment for “Furnish and Install Bathroom Tub, Tub Control Valve, Tub Enclosure, Shower Rod, Low Flow Shower Head, and Towel Bar” and all related work shall be made for each unit (EA) where the listed materials are installed, and shall include all necessary materials, labor and equipment to perform the work described herein.

4.03 FURNISH AND INSTALL TOILET

- A. Quantity of “Furnish and Install Toilet” will be measured for each toilet (EA) installed.
- B. Payment for “Furnish and Install Toilet” and all related work shall be made for each toilet (EA) installed, and shall include all necessary materials, labor and equipment to perform the work described herein.

END OF SECTION

SECTION 114000
KITCHEN EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish and install kitchen equipment for the project, as shown on the drawings and as specified herein.

1.02 COMPLIANCE WITH CODES, STANDARDS, AND REGULATIONS

- A. All material, equipment and installation shall comply with these specifications and the applicable requirements of the following:
 - 1. National Standard Plumbing Code
 - 2. National Fire Protection Association (NFPA)
 - 3. Underwriter's Laboratories, Inc. (UL)
 - 4. National Electric Code
 - 5. Occupational Safety and Health Administration (OSHA)
 - 6. American Society for Testing & Materials (ASTM)
 - 7. American Society of Mechanical Engineers(ASME)

1.03 SUBMITTALS

- A. The contractor shall provide six (6) copies of the following information to the Engineer for review and approval prior to construction:
- B. Provide product data sheets for the following:
 - 1. Stainless Steel Sink
 - 2. Kitchen Faucet
 - 3. Range Hood
 - 4. Laminate Top With Back Splash

PART 2 - PRODUCTS

2.01 STAINLESS STEEL SINK

- A. Furnish and install Franke 25" x 22" Stainless Steel Sink, Model #SS604Bx, or approved equal.

2.02 KITCHEN FAUCET

- A. Furnish and install Pfister Kitchen faucet Model #WK1-140C, or approved equal.

2.03 RANGE HOOD

- A. Furnish and install Broan 30 inch range hood, or approved equal.

2.04 LAMINATE TOP

- A. Furnish and install kitchen laminate countertop with back splash by Wilson Art, product number 1794-07, color Amber Fusion, or approved equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The contractor shall install all equipment herein specified in full accordance with all of the manufacturer's instructions and recommendations.

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL STAINLESS STEEL SINK AND FAUCET, INCLUDING NEW PVC P-TRAP AND CONNECTION

- A. Quantity of "Furnish and Install Stainless Steel Sink and Faucet, Including New PVC P-Trap and Connection" will be measured for each kitchen sink (EA) installed.
- B. Payment for "Furnish and Install Stainless Steel Sink and Faucet, Including New PVC P-Trap and Connection" will be made for each kitchen sink (EA) installed, and shall include construction layout, all material, labor and equipment required to make the kitchen functional, restorations and incidental work.

4.02 FURNISH AND INSTALL NON-VENTED RANGE HOOD

- A. Quantity of "Furnish and Install Non-vented Range Hood" will be not be measured for this project.
- B. Payment for "Furnish and Install Non-vented Range Hood" will be made for each (EA) installed unit, and shall include construction layout, all material, labor and equipment required to make the kitchen functional, restorations and incidental work.

END OF SECTION

SECTION 123550
WOOD KITCHEN CABINETS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes the requirements for installation of wood kitchen cabinets.

PART 2 - PRODUCTS

2.01 DOOR CONSTRUCTION

- A. Wood doors consist of door frames constructed from kiln-dried $\frac{3}{4}$ " solid hardwood with mortise and tenon joints and floating center panels constructed of veneered or solid wood.
- B. Cabinet Front Face Frames
1. Cabinet front face frames are made from $\frac{3}{4}$ " X $\frac{5}{8}$ " solid hardwood. They are kiln-dried to prevent warping. Face frame joints are pressure fitted, glued, double doveled and stapled.
- C. Cabinet Side Panels
1. Cabinet side panels are $\frac{1}{2}$ " thick and made of engineered wood with UV-cured finish. They are captured into a grooved front face frames and secured using high-strength fasteners and glue.
- D. Cabinet Tops, Bottoms, Floors, and Backs
1. Tops, bottoms, and floors are $\frac{1}{2}$ " thick and made from engineered wood. They are fitted and glued into the cabinet front face grooves, then captured in the grooves of the cabinet side panels.
- E. Hanging Rails
1. The base and vanity top hanging rail is $\frac{3}{4}$ " thick solid wood, mortise and tenon joined and glued to cabinet side panels. The wall cabinet hanging rails are $\frac{1}{2}$ " thick engineered wood, glued and pinned into the cabinet back, cabinet side panels and top/bottom.
- F. Cabinet Shelves
1. Cabinet shelves are $\frac{3}{4}$ " thick engineered wood with wood door styles or

melamine on white door styles. Shelves are banded on one side of melamine of PVC edge banding. All shelves are adjustable and meet KCMA load standards of 15 pounds per square foot.

G. Drawer Systems

1. 24" deep Base and Desk cabinets utilize natural finish dovetail hardwood drawers with plywood bottoms and Full Access Hidden Glides. All drawers meet KCMA load standards of 15 pounds per square foot.

H. Drawer Systems – Vanity

1. All Vanity cabinets, 21" deep Desk cabinets and Deep Roll Out Trays utilize natural finish dovetail hardwood drawers with printed MDF bottoms and Side-Mounted Drawer Glides, which are $\frac{3}{4}$ access. All drawers meet KCMA load standards of 15 pounds per square foot.

I. Corner Block

1. Corner blocks are attached to help ensure cabinet squareness and allow for proper countertop installation.

J. Hinges

1. Fully concealed, self-closing Hidden Hinges ® are standard on all door styles.

K. Insert Toe Kick

1. Inset toe kicks are constructed of $\frac{1}{2}$ " thick unfinished engineered wood and are recessed 3 $\frac{1}{2}$ ".

2.02 KITCHEN FINISHES

A. Oak:

1. Oak is a prominently grained hardwood with pattern variations from straight grain to arcs. It is durable and forgiving of nicks and bumps, and mellows with golden hues over time. Darker stains provide a more uniform appearance. Features described below are typical and not considered defects:
 - a. Streaks of yellow or black mineral deposits
 - b. Noticeable differences in colored between open and close-grained areas which may be more evident with light colored stain
 - c. Variations within a single door.

2.03 SUPPLIES

A. Kitchen Cabinets

1. Kitchen Cabinets shall be manufactured by Kemper Echo located in Richmond, Ind. 47374, style Tarver Oak or approved equal.

B. Bathroom Cabinets

1. See description in technical specification 10800 – Bathroom Accessories.

2.04 LAMINATE TOP

- A. Furnish and install kitchen laminate countertop with back splash by Wilson Art, product number 1794-07, color Amber Fusion, or approved equal.

PART 3 - EXECUTION

(Not Used)

PART 4 - QUANTITY AND PAYMENT

4.01 FURNISH AND INSTALL KITCHEN CABINETS AND KITCHEN LAMINATE COUNTERTOP

- A. Quantity of “Furnish and Install Kitchen Cabinets and Kitchen Laminate Countertop” will be measured for each unit (EA) where kitchen cabinets are installed.
- B. Payment for “Furnish and Install Kitchen Cabinets and Kitchen Laminate Countertop” will be made for each unit (EA) where kitchen cabinets are installed, and shall include construction layout, all material, labor and equipment required to make the kitchen functional, restorations and incidental work. The contractor shall be responsible for surveying the existing cabinet layout of each unit and providing new cabinets in that layout.

END OF SECTION

SECTION 211313
WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. PEX-a pipe and fittings.
 - 2. Cover system for sprinkler piping.
 - 3. Specialty valves.
 - 4. Sprinkler piping specialties.
 - 5. Sprinklers.

1.02 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig (1200-kPa) maximum.

1.03 ACTION SUBMITTALS

- B. Product Data: For each type of product.
 - 1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- C. Shop Drawings: For wet-pipe sprinkler systems.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include diagrams for power, signal, and control wiring.
- D. Delegated Design Submittals: For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data, NICET certified-technician submittals are to include the following information on each drawing title block: technician's name, NICET certification number, and NICET certification specialty area and level.

1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler system plans and sections, or Building Information Model (BIM), drawn to scale, showing the items described in this Section and coordinated with all building trades.

- B. Qualification Data: For qualified Installer and NICET certified technician.
- C. Design Data: Approved sprinkler piping working plans, prepared according to NFPA 13, including documented approval by authorities having jurisdiction, and including hydraulic calculations if applicable.
- D. Field Test Reports:
 - 1. Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wet-pipe sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.06 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. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.07 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by NICET Level III-certified technician, "Water-Based Systems Layout."

1.08 FIELD CONDITIONS

- A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler service to facilities occupied by Owner or others unless permitted under the following

conditions and then only after arranging to provide temporary sprinkler service according to requirements indicated:

1. Notify Owner no fewer than 48 hours in advance of proposed interruption of sprinkler service.
2. Do not proceed with interruption of sprinkler service without Owner's written permission.

PART 2 - PRODUCTS

2.01 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.
- B. Sprinkler system equipment, specialties, accessories, installation, and testing to comply with NFPA 13D.
- C. Standard-Pressure Piping System Component: Listed for 175-psig (1200-kPa) minimum working pressure.
 1. Margin of Safety for Available Water Flow and Pressure: 20 percent, including losses through water-service piping, valves, and backflow preventers.
 2. Sprinkler Occupancy Hazard Classifications:
 - a. Residential: Light Hazard
 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Residential (Dwelling) Occupancy: 0.05 gpm/sq. ft. over 400 sq. ft.
 4. Maximum protection area per sprinkler according to UL listing.
 5. Maximum Protection Area per Sprinkler:
 - a. Residential Areas: 400 sq. ft.
- D. Obtain documented approval of sprinkler system design from authorities having jurisdiction.
- E. Seismic Performance: Sprinkler piping to withstand the effects of earthquake motions determined according to NFPA 13. And ASCE/SEI 7. See Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

2.02 PEX PIPE AND FITTINGS

- A. PEX-a (Engle-Method Crosslinked Polyethylene) Piping: ASTM F 876/877 by Uponor.
- B. PEX-a Fittings: elbows, adapters, couplings, plugs, tees and multi-port tees (1/2 inch through 2 inch nominal pipe size): ASTM F1960 cold-expansion fitting manufactured from the following material types:
 - 1. UNS No. C69300 Lead-free (LF) Brass.
 - 2. 20% glass-filled polysulfone as specified in ASTM D 6394.
 - 3. Unreinforced polysulfone (group 01, class 1, grade 2) as specified in ASTM D 6394.
 - 4. Polyphenylsulfone (group 03, class 1, grade 2) as specified in ASTM D 6394.
 - 5. Blend of polyphenylsulfone (55-80%) and unreinforced polysulfone (rem.) as specified in ASTM D 6394.
 - 6. Reinforcing cold-expansion rings shall be manufactured from the same source as PEX-a piping manufacturer and marked "F1960.
- C. Pre-Sleeved Piping: PEX-a piping, with a high-density polyethylene (HDPE) corrugated sleeve.
- D. Multi-Port Tees: Multiple-outlet fitting complying with ASTM F 877; with ASTM F 1960 inlets and outlets.
 - 1. Engineered polymer branch multi-port tee.
 - 2. Engineered polymer flow-through multi-port tee.
 - 3. Engineered polymer commercial branch multi-port tee.
 - 4. Engineered polymer commercial branch multi-port elbow.
 - 5. Engineered polymer commercial flow-through multi-port tee.
- E. Manifolds: Multiple-outlet assembly complying with ASTM F 877; with ASTM F 1960 outlets.
 - 1. Engineered polymer valved manifold.
 - 2. Engineered polymer valveless manifold.
 - 3. Lead - free copper branch manifold.
 - 4. Lead-free copper valved manifold.

2.03 TRANSITION FITTINGS

- A. PEX-to-Metal Transition Fittings:
 - 1. Manufacturers: Provide fittings from the same manufacturer of the piping.
 - 2. Threaded Brass to PEX-a Transition: one-piece brass fitting with male or female threaded adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
 - 3. Brass Sweat to PEX-a Transition: one-piece brass fitting with sweat adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.
- B. PEX-to-Thermoplastic Transition Fittings: CPVC or PP-R to PEX-a Transition: one-piece thermoplastic fitting with male or female threaded adapter and ASTM F 1960 cold-expansion end, with PEX-a reinforcing cold-expansion ring.

2.04 VALVES

- A. PEX-to-PEX, Lead Free (LF) Brass Ball Valves (1/2 inch through 2 inch nominal pipe size)
 - 1. Manufacturers: Provide ball valve(s) from the same manufacturer as the piping system.
 - 2. Full-port ball valve: two-piece, ASTM F1960 cold-expansion ends, with PEX-a reinforcing cold-expansion ring.
 - 3. LF brass valve with a positive stop shoulder manufactured from C69300 brass.
 - 4. In compliance with: 250 CWP, ANSI/NSF 359, ANSI/NSF 14/61, cNSF-us-pw_G lead free 0.25% Lead max., ASTM F1960, ASTM F 877.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Site Verification of Conditions: Verify that site conditions are acceptable for installation of the domestic water piping. Do not proceed with installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install plumbing system according to approved shop drawings and coordination drawings.
- B. Comply with manufacturer's product data, including product technical bulletins, installation instructions and design drawings, including the following.
- C. Piping Installation:
 - 1. Install PEX-a Pipe Support, expansion loops, arms and offsets in compliance with Chapter 5 - "System Design and Layout" in the Uponor Plumbing Design Assistance Manual (PDAM).
 - 2. PEX shall not be installed in areas within five feet of UV light.
 - 3. Install piping in compliance with manufacturer's Plumbing Installation Guide.
- D. Hangers and Supports:
 - 1. Horizontal PEX-a Piping Hangers: Install CTS hangers suitable for PEX-a piping in compliance with Chapter 6 - "Installation Methods" and local codes, with the following maximum spacing:
 - a. 3 inch and below: Maximum span, 32 inches.
 - 2. Vertical PEX-a Piping: Support PEX-a piping with minimum spacing of 5 feet.
 - 3. Horizontal PEX-a Piping with PEX-a Pipe Channel: Install hangers for PEX-a

piping with horizontal support channel in accordance with local jurisdiction and manufacturer's recommendations, with the following maximum spacing:

- a. 3/4 inch and below: Maximum span, 6 feet.
- b. 1 inch and above: Maximum span, 8 feet.

4. PEX-a Riser Supports: Install CTS riser clamps at the base of each floor and at the top of every other floor for domestic hot-water systems. Install mid-story guides between each floor. Install CTS riser clamps at the base of each floor and at the top of every fourth floor for domestic cold-water systems. Install mid-story guides.

E. Piping Schedule:

1. Underground / under-building slab, domestic water piping (3 inch and below) shall be the following:
 - a. 1/2 inch through 2 inch - Pre-insulated PEX-a piping with PEX-foam insulation with engineered polymer (EP) or lead-free brass ASTM F 1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
 - b. 3/4 inch through 2 inch - Pre-insulated PEX-a piping with multi-layer, closed-closed cell PEX-foam insulation and a corrugated HDPE jacket with engineered polymer (EP) or lead-free brass ASTM F 1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
2. In-slab, domestic water piping (2 inch and below) shall be the following: Bare PEX-a piping, pre-sleeved PEX-a piping, or pre-insulated PEX-a piping with engineered polymer (EP) or lead-free brass F1960 cold-expansion fittings. Use the fewest possible joints and install per manufacturer's recommendations.
3. Aboveground domestic water piping (3 inch and below) shall be the following: PEX-a piping, with engineered polymer (EP) or lead-free brass F1960 cold-expansion fittings, or lead-free brass compression fittings complying with ASTM F 877.

F. Pipe Joint Construction: PEX-a Connections: Install per manufacturer's recommendations. Use manufacturer-recommended cold-expansion tool for ASTM F 1960 connections.

G. Field Quality Control: Do not expose PEX piping to direct sunlight for more than 30 days. If construction delays are encountered, provide cover to portions of piping exposed to direct sunlight.

PART 4 – QUANTITY AND PAYMENT

4.01 REPLACE EXISTING ½” CPVC PIPING WITH ½” PEX TUBING

- A. Quantity of “Replace Existing ½” CPVC Piping with ½” Pex Tubing” will be measured per linear foot (LF) of Pex Tubing installed.
- B. Payment for “Replace Existing ½” CPVC Piping with ½” Pex Tubing” will be made based on linear foot (LF) of Pex Tubing installed.

4.02 REPLACE EXISTING CPVC FIRE SUPPRESSION SPRINKLER PIPING WITH 2” PEX FIRE SUPPRESSION SPRINKLER PIPING

- A. Quantity of “Replace Existing CPVC Fire Suppression Sprinkler Piping with 2” Pex Fire Suppression Sprinkler Piping” will be measured per linear foot (LF) of Pex Fire Suppression Sprinkler Piping installed.
- B. Payment for “Replace Existing CPVC Fire Suppression Sprinkler Piping with 2” Pex Fire Suppression Sprinkler Piping” will be made based on linear foot (LF) of Pex Fire Suppression Sprinkler Piping installed.

END OF SECTION

SECTION 220400
PLUMBING FIXTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes plumbing fixtures and related components.
- B. Related Sections include the following:
 - 1. Section 102800 – Bathroom Accessories
 - 2. Section 114000 – Kitchen Equipment
 - 3. Provide plumbing fixtures in accordance with the fixtures schedules provided on the drawings.

1.03 DEFINITIONS

- A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- B. Fitting: Device that controls flow of water into or out of plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

1.04 SUBMITTALS

- A. Product Data: Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow-control rates for each type of fixture scheduled.
- B. Maintenance Data: For plumbing fixtures to include in maintenance manuals specified in Division 1.

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain plumbing fixtures, faucets, and other components in the same category through one source from a single manufacturer.

- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"[; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act";] about plumbing fixtures for people with disabilities.
- C. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- D. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- E. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- F. Comply with the following applicable standards and other requirements specified for faucets:
 - 1. Faucets: ASME A112.18.1M.
 - 2. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
 - 3. Supply and Drain Fittings: ASME A112.18.1M.
 - 4. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
 - 5. Faucets: ASME A112.18.1M.
 - 6. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
 - 7. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
- G. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Floor Drains: ASME A112.21.1M.
 - 2. Grab Bars: ASTM F 446.
 - 3. Hose-Coupling Threads: ASME B1.20.7.
 - 4. Hot-Water Dispensers: ASSE 1023 and UL 499.
 - 5. Off-Floor Fixture Supports: ASME A112.6.1M.
 - 6. Pipe Threads: ASME B1.20.1.
 - 7. Plastic Toilet Seats: ANSI Z124.5.
 - 8. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.06 COORDINATION

- A. Coordinate roughing-in and final plumbing fixture locations, and verify that fixtures can be installed to comply with original design and referenced standards.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified in other Part 2 articles.
- B. Provide plumbing fixtures in accordance with the plumbing fixture schedule included with the contract drawings. Provide all accessories (carriers, mounting hardware, seats, etc) as required to install and operate plumbing fixtures even if not specifically shown on the drawings or required by the specifications.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine roughing-in for water soil and for waste piping systems and supports to verify actual locations and sizes of piping connections and that locations and types of supports match those indicated, before plumbing fixture installation. Use manufacturer's roughing-in data if roughing-in data are not indicated.
- B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FIXTURE INSTALLATION

- A. Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install counter-mounting fixtures in and attached to casework.
- C. Install fixtures level and plumb according to manufacturers' written instructions and roughing-in drawings.
- D. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball, gate, or globe valve if stops are not specified with fixture. Refer to Division 15 Section "Valves" for general-duty valves.

- E. Install trap and tubular waste piping on drain outlet of each fixture and connect to drainage system.
- F. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- G. Install toilet seats on water closets.
- H. Remove and reinstall toilets as necessary, preparing surfaces and installing a new wax ring. No additional payment will be made for this operation and should be included in the various items of the bid.
- I. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
 - 2. Exception: Omit trap on indirect wastes, unless otherwise indicated.
- J. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for escutcheons.
- K. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Refer to Division 7 Section "Joint Sealants" for sealant and installation requirements.

3.03 CONNECTIONS

- A. Piping installation requirements are specified in other Sections.
- B. Connect water supplies from water distribution piping to fixtures.
- C. Connect drain piping from fixtures to drainage piping.
- D. Supply and Waste Connections to Plumbing Fixtures: Connect fixtures with water supplies, stops, risers, traps, and waste piping. Use size fittings required to match fixtures. Connect to plumbing piping.
- E. Supply and Waste Connections to Fixtures and Equipment Specified in Other Sections: Connect fixtures and equipment with water supplies, stops, risers, traps, and waste piping specified. Use size fittings required to match fixtures and equipment. Connect to plumbing piping.

3.04 FIELD QUALITY CONTROL

- A. Verify that installed fixtures are categories and types specified for locations where installed.
- B. Check that fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.05 ADJUSTING

- A. Operate and adjust faucets and controls.
- B. Replace damaged and malfunctioning fixtures, fittings, and controls.

3.06 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
 - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
 - 2. Remove sediment and debris from drains.
 - 3. Clean fixtures to a reasonable degree of shine. No visible grease or other marks from construction should be apparent.

3.07 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

PART 4 - QUANTITY AND PAYMENT

4.01 PLUMBING FIXTURES

- A. Quantity of Plumbing Fixtures will not be measured for this project.
- B. Payment for Plumbing Fixtures and all related work will not be made for this project, but the cost shall be included in the various items of the proposal

END OF SECTION

SECTION 220500
COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Mechanical sleeve seals.
 - 5. Sleeves.
 - 6. Escutcheons.
 - 7. Grout.
 - 8. Plumbing demolition.
 - 9. Equipment installation requirements common to equipment sections.
 - 10. Painting and finishing.
 - 11. Concrete bases.
 - 12. Supports and anchorages.

1.03 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. CPVC: Chlorinated polyvinyl chloride plastic.
 - 3. PE: Polyethylene plastic.
 - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
 - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Dielectric fittings.
 - 3. Mechanical sleeve seals.
 - 4. Escutcheons.
- B. Welding certificates.

1.05 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.07 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.03 JOINING MATERIALS

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
1. ABS Piping: ASTM D 2235.
 2. CPVC Piping: ASTM F 493.
 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 4. PVC to ABS Piping Transition: ASTM D 3138.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.04 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Dresser Industries, Inc.; DMD Div.
 - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.

- g. Or Approved Equal
 - 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
 - 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
 - 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: CPVC and PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- 1. Manufacturers:
 - a. Eslon Thermoplastics.
 - b. Or Approved Equal
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
- 1. Manufacturers:
 - a. Thompson Plastics, Inc.
 - b. Or Approved Equal
- D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC and PVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
- 1. Manufacturers:
 - a. NIBCO INC.
 - b. NIBCO, Inc.; Chemtrol Div.
 - c. Or Approved Equal
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
- 1. Manufacturers:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities, Inc.
 - e. Or Approved Equal

2.05 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Eclipse, Inc.
 - d. Epco Sales, Inc.
 - e. Hart Industries, International, Inc.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Zurn Industries, Inc.; Wilkins Div.
 - h. Or Approved Equal
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
 - 1. Manufacturers:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epco Sales, Inc.
 - d. Watts Industries, Inc.; Water Products Div.
 - e. Or Approved Equal
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene, or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Manufacturers:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - e. Or Approved Equal
 - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

1. Manufacturers:

- a. Calpico, Inc.
- b. Lochinvar Corp.
- c. Or Approved Equal

- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1. Manufacturers:

- a. Perfection Corp.
- b. Precision Plumbing Products, Inc.
- c. Sioux Chief Manufacturing Co., Inc.
- d. Victaulic Co. of America.
- e. Or Approved Equal

2.06 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

- a. Advance Products & Systems, Inc.
- b. Calpico, Inc.
- c. Metraflex Co.
- d. Pipeline Seal and Insulator, Inc.
- e. Or Approved Equal

- 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- 3. Pressure Plates: Stainless steel. Include two for each sealing element.
- 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.07 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.08 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated and rough brass.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated and rough brass.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. Split-Plate, Stamped-Steel Type: With concealed hinge, set screw or spring clips, and chrome-plated finish.
- G. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.09 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.

2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 PLUMBING DEMOLITION

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.02 PLUMBING SYSTEM – COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

- a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
- b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
- c. Insulated Piping: One-piece, stamped-steel type with spring clips.
- d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
- e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
- f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece or split-casting, cast-brass type with polished chrome-plated finish.
- g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge and set screw.
- h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
- i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed or exposed-rivet hinge and set screw or spring clips.
- j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
- k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw or spring clips.
- l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

2. Existing Piping: Use the following:

- a. Chrome-Plated Piping: Split-casting, cast-brass type with chrome-plated finish.
 - b. Insulated Piping: Split-plate, stamped-steel type with concealed or exposed-rivet hinge and spring clips.
 - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - e. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
 - f. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped-steel type with concealed hinge and set screw.
 - g. Bare Piping in Unfinished Service Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
 - h. Bare Piping in Unfinished Service Spaces: Split-plate, stamped-steel type with concealed or exposed-rivet hinge and set screw or spring clips.
 - i. Bare Piping in Equipment Rooms: Split-casting, cast-brass type.
 - j. Bare Piping in Equipment Rooms: Split-plate, stamped-steel type with set screw or spring clips.
 - k. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.

- c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

- 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.03 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.04 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.05 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.06 PAINTING

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.07 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

PART 4 - QUANTITY AND PAYMENT

4.01 COMMON WORK RESULTS FOR PLUMBING

- A. Quantity of all other items covered in the Common Work Results for Plumbing will not be measured for this project, but the work shall be performed incidental to the proposed work.
- B. Payment for all other items covered in the Common Work Results for Plumbing will not be made for this project, but the cost shall be included in the various items of the proposal.

4.02 PLUMBING & HVAC PIPE REPLACEMENT

- A. Quantity of all other items covered in Plumbing & HVAC Pipe Replacement will not be measured for this project, but the work shall be performed incidental to the proposed work.
- B. Payment for all other items covered in Plumbing & HVAC Pipe Replacement will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 220523
GENERAL DUTY VALVES FOR PLUMBING PIPING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

- 1. Bronze angle valves.
- 2. Bronze ball valves.
- 3. Bronze lift check valves.
- 4. Bronze swing check valves.
- 5. Bronze gate valves.
- 6. Iron gate valves.
- 7. Bronze globe valves.
- 8. Lubricated plug valves.

B. Related Sections:

- 1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
- 2. Division 33 water distribution piping Sections for general-duty and specialty valves for site construction piping.

1.03 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

1.04 SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.05 SUMMARY

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 2. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, grooves, and weld ends.
 - 3. Set angle, gate, and globe valves closed to prevent rattling.
 - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
 - 5. Set butterfly valves closed or slightly open.
 - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.

- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
 - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
 - 2. Handwheel: For valves other than quarter-turn types.
 - 3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
 - 4. Wrench: For plug valves with square heads. Furnish Owner with 1 wrench for every 10 plug valves, for each size square plug-valve head.
 - 5. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
 - 1. Gate Valves: With rising stem.
 - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
 - 3. Butterfly Valves: With extended neck.
- F. Valve-End Connections:
 - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
 - 2. Grooved: With grooves according to AWWA C606.
 - 3. Solder Joint: With sockets according to ASME B16.18.
 - 4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

2.02 BRONZE ANGLE VALVES

- A. Class 125, Bronze Angle Valves with Bronze Disc:
 - 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. Hammond Valve.
 - b. Milwaukee Valve Company.
 - c. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded.
- e. Stem and Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, Bronze Angle Valves with Nonmetallic Disc:

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 Valve, Inc.
- b. NIBCO INC.
- c. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

C. Class 150, Bronze Angle Valves with Bronze Disc:

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. Crane Co.; Crane Valve Group; Stockham Division.
- b. Kitz Corporation.
- c. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 300 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
- d. Ends: Threaded.

- e. Stem and Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

D. Class 150, Bronze Angle Valves with Nonmetallic Disc:

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. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Hammond Valve.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.
 - g. Powell Valves.
 - h. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 300 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
 - d. Ends: Threaded.
 - e. Stem: Bronze.
 - f. Disc: PTFE or TFE.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

2.03 BRONZE BALL VALVES

A. One-Piece, Reduced-Port, Bronze Ball Valves with Bronze Trim:

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 Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. NIBCO INC.
 - d. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-110.

- b. CWP Rating: 400 psig.
- c. Body Design: One piece.
- d. Body Material: Bronze.
- e. Ends: Threaded.
- f. Seats: PTFE or TFE.
- g. Stem: Bronze.
- h. Ball: Chrome-plated brass.
- i. Port: Reduced.

2.04 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Bronze Disc:

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. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Jenkins Valves.
 - c. Crane Co.; Crane Valve Group; Stockham Division.
 - d. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-80, Type 1.
 - b. CWP Rating: 200 psig.
 - c. Body Design: Vertical flow.
 - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
 - e. Ends: Threaded.
 - f. Disc: Bronze.

B. Class 125, Lift Check Valves with Nonmetallic Disc:

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. Flo Fab Inc.
 - b. Hammond Valve.
 - c. Kitz Corporation.
 - d. Milwaukee Valve Company.
 - e. Mueller Steam Specialty; a division of SPX Corporation.
 - f. NIBCO INC.
 - g. Red-White Valve Corporation.
 - h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - i. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig.
- c. Body Design: Vertical flow.
- d. Body Material: ASTM B 61 or ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: NBR, PTFE, or TFE.

2.05 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

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 Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Powell Valves.
- j. Red-White Valve Corporation.
- k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- l. Zy-Tech Global Industries, Inc.
- m. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 3.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

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. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Jenkins Valves.

- c. Crane Co.; Crane Valve Group; Stockham Division.
- d. Hammond Valve.
- e. Kitz Corporation.
- f. Milwaukee Valve Company.
- g. NIBCO INC.
- h. Red-White Valve Corporation.
- i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- j. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 4.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

2.06 BRONZE GATE VALVES

A. Class 125, NRS Bronze Gate Valves:

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 Valve, Inc.
- b. Crane Co.; Crane Valve Group; Crane Valves.
- c. Crane Co.; Crane Valve Group; Jenkins Valves.
- d. Crane Co.; Crane Valve Group; Stockham Division.
- e. Hammond Valve.
- f. Kitz Corporation.
- g. Milwaukee Valve Company.
- h. NIBCO INC.
- i. Powell Valves.
- j. Red-White Valve Corporation.
- k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- l. Zy-Tech Global Industries, Inc.
- m. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig.
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem: Bronze.

- f. Disc: Solid wedge; bronze.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, RS Bronze Gate Valves:

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 Valve, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Crane Co.; Crane Valve Group; Stockham Division.
 - e. Hammond Valve.
 - f. Kitz Corporation.
 - g. Milwaukee Valve Company.
 - h. NIBCO INC.
 - i. Powell Valves.
 - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - k. Zy-Tech Global Industries, Inc.
 - l. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-80, Type 2.
 - b. CWP Rating: 200 psig.
 - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
 - d. Ends: Threaded or solder joint.
 - e. Stem: Bronze.
 - f. Disc: Solid wedge; bronze.
 - g. Packing: Asbestos free.
 - h. Handwheel: Malleable iron, bronze, or aluminum.

2.07 BRONZE GLOBE VALVES

A. Class 125, Bronze Globe Valves with Bronze Disc:

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. Crane Co.; Crane Valve Group; Crane Valves.
 - b. Crane Co.; Crane Valve Group; Stockham Division.
 - c. Hammond Valve.
 - d. Kitz Corporation.
 - e. Milwaukee Valve Company.
 - f. NIBCO INC.

- g. Powell Valves.
- h. Red-White Valve Corporation.
- i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- j. Zy-Tech Global Industries, Inc.
- k. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 1.
- b. CWP Rating: 200 psig
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem and Disc: Bronze.
- f. Packing: Asbestos free.
- g. Handwheel: Malleable iron, bronze, or aluminum.

B. Class 125, Bronze Globe Valves with Nonmetallic Disc:

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. Crane Co.; Crane Valve Group; Crane Valves.
- b. Crane Co.; Crane Valve Group; Stockham Division.
- c. NIBCO INC.
- d. Red-White Valve Corporation.
- e. Or Approved Equal

2. Description:

- a. Standard: MSS SP-80, Type 2.
- b. CWP Rating: 200 psig
- c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
- d. Ends: Threaded or solder joint.
- e. Stem: Bronze.
- f. Disc: PTFE or TFE.
- g. Packing: Asbestos free.
- h. Handwheel: Malleable iron, bronze, or aluminum.

2.08 LUBRICATED PLUG VALVES

A. Class 125, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

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. Nordstrom Valves, Inc.

- b. Or Approved Equal
 - 2. Description:
 - a. Standard: MSS SP-78, Type II.
 - b. CWP Rating: 200 psig
 - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
 - d. Pattern: Regular or short.
 - e. Plug: Cast iron or bronze with sealant groove.
- B. Class 125, Regular-Gland, Lubricated Plug Valves with Flanged Ends:
- 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. Nordstrom Valves, Inc.
 - b. Or Approved Equal
 - 2. Description:
 - a. Standard: MSS SP-78, Type II.
 - b. CWP Rating: 200 psig
 - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
 - d. Pattern: Regular or short.
 - e. Plug: Cast iron or bronze with sealant groove.
- C. Class 125, Cylindrical, Lubricated Plug Valves with Threaded Ends:
- 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. Homestead Valve; a division of Olson Technologies, Inc.
 - b. Milliken Valve Company.
 - c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
 - d. Or Approved Equal
 - 2. Description:
 - a. Standard: MSS SP-78, Type IV.
 - b. CWP Rating: 200 psig
 - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
 - d. Pattern: Regular or short.
 - e. Plug: Cast iron or bronze with sealant groove.

D. Class 125, Cylindrical, Lubricated Plug Valves with Flanged Ends:

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. Homestead Valve; a division of Olson Technologies, Inc.
 - b. Milliken Valve Company.
 - c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
 - d. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-78, Type IV.
 - b. CWP Rating: 200 psig
 - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
 - d. Pattern: Regular or short.
 - e. Plug: Cast iron or bronze with sealant groove.

E. Class 250, Regular-Gland, Lubricated Plug Valves with Threaded Ends:

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. Nordstrom Valves, Inc.
 - b. Or Approved Equal
2. Description:
 - a. Standard: MSS SP-78, Type II.
 - b. CWP Rating: 400 psig
 - c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
 - d. Pattern: Regular or short.
 - e. Plug: Cast iron or bronze with sealant groove.

F. Class 250, Regular-Gland, Lubricated Plug Valves with Flanged Ends:

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. Nordstrom Valves, Inc.
 - b. Or Approved Equal

2. Description:

- a. Standard: MSS SP-78, Type II.
- b. CWP Rating: 400 psig
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short.
- e. Plug: Cast iron or bronze with sealant groove.

G. Class 250, Cylindrical, Lubricated Plug Valves with Threaded Ends:

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. Homestead Valve; a division of Olson Technologies, Inc.
- b. Milliken Valve Company.
- c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
- d. Or Approved Equal

2. Description:

- a. Standard: MSS SP-78, Type IV.
- b. CWP Rating: 400 psig
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, cast iron with lubrication-sealing system.
- d. Pattern: Regular or short.
- e. Plug: Cast iron or bronze with sealant groove.

H. Class 250, Cylindrical, Lubricated Plug Valves with Flanged Ends:

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. Homestead Valve; a division of Olson Technologies, Inc.
- b. Milliken Valve Company.
- c. R & M Energy Systems; a unit of Robbins & Myers, Inc.
- d. Or Approved Equal

2. Description:

- a. Standard: MSS SP-78, Type IV.
- b. CWP Rating: 400 psig
- c. Body Material: ASTM A 48/A 48M or ASTM A 126, Grade 40 cast iron with lubrication-sealing system.

- d. Pattern: Regular or short.
- e. Plug: Cast iron or bronze with sealant groove.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.02 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
 - 1. Swing Check Valves: In horizontal position with hinge pin level.
 - 2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
 - 3. Lift Check Valves: With stem upright and plumb.

3.03 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball, butterfly, gate, or plug valves.
 - 2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
 - 3. Throttling Service: Globe, ball, or butterfly valves.
 - 4. Pump-Discharge Check Valves:
 - a. NPS 2 and Smaller: Bronze swing check valves with bronze or nonmetallic disc.
 - b. NPS 2-1/2 and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, metal or resilient-seat check valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For Steel Piping, NPS 2 and Smaller: Threaded ends.
 - 2. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
 - 3. For Steel Piping, NPS 5 and Larger: Flanged ends.
 - 4. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

3.05 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
 - 2. Bronze Angle Valves: Class 150, bronze nonmetallic disc.
 - 3. Ball Valves: One piece, regular port, bronze with bronze trim.
 - 4. Bronze Swing Check Valves: Class 150, bronze nonmetallic disc.
 - 5. Bronze Gate Valves: Class 150, NRS.
 - 6. Bronze Globe Valves: Class 150, bronze nonmetallic disc.

PART 4 – QUANTITY AND PAYMENT

4.01 GENERAL DUTY VALVES FOR PLUMBING PIPING

- A. Quantity of General Duty Valves for Plumbing Piping will not be measured for this project but the work shall be performed as necessary for each item installed in any location shown and as described herein.

- B. Payment for General Duty Valves for Plumbing Piping will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 220529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 – GENERAL

1.01 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 RELATED DOCUMENTS

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Fastener systems.
 - 5. Pipe positioning systems.
 - 6. Equipment supports.
- B. Related Sections include the following:
 - 1. Division 22 Section "Expansion Fittings and Loops for Plumbing Piping" for pipe guides and anchors.

1.03 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.04 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment.

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.
 - 2. Fiberglass pipe hangers.
 - 3. Thermal-hanger shield inserts.
 - 4. Powder-actuated fastener systems.
 - 5. Pipe positioning systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze pipe hangers. Include Product Data for components.
 - 2. Metal framing systems. Include Product Data for components.
 - 3. Fiberglass strut systems. Include Product Data for components.
 - 4. Pipe stands. Include Product Data for components.
 - 5. Equipment supports.
- C. Welding certificates.

1.06 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
 - 4. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.02 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. AAA Technology & Specialties Co., Inc.
 - 2. Bergen-Power Pipe Supports.
 - 3. B-Line Systems, Inc.; a division of Cooper Industries.
 - 4. Carpenter & Paterson, Inc.
 - 5. Empire Industries, Inc.
 - 6. ERICO/Michigan Hanger Co.
 - 7. Globe Pipe Hanger Products, Inc.
 - 8. Grinnell Corp.
 - 9. GS Metals Corp.
 - 10. National Pipe Hanger Corporation.
 - 11. PHD Manufacturing, Inc.
 - 12. PHS Industries, Inc.
 - 13. Piping Technology & Products, Inc.
 - 14. Tolco Inc.
 - 15. Or Approved Equal
- C. Galvanized, Metallic Coatings: Pre-galvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.03 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.04 METAL FRAMING SYSTEM

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
 - 3. GS Metals Corp.
 - 4. Power-Strut Div.; Tyco International, Ltd.
 - 5. Thomas & Betts Corporation.

6. Tolco Inc.
7. Unistrut Corp.; Tyco International, Ltd.
8. Or Approved Equal

C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.05 FASTENER SYSTEM

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

- a. Hilti, Inc.
- b. ITW Ramset/Red Head.
- c. Masterset Fastening Systems, Inc.
- d. MKT Fastening, LLC.
- e. Powers Fasteners.

2. Or Approved Equal

B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

- a. B-Line Systems, Inc.; a division of Cooper Industries.
- b. Empire Industries, Inc.
- c. Hilti, Inc.
- d. ITW Ramset/Red Head.
- e. MKT Fastening, LLC.
- f. Powers Fasteners.
- g. Or Approved Equal

2.06 PIPE POSITIONING SYSTEM

A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

B. Manufacturers:

1. C & S Mfg. Corp.
2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.
4. Or Approved Equal

2.07 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.08 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 – EXECUTION

3.01 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.

5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4 to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated stationary pipes, NPS 3/4 to NPS 8
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8
8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 8.
11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 3
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20

2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.

14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
 7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
 8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.02 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 Section "Plumbing Fixtures" for plumbing fixtures.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- M. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
 - b. NPS 4: 12 inches long and 0.06 inch thick.
 - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
 - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.

- e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
- 5. Pipes NPS 8 and Larger: Include wood inserts.
- 6. Insert Material: Length at least as long as protective shield.
- 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.03 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.04 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and 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. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.05 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

PART 4 – QUANTITY AND PAYMENT

4.01 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

- A. Quantity of Hangers and Supports for Plumbing Piping and Equipment will not be measured for this project, but the work shall be performed as necessary and shall include all labor, materials, and equipment necessary to install plumbing piping as per the project plans and specifications including all incidental work.
- B. Payment for Hangers and Supports for Plumbing Piping and Equipment will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 220700
PLUMBING INSULATION

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Insulation Materials:
 - a. Calcium silicate.
 - b. Cellular glass.
 - c. Flexible elastomeric.
 - d. Mineral fiber.
 - e. Phenolic.
 - f. Polyisocyanurate.
 - g. Polyolefin.
 - h. Polystyrene.
2. Insulating cements.
3. Adhesives.
4. Mastics.
5. Lagging adhesives.
6. Sealants.
7. Factory-applied jackets.
8. Field-applied fabric-reinforcing mesh.
9. Field-applied cloths.
10. Field-applied jackets.
11. Tapes.
12. Securements.
13. Corner angles.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
1. Product Data for Credit EQ 4.1: For adhesives and sealants, including printed statement of VOC content.
- B. Shop Drawings:
1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
 2. Detail attachment and covering of heat tracing inside insulation.

3. Detail insulation application at pipe expansion joints for each type of insulation.
 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
 6. Detail application of field-applied jackets.
 7. Detail application at linkages of control devices.
 8. Detail field application for each equipment type.
- C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
1. Sample Sizes:
 - a. Preformed Pipe Insulation Materials: 12 inches long by NPS 2.
 - b. Sheet Form Insulation Materials: 12 inches square.
 - c. Jacket Materials for Pipe: 12 inches long by NPS 2.
 - d. Sheet Jacket Materials: 12 inches square.
 - e. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.
- D. Qualification Data: For qualified Installer.
- E. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- F. Field quality-control reports.

1.03 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

- C. Mockups: Before installing insulation, build mockups for each type of insulation and finish listed below to demonstrate quality of insulation application and finishes. Build mockups in the location indicated or, if not indicated, as directed by Architect. Use materials indicated for the completed Work.

1. Piping Mockups:

- a. One 10-foot section of NPS 2 straight pipe.
- b. One each of a 90-degree threaded, welded, and flanged elbow.
- c. One each of a threaded, welded, and flanged tee fitting.
- d. One NPS 2 or smaller valve, and one NPS 2-1/2 or larger valve.
- e. Four support hangers including hanger shield and insert.
- f. One threaded strainer and one flanged strainer with removable portion of insulation.
- g. One threaded reducer and one welded reducer.
- h. One pressure temperature tap.
- i. One mechanical coupling.

2. Equipment Mockups: One tank or vessel.
3. For each mockup, fabricate cutaway sections to allow observation of application details for insulation materials, adhesives, mastics, attachments, and jackets.
4. Notify Architect seven days in advance of dates and times when mockups will be constructed.
5. Obtain Architect's approval of mockups before starting insulation application.
6. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.05 RELATED DOCUMENTS

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for

installation of insulation and field-applied jackets and finishes and for space required for maintenance.

- C. Coordinate installation and testing of heat tracing.

1.06 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
 - 1. Products: Subject to compliance with requirements, provide one of the following
 - a. Cell-U-Foam Corporation; Ultra-CUF.
 - b. Pittsburgh Corning Corporation; Foamglas Super K.
 - c. Or Approved Equal.
 - 2. Block Insulation: ASTM C 552, Type I.
 - 3. Special-Shaped Insulation: ASTM C 552, Type III.
 - 4. Board Insulation: ASTM C 552, Type IV.

5. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
 6. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
 7. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
1. Products: Subject to compliance with requirements, provide one of the following
 - a. Aeroflex USA Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
 - d. Or Approved Equal.
- H. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Duct Wrap.
 - b. Johns Manville; Microlite.
 - c. Knauf Insulation; Duct Wrap.
 - d. Manson Insulation Inc.; Alley Wrap.
 - e. Owens Corning; All-Service Duct Wrap.
 - f. Or Approved Equal.
- I. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For equipment applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; Commercial Board.
 - b. Fibrex Insulations Inc.; FBX.
 - c. Johns Manville; 800 Series Spin-Glas.
 - d. Knauf Insulation; Insulation Board.
 - e. Manson Insulation Inc.; AK Board.
 - f. Owens Corning; Fiberglas 700 Series.
 - g. Or Approved Equal.
- J. Mineral-Fiber, Preformed Pipe Insulation:
1. Products: Subject to compliance with requirements, provide one of the following:

- a. Fibrex Insulations Inc.; Coreplus 1200.
 - b. Johns Manville; Micro-Lok.
 - c. Knauf Insulation; 1000(Pipe Insulation.
 - d. Manson Insulation Inc.; Alley-K.
 - e. Owens Corning; Fiberglas Pipe Insulation.
 - f. Or Approved Equal.
 - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- K. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C 1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C 612, Type IB. Nominal density is 3 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. CertainTeed Corp.; CrimpWrap.
 - b. Johns Manville; MicroFlex.
 - c. Knauf Insulation; Pipe and Tank Insulation.
 - d. Manson Insulation Inc.; AK Flex.
 - e. Owens Corning; Fiberglas Pipe and Tank Insulation.
 - f. Or Approved Equal.

2.02 INSULATING CEMENTS

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; Triple I.
 - b. P. K. Insulation Mfg. Co., Inc.; Super-Stik.
 - c. Or Approved Equal.
- B. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Insulco, Division of MFS, Inc.; SmoothKote.
 - b. P. K. Insulation Mfg. Co., Inc.; PK No. 127, and Quik-Cote.
 - c. Rock Wool Manufacturing Company; Delta One Shot.
 - d. Or Approved Equal.

2.03 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Cellular-Glass, Phenolic, Polyisocyanurate, and Polystyrene Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-96.
 - b. Foster Products Corporation, H. B. Fuller Company; 81-33.
 - c. Or Approved Equal.
 - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aeroseal.
 - b. Armacell LCC; 520 Adhesive.
 - c. Foster Products Corporation, H. B. Fuller Company; 85-75.
 - d. RBX Corporation; Rubatex Contact Adhesive.
 - e. Or Approved Equal.
 - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal.
 - 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products, Division of ITW; CP-82.
 - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
 - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
 - d. Marathon Industries, Inc.; 225.
 - e. Mon-Eco Industries, Inc.; 22-25.
 - f. Or Approved Equal.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); 739, Dow Silicone.
 - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
 - c. P.I.C. Plastics, Inc.; Welding Adhesive.
 - d. Speedline Corporation; Speedline Vinyl Adhesive.
 - e. Or Approved Equal.
2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.04 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
 - b. Compac Corp.; 104 and 105.
 - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
 - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
 - e. Or Approved Equal.
2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
- b. Compac Corp.; 110 and 111.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
- d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
- e. Or Approved Equal.

2. Width: 3 inches.

3. Thickness: 6.5 mils.

4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.

6. Tensile Strength: 40 lbf/inch in width.

7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
- b. Compac Corp.; 130.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
- d. Venture Tape; 1506 CW NS.
- e. Or Approved Equal.

2. Width: 2 inches.

3. Thickness: 6 mils.

4. Adhesion: 64 ounces force/inch in width.

5. Elongation: 500 percent.

6. Tensile Strength: 18 lbf/inch in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
- b. Compac Corp.; 120.
- c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
- d. Venture Tape; 3520 CW.
- e. Or Approved Equal.

2. Width: 2 inches.

3. Thickness: 3.7 mils.

4. Adhesion: 100 ounces force/inch in width.

5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch in width.

E. PVDC Tape: White vapor-retarder PVDC tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dow Chemical Company (The); Saran 540 Vapor Retarder Tape.
 - b. Or Approved Equal.
2. Width: 3 inches
3. Film Thickness: 6 mils
4. Adhesive Thickness: 1.5 mils
5. Elongation at Break: 145 percent.
6. Tensile Strength: 55 lbf/inch in width.

2.05 SECUREMENTS

A. Bands:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Childers Products; Bands.
 - b. PABCO Metals Corporation; Bands.
 - c. RPR Products, Inc.; Bands.
 - d. Or Approved Equal.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304 0.015 inch thick, 3/4 inch wide with wing or closed seal.
3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing or closed seal.
4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:

1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated.
2. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; CD.
 - 3) Midwest Fasteners, Inc.; CD.
 - 4) Nelson Stud Welding; TPA, TPC, and TPS.
 - 5) Or Approved Equal.

3. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; CWP-1.
 - 2) GEMCO; Cupped Head Weld Pin.
 - 3) Midwest Fasteners, Inc.; Cupped Head.
 - 4) Nelson Stud Welding; CHP.
 - 5) Or Approved Equal.
4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
 - 5) Or Approved Equal.
 - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- D. Wire: 0.080-inch nickel-copper alloy, 0.062-inch soft-annealed, stainless steel or 0.062-inch soft-annealed, galvanized steel.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. C & F Wire.
 - b. Childers Products.
 - c. PABCO Metals Corporation.
 - d. RPR Products, Inc.
 - e. Or Approved Equal.

2.06 CORNER ANGLES

- A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105 or 5005; Temper H-14.
- C. Stainless-Steel Corner Angles: 0.024 inch thick, minimum 1 by 1 inch, stainless steel according to ASTM A 167 or ASTM A 240/A 240M, Type 304.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
 - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
 - 2. Verify that surfaces to be insulated are clean and dry.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
 - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 milsthick and an epoxy finish 5 milsthick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
 - 2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Provide an additional twenty five feet of preformed insulation and twenty five square feet of blanket and board type insulation as well as accessories and labor for each size, thickness and type used on the project to accommodate any changes required to resolve interferences or as directed by the Engineer.
- J. Install insulation with least number of joints practical.
- K. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

- L. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- M. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
 - a. For below ambient services, apply vapor-barrier mastic over staples.
 - 4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
 - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- N. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- O. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- P. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- Q. For above ambient services, do not install insulation to the following:
 - 1. Vibration-control devices.
 - 2. Testing agency labels and stamps.
 - 3. Nameplates and data plates.
 - 4. Manholes.
 - 5. Handholes.
 - 6. Cleanouts.

3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor

- insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
- F. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.

3.05 GENERAL PIPE INSULATIONS INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
 9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover

- in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.06 FINISHES

- A. Equipment and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
 1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

3.07 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. Inspect field-insulated equipment, randomly selected by the Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to ten location(s) for each type of equipment defined in the "Equipment Insulation Schedule" Article. For large equipment, remove only a portion adequate to determine compliance.

2. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to ten locations of straight pipe, ten locations of threaded fittings, ten locations of welded fittings, five locations of threaded strainers, five locations of welded strainers, five locations of threaded valves, and five locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

PART 4 – QUANTITY AND PAYMENT

4.01 PLUMBING INSULATION

- A. Quantity of Plumbing Insulation will not be measured for this project but the work shall be performed as necessary.
- B. Payment for Plumbing Insulation will not be measured for this project but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 221116
DOMESTIC WATER PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
2. Encasement for piping.
3. Specialty valves.
4. Flexible connectors.
5. Water meters furnished by utility company for installation by Contractor.
6. Water meters.
7. Escutcheons.
8. Sleeves and sleeve seals.
9. Wall penetration systems.

1.02 SUBMITTALS

A. Product Data: For the following products:

1. Specialty valves.
2. Transition fittings.
3. Dielectric fittings.
4. Flexible connectors.
5. Water meters.
6. Backflow preventers and vacuum breakers.
7. Escutcheons.
8. Sleeves and sleeve seals.
9. Water penetration systems.

B. Water Samples: Specified in "Cleaning" Article.

C. Coordination Drawings: For piping in equipment rooms and other congested areas, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Fire-suppression-water piping.
2. Domestic water piping.
3. Compressed air piping.
4. HVAC hydronic piping.

D. Field quality-control reports.

1.03 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic, potable domestic water piping and components.
- C. Comply with NSF 61 for potable domestic water piping and components.

1.04 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not proceed with interruption of water service without Owner's written permission.

1.05 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

PART 2 – PRODUCTS

2.01 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.02 DUCTILE-IRON PIPE AND FITTINGS

- A. Grooved-End, Ductile-Iron Fittings: ASTM A 47/A 47M, malleable-iron castings or ASTM A 536, ductile-iron castings with dimensions matching pipe.
- B. Couplings in subparagraph below are available in NPS 4 to NPS 24 (DN 100 to DN 600). Other AWWA pipe size couplings in NPS 3 to NPS 36 (DN 80 to DN 900) are also available.
 - 1. Grooved-End, Ductile-Iron-Pipe Couplings: AWWA C606 for ductile-iron-pipe dimensions. Include ferrous housing sections, EPDM-rubber gaskets suitable for hot and cold water, and bolts and nuts.

2.03 GALVANIZED STAINLESS-STEEL PIPING AND FITTINGS- DOMESTIC WATER

- A. Potable-water piping and components are to comply with NSF 61 and NSF 372.

Pipe in "Stainless Steel Pipe" Paragraph below is available in NPS 1/8 to NPS 30

- B. Stainless Steel Pipe: ASTM A312/A312M, seamless, stainless steel of types and schedules as indicated in "Piping Applications" Article.

- C. Stainless Steel Pipe Fittings: ASTM A815/A815M.

Fittings and couplings in "Appurtenances for Grooved-End, Stainless Steel Pipe - Domestic Water" Paragraph below is available in NPS 1 to NPS 24

- D. Appurtenances for Grooved-End, Stainless Steel Pipe - Domestic Water:

1. Source Limitations: Obtain appurtenance for grooved-end, stainless steel pipe from single manufacturer.
2. Fittings for Grooved-End, Stainless Steel Pipe: Stainless steel casting with dimensions matching stainless steel pipe.

AWWA C606 covers couplings in NPS 3/4 to NPS 24 (DN 20 to DN 600) in "Mechanical Couplings for Grooved-End, Stainless Steel Pipe" Subparagraph below.

3. Mechanical Couplings for Grooved-End, Stainless Steel Pipe:

- a. AWWA C606 for stainless steel pipe dimensions.
- b. Stainless steel housing sections.
- c. Stainless steel bolts and nuts.
- d. EPDM-rubber gaskets suitable for hot and cold water.
- e. Minimum Pressure Rating:
 - 1) NPS 8 (DN 200) and Smaller: 600 psig.
 - 2) NPS 10 and NPS 12 (DN 250 to DN 300): 400 psig.
 - 3) NPS 14 to NPS 24 (DN 350 to DN 600): 250 psig.

Fittings in "Stainless Steel Piping, Pressure-Seal-Joint Fittings - Domestic Water" Paragraph below are currently available from Viega in NPS 1/2 to NPS 4 (DN 15 to DN 100). Victaulic and Anvil currently offer pressure-seal joints for NPS 1/2 to NPS 2 (DN 15 to DN 50) but use their grooved fittings lines to cover NPS 2-1/2 (DN 75) and larger.

- E. Stainless Steel Piping, Pressure-Seal-Joint Fittings - Domestic Water:

1. Source Limitations: Obtain stainless steel piping, pressure-seal-joint fittings from single manufacturer.
 - a. Material: Type 316 stainless steel, ASTM A312/A312M, Schedule 5 or Schedule 10.
 - b. Fittings: Type 316 stainless steel with EPDM O-ring seal in each end and approved for potable-water applications.
 - c. Listing: ICC-ES LC1002 or UL classified in accordance with NSF 61 and NSF 372.
 - d. Minimum 200 psig working-pressure rating at 250 deg F.

2.04 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.05 ENCASEMENT FOR PIPING

- A. Standard: ASTM A 674 or AWWA C105.
- B. Form: Sheet or Tube.
- C. Material: LLDPE film of 0.008-inch minimum thickness or high-density, cross-laminated PE film of 0.004-inch minimum thickness.
- D. Color: Black or Natural.

2.06 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
 - 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. Cascade Waterworks Manufacturing.
 - b. Dresser, Inc.; Dresser Piping Specialties.
 - c. Ford Meter Box Company, Inc. (The).
 - d. JCM Industries.

- e. Romac Industries, Inc.
- f. Smith-Blair, Inc; a Sensus company.
- g. Viking Johnson; c/o Mueller Co.
- h. Or Approved Equal.

D. Plastic-to-Metal Transition Fittings:

- 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. Charlotte Pipe and Foundry Company.
 - b. Harvel Plastics, Inc.
 - c. Spears Manufacturing Company.
 - d. Or Approved Equal.

E. Plastic-to-Metal Transition Unions:

- 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. Colonial Engineering, Inc.
 - b. NIBCO INC.
 - c. Spears Manufacturing Company.
 - d. Or Approved Equal.

2.07 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

B. Dielectric Unions:

- 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. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. EPCO Sales, Inc.
 - d. Hart Industries International, Inc.
 - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - f. Zurn Plumbing Products Group; Wilkins Water Control Products.
 - g. Or Approved Equal.
- 2. Description:

- a. Pressure Rating: 250 psig at 180 deg F.
- b. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

- 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. Capitol Manufacturing Company.
 - b. Central Plastics Company.
 - c. EPCO Sales, Inc.
 - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - e. Or Approved Equal.
- 2. Description:
 - a. Factory-fabricated, bolted, companion-flange assembly.
 - b. Pressure Rating: 175 psig minimum.
 - c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:

- 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. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.
 - e. Or Approved Equal.
- 2. Description:
 - a. Nonconducting materials for field assembly of companion flanges.
 - b. Pressure Rating: 150 psig.
 - c. Gasket: Neoprene or phenolic.
 - d. Bolt Sleeves: Phenolic or polyethylene.
 - e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:

- 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. Calpico, Inc.
- b. Lochinvar Corporation.
- c. Or Approved Equal.

2. Description:

- a. Galvanized-steel coupling.
- b. Pressure Rating: 300 psig at 225 deg F.
- c. End Connections: Female threaded.
- d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:

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. Perfection Corporation; a subsidiary of American Meter Company.
- b. Precision Plumbing Products, Inc.
- c. Victaulic Company.
- d. Or Approved Equal.

2. Description:

- a. Electroplated steel nipple complying with ASTM F 1545.
- b. Pressure Rating: 300 psig at 225 deg F.
- c. End Connections: Male threaded or grooved.
- d. Lining: Inert and noncorrosive, propylene.

2.08 FLEXIBLE CONNECTORS

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. Flex-Hose Co., Inc.
- 2. Flexicraft Industries.
- 3. Flex Pression, Ltd.
- 4. Flex-Weld, Inc.
- 5. Hyspan Precision Products, Inc.
- 6. Mercer Rubber Co.
- 7. Metraflex, Inc.
- 8. Proco Products, Inc.
- 9. Tozen Corporation.
- 10. Unaflex, Inc.
- 11. Universal Metal Hose; a Hyspan company
- 12. Or Approved Equal.

- B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
 - 1. Working-Pressure Rating: Minimum 250 psig.
 - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
 - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.09 ESCUTCHEONS

- A. General: Manufactured ceiling, floor, and wall escutcheons and floor plates.
- B. One Piece, Cast Brass: Polished, chrome-plated or rough-brass finish with setscrews.
- C. One Piece, Deep Pattern: Deep-drawn, box-shaped brass with chrome-plated finish.
- D. One Piece, Stamped Steel: Chrome-plated finish with setscrew or spring clips.
- E. Split Casting, Cast Brass: Polished, chrome-plated or rough-brass finish with concealed hinge and setscrew.
- F. Split Plate, Stamped Steel: Chrome-plated finish with concealed hinge, setscrew or spring clips.
- G. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
- H. Split-Casting Floor Plates: Cast brass with concealed hinge.

2.10 SLEEVES

- A. Cast-Iron Wall Pipes: Fabricated of cast iron, and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Molded-PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- D. Molded-PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.
- E. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- F. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
- G. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with setscrews.

2.11 SLEEVE SEALS

- 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. Advance Products & Systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex, Inc.
 - 4. Pipeline Seal and Insulator, Inc.
 - 5. Or Approved Equal.
- B. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.
 - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 2. Pressure Plates: Stainless steel.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.12 WALL PENETRATION SYSTEMS

- 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. SIGMA.
 - 2. Or Approved Equal.
- B. Description: Wall-sleeve assembly, consisting of housing and gland, gaskets, and pipe sleeve.
 - 1. Carrier-Pipe Deflection: Up to 5 percent without leakage.
 - 2. Housing: Ductile-iron casting with hub, waterstop, anchor ring, and locking devices. Include gland, bolts, and nuts.
 - 3. Housing-to-Sleeve Gasket: EPDM rubber.
 - 4. Housing-to-Carrier-Pipe Gasket: AWWA C111, EPDM rubber.
 - 5. Pipe Sleeve: AWWA C151, ductile-iron pipe or ASTM A 53/A 53M, Schedule 40, zinc-coated steel pipe.

2.13 GROUT

- A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.

- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 – EXECUTION

3.01 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install shutoff valve immediately upstream of each dielectric fitting.
- C. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- D. Install domestic water piping level without pitch and plumb.
- E. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- F. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- G. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- H. Install piping to permit valve servicing.
- I. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- J. Install piping free of sags and bends.
- K. Install fittings for changes in direction and branch connections.
- L. Install PEX piping with loop at each change of direction of more than 90 degrees.
- M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

3.02 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- G. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- H. Steel-Piping Grooved Joints: Cut or roll groove end of pipe. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- I. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- J. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.03 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to

plumbing fixtures that do not have supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.

- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
 - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
 - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.
- E. Install calibrated balancing valves in each hot-water circulation return branch and discharge side of each pump and circulator. Set calibrated balancing valves partly open to restrict but not stop flow. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for calibrated balancing valves.

3.04 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
 - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.05 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings or nipples.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
- D. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.06 FLEXIBLE CONNECTOR INSTALLATION

- A. Install stainless-steel-hose flexible connectors in steel domestic water piping.

3.07 HANGERS AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for pipe hanger and support products and installation.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet If Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch
- D. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 - 3. NPS 2: 10 feet with 3/8-inch rod.
 - 4. NPS 2-1/2: 11 feet with 1/2-inch rod.
 - 5. NPS 3 and NPS 3-1/2: 12 feet with 1/2-inch rod.
 - 6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
 - 7. NPS 6: 12 feet with 3/4-inch rod.
 - 8. NPS 8 to NPS 12: 12 feet with 7/8-inch rod.
- E. Install supports for vertical steel piping every 15 feet.
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.08 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
1. Domestic Water Booster Pumps: Cold-water suction and discharge piping.
 2. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 3. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
 4. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.09 ESCUTCHEON INSTALLATION

- A. Install escutcheons for penetrations of walls, ceilings, and floors.
- B. Escutcheons for New Piping:
1. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep pattern.
 2. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, stamped steel with set screw or spring clips.
 3. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece or split plate, stamped steel with set screw.
 4. Bare Piping in Unfinished Service Spaces: One piece, stamped steel with set screw or spring clips.
 5. Bare Piping in Equipment Rooms: One piece, stamped steel with set screw or spring clips.
 6. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece floor plate.
- C. Escutcheons for Existing Piping:
1. Chrome-Plated Piping: Split casting, cast brass with chrome-plated finish.
 2. Insulated Piping: Split plate, stamped steel with concealed or exposed-rivet hinge and spring clips.
 3. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split plate, stamped steel with concealed hinge and spring clips.
 4. Bare Piping at Ceiling Penetrations in Finished Spaces: Split plate, stamped steel with concealed hinge and set screw.
 5. Bare Piping in Unfinished Service Spaces: Split plate, stamped steel with concealed or exposed-rivet hinge and set screw or spring clips.
 6. Bare Piping in Equipment Rooms: Split plate, stamped steel with set screw or spring clips.
 7. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting floor plate.

3.10 SLEEVE INSTALLATION

- A. General Requirements: Install sleeves for pipes and tubes passing through penetrations in floors, partitions, roofs, and walls.
- B. Sleeves are not required for core-drilled holes.
- C. Permanent sleeves are not required for holes formed by removable PE sleeves.
- D. Cut sleeves to length for mounting flush with both surfaces unless otherwise indicated.
- E. Install sleeves in new partitions, slabs, and walls as they are built.
- F. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint.
- G. Seal space outside of sleeves in concrete slabs and walls with grout.
- H. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated.
- I. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestop materials and installations.

3.11 SLEEVE SEAL INSTALLATION

- A. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building.
- B. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.12 WALL PENETRATION SYSTEM INSTALLATION

- A. Install wall penetration systems in new, exterior concrete walls.
- B. Assemble wall penetration system components with sleeve pipe. Install so that end of sleeve pipe and face of housing are flush with wall. Adjust locking devices to secure sleeve pipe in housing.

3.13 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.

- B. Label pressure piping with system operating pressure.

3.14 FIELD QUALITY CONTROL

- A. Perform tests and inspections.

- B. Piping Inspections:

1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange final inspection for authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

- D. Domestic water piping will be considered defective if it does not pass tests and inspections.

- E. Prepare test and inspection reports.

3.15 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide flow of hot water in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.16 CLEANING

- A. Clean and disinfect potable and non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Clean non-potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- C. Prepare and submit reports of purging and disinfecting activities.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.17 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Aboveground domestic water piping, shall be the following:
 1. Stainless Steel, schedule 10 pipe, pressure-seal joint fittings; and pressure sealed joints.

3.18 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 3. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.
 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
- C. Iron grooved-end valves may be used with grooved-end piping.

PART 4 – QUANTITY AND PAYMENT

4.01 DOMESTIC WATER PIPING

- A. Quantity of Domestic Water Piping will not be measured for this project, but the work shall be performed as necessary.
- B. Payment for Domestic Water Piping will not be made for this project but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 221119
DOMESTIC WATER PIPING SPECIALTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following domestic water piping specialties:
 - 1. Balancing valves.
 - 2. Strainers.
 - 3. Air vents.
- B. Related Sections include the following:
 - 1. Division 22 Section "Domestic Water Piping" for water meters.

1.03 PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig, unless otherwise indicated.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

1.05 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NSF Compliance:

1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

PART 2 – PRODUCTS

2.01 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - a. Armstrong International, Inc.
 - b. Flo Fab Inc.
 - c. ITT Industries; Bell & Gossett Div.
 - d. NIBCO INC.
 - e. TAC Americas.
 - f. Taco, Inc.
 - g. Watts Industries, Inc.; Water Products Div.
 - h. Or Approved Equal.
4. Type: Ball or Y-pattern globe valve with two readout ports and memory setting indicator.
5. Body: Brass or bronze,
6. Size: Same as connected piping, but not larger than NPS 2.
7. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

B. Cast-Iron Calibrated Balancing Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide product by one of the following:
 - a. Armstrong International, Inc.
 - b. Flo Fab Inc.

- c. ITT Industries; Bell & Gossett Div.
 - d. NIBCO INC.
 - e. TAC Americas.
 - f. Watts Industries, Inc.; Water Products Div.
 - g. Or Approved Equal.
- 4. Type: Adjustable with Y-pattern globe valve, two readout ports, and memory-setting indicator.
- 5. Size: Same as connected piping, but not smaller than NPS 2-1/2 (DN 65).
- C. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.
- D. Memory-Stop Balancing Valves:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Conbraco Industries, Inc.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Crane Co.; Crane Valve Group; Jenkins Valves.
 - d. Crane Co.; Crane Valve Group; Stockham Div.
 - e. Hammond Valve.
 - f. Milwaukee Valve Company.
 - g. NIBCO INC.
 - h. Red-White Valve Corp.
 - i. Or Approved Equal.
 - 3. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
 - 4. Pressure Rating: 400-psig minimum CWP.
 - 5. Size: NPS 2 or smaller.
 - 6. Body: Copper alloy.
 - 7. Port: Standard or full port.
 - 8. Ball: Chrome-plated brass.
 - 9. Seats and Seals: Replaceable.
 - 10. End Connections: Solder joint or threaded.
 - 11. Handle: Vinyl-covered steel with memory-setting device.

2.02 STRAINERS FOR DOMESTIC WATER PIPING

- A. Y-Pattern Strainers:
 - 1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
 - 2. Body: Bronze for NPS 2 and smaller; cast iron for NPS 2-1/2 and larger.

3. End Connections: Threaded for NPS 2 and smaller flanged for NPS 2-1/2 (and larger).
4. Screen: Stainless steel with round perforations, unless otherwise indicated.
5. Perforation Size:
 - a. Strainers NPS 2 and Smaller: 0.033 inch.
 - b. Strainers NPS 2-1/2 to NPS 4: 0.062 inch.
 - c. Strainers NPS 5 and Larger: 0.125 inch.
6. Drain: Pipe plug.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for Plumbing" for piping joining materials, joint construction, and basic installation requirements.
- B. Install water control valves with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- C. Install balancing valves in locations where they can easily be adjusted.
- D. Install Y-pattern strainers for water on supply side of each control valve,.
- E. Install air vents at high points of water piping.

3.02 CONNECTIONS

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.

3.03 ADJUSTING

- A. Set field-adjustable flow set points of balancing valves.

PART 4 – QUANTITY AND PAYMENT

4.01 DOMESTIC WATER PIPING SPECIALTIES

- A. Quantity of Domestic Water Piping Specialties will not be measured for this project, but the work shall be performed as necessary.
- B. Payment for Domestic Water Piping Specialties will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 026460
PIPING, FITTINGS AND VALVES

PART 1 - GENERAL

1.01 GENERAL

- A. This Section includes pipe and fitting materials, joining methods, special-duty valves, and specialties for the following:
 - 1. Hot-water heating piping.
 - 2. Safety-valve-inlet and – outlet piping.
 - 3. Washing machine piping and water shut-off valves.

1.02 SUBMITTALS

- A. Product Data: For each type of the following:
 - 1. Pressure-seal fittings.
 - 2. Valves. Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
- B. Shop Drawings: Detail of the piping layout, fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to the building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.03 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.01 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tubing: 30TASTM B 88, Type L30T39T.
- B. Wrought-Copper Fittings: ASME B16.22.

1. Grooved-End Copper Fittings: 30_TASTM B 7530_{T39T} (ASTM B 75M)39_T, copper tube or ASTM B 584, bronze casting.
2. Grooved-End-Tube Couplings: Rigid pattern, unless otherwise indicated; gasketed fitting. Ductile-iron housing with keys matching pipe and fitting grooves, prelubricated EPDM gasket rated for minimum 30_T230 deg F30_T for use with housing, and steel bolts and nuts.

C. Wrought Copper Unions: ASME B16.22.

2.02 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 30T1/8-inch30T maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.

E. Gasket Material: Thickness, material, and type suitable for fluid to be handled and working temperatures and pressures.

2.03 VALVES

A. Gate, Globe, Check, Ball, and Butterfly Valves ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS

A. Hot-water heating piping, aboveground, 30TNPS, 3/4" 30TType 30TL30T drawn-temper copper tubing, wrought-copper fittings, and pressure-seal joints.

3.02 VALVE APPLICATIONS

- A. Install shutoff-duty valves at each branch connection to supply mains, and at supply connection to each piece of equipment.
- B. Install calibrated-orifice, balancing valves at each branch connection to return main.
- C. Install calibrated-orifice, balancing valves in the return pipe of each heating or cooling terminal.
- D. Install check valves at each pump discharge and elsewhere as required to control flow direction.
- E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; and pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.
- F. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

3.03 PIPING INSTALLATIONS

- A. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- B. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- C. Install piping free of sags and bends.
- D. Install fittings for changes in direction and branch connections.
- E. Install piping to allow application of insulation.
- F. Select system components with pressure rating equal to or greater than system operating pressure.
- G. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

- H. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- I. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- J. Install unions in piping, 30TNPS 230T and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

3.04 PIPE JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- H. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end pipe couplings.

- I. Mechanically Formed, Copper-Tube-Outlet Joints: Use manufacturer-recommended tool and procedure, and brazed joints.

3.05 FIELD QUALITY CONTROL

- A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

- B. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Set temperature controls so all coils are calling for full flow.
5. Inspect and set operating temperatures of hydronic equipment to specified values.

PART 4 - QUANTITY AND PAYMENT

4.01 PIPING, FITTINGS, AND VALVES

- A. Quantity of Piping, Fittings, and Valves will not be measured for this project.
- B. Payment for Piping, Fittings, and Valves will not be made for this project, but the cost shall be included in the various items of the proposal.

END OF SECTION

SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.02 SUMMARY

- A. This Section includes TAB to produce design objectives for the following:

- 1. Hydronic Piping Systems:
 - a. Constant-flow systems.
 - b. Variable-flow systems.
 - c. Primary-secondary systems.
- 2. HVAC equipment quantitative-performance settings.
- 3. Verifying that automatic control devices are functioning properly.
- 4. Reporting results of activities and procedures specified in this Section.

1.03 DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.
- C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.
- D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.
- E. RC: Room criteria.
- F. Report Forms: Test data sheets for recording test data in logical order.
- G. above the point of measurement. In a closed system, static head is equal on both sides of the pump.

- H. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.
- I. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- J. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- K. TAB: Testing, adjusting, and balancing.
- L. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.
- M. Test: A procedure to determine quantitative performance of systems or equipment.

1.04 SUBMITTALS

- A. Product information for new furnace to be furnished and installed.
- B. Product information for new hot water heater to be furnished and installed.
- C. Warranties specified in this Section.

1.05 QUALITY ASSURANCE

- A. TAB Conference: Meet with Owner's and Architect's representatives on approval of TAB strategies and procedures plan to develop a mutual understanding of the details. Ensure the participation of TAB team members, equipment manufacturers' authorized service representatives, HVAC controls installers, and other support personnel. Provide seven days' advance notice of scheduled meeting time and location.
 - 1. Agenda Items: Include at least the following:
 - a. Submittal distribution requirements.
 - b. The Contract Documents examination report.
 - c. TAB plan.
 - d. Work schedule and Project-site access requirements.
 - e. Coordination and cooperation of trades and subcontractors.
 - f. Coordination of documentation and communication flow.
- B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.

2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- C. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
 1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

1.06 PROJECT CONDITIONS

- A. Existing Appliances: The Contractor shall obtain the manufacturer's make, model, year, size, and specifications for the existing hot water heater and furnace in each unit. The Contractor shall furnish and install new hot water heater and furnace of the same make, model, and size for the year 2025, or approved equal.
- B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.07 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.08 WARRANTY

- A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:
 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
 2. Systems are balanced to optimum performance capabilities within design and installation limits.
- B. Special Guarantee: Provide a guarantee on TABB forms stating that TABB will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee shall include the following provisions:
 1. The certified TAB firm has tested and balanced systems according to the Contract Documents.

2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS

(Not used)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
 1. Contract Documents are defined in the General and Supplementary Conditions of Contract.
 2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- D. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- E. Examine system and equipment test reports.
- F. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and that their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- G. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- H. Examine strainers for clean screens and proper perforations.

- I. Examine equipment for installation and for properly operating safety interlocks and controls.
- J. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices are operated by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
 - 4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
 - 5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
 - 6. Sensors are located to sense only the intended conditions.
 - 7. Sequence of operation for control modes is according to the Contract Documents.
 - 8. Controller set points are set at indicated values.
 - 9. Interlocked systems are operating.
 - 10. Changeover from heating to cooling mode occurs according to indicated values.
- K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.02 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" and this Section.
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.
- C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.03 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

- A. Prepare test reports with pertinent design data and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against approved pump flow rate. Correct variations that exceed plus or minus 5 percent.
- B. Prepare schematic diagrams of systems' "as-built" piping layouts.
- C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
 - 1. Open all manual valves for maximum flow.
 - 2. Check makeup-water-station pressure gage for adequate pressure for highest vent.
 - 3. Check flow-control valves for specified sequence of operation and set at indicated flow.
 - 4. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type unless several terminal valves are kept open.
 - 5. Set system controls so automatic valves are wide open to heat exchangers.
 - 6. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.
 - 7. Check air vents for forceful liquid flow exiting from vents when manually operated.

3.04 PROCEDURES FOR HYDRONIC SYSTEMS

- A. Measure water flow at pumps. Use the following procedures, except for positive-displacement pumps:
 - 1. Verify impeller size by operating the pump with the discharge valve closed. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.
 - 2. Check system resistance. With all valves open, read pressure differential across the pump and mark pump manufacturer's head-capacity curve. Adjust pump discharge valve until indicated water flow is achieved.
 - 3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
 - 4. Report flow rates that are not within plus or minus 5 percent of design.
- B. Set calibrated balancing valves, if installed, at calculated presettings.
- C. Measure flow at all stations and adjust, where necessary, to obtain first balance.
 - 1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

- D. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than indicated flow.
- E. Adjust balancing stations to within specified tolerances of indicated flow rate as follows:
 - 1. Determine the balancing station with the highest percentage over indicated flow.
 - 2. Adjust each station in turn, beginning with the station with the highest percentage over indicated flow and proceeding to the station with the lowest percentage over indicated flow.
 - 3. Record settings and mark balancing devices.
- F. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures including outdoor-air temperature.
- G. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.05 TEMPERATURE-CONTROL VERIFICATION

- A. Verify that controllers are calibrated and commissioned.
- B. Check transmitter and controller locations and note conditions that would adversely affect control functions.
- C. Record controller settings and note variances between set points and actual measurements.
- D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).
- E. Check free travel and proper operation of control devices such as damper and valve operators.
- F. Check the sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water flow measurements. Note the speed of response to input changes.
- G. Check the interaction of electrically operated switch transducers.
- H. Check the interaction of interlock and lockout systems.
- I. Check main control supply-air pressure and observe compressor and dryer operations.
- J. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.
- K. Note operation of electric actuators using spring return for proper fail-safe operations.

3.06 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Heating-Water Flow Rate: 0 to minus 10 percent.

3.07 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional testing, inspecting, and adjusting during near-peak summer and winter conditions.

PART 4 – QUANTITY AND PAYMENT

4.01 TESTING, ADJUSTING, AND BALANCING FOR HVAC

- A. Quantity of Testing, Adjusting, and Balancing for HVAC will not be measured for this project, but the work shall be performed as necessary.
- B. Payment for Testing, Adjusting, and Balancing for HVAC will not be made for this project, but the cost shall be included in the various items of the proposal.

4.02 REPLACE HVAC AIR GRILL COVER

- A. Quantity of “Replace HVAC Air Grill Cover” will be measured in each grill cover (EA) for this project.
- B. Payment of “Replace HVAC Air Grill Cover” will be measured for each grill cover (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.03 REPLACE EXISTING FURNACE

- A. Quantity of “Replace Existing Furnace” will be measured in each (EA) for this project.
- B. Payment of “Replace Existing Furnace” will be measured for each (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.04 FURNISH AND INSTALL HVAC ROOM DOOR WITH GRATE

- A. Quantity of “Furnish and Install HVAC Room Door with Grate” will be measured in each door with grate (EA) for this project.
- B. Payment of “Furnish and Install HVAC Room Door with Grate” will be measured for each door with grate (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

4.05 FURNISH AND INSTALL NEW AIR FILTER VENT COVER AND REPLACE AIR FILTER

- A. Quantity of “Furnish and Install New Air Filter Vent Cover and Replace Air Filter” will be measured in each new air filter vent cover and replaced air filters (EA) for this project.
- B. Payment of “Furnish and Install New Air Filter Vent Cover and Replace Air Filter” will be measured for each new air filter vent cover and replaced air filters (EA), and shall include all materials, labor and equipment necessary to perform construction layout, installation, framing and all incidental work.

END OF SECTION

SECTION 260500
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 STIPULATIONS

- A. The specifications sections "General Conditions" and "General Requirements" form a part of this section by this reference thereto and have the same force and effect as if printed herewith in full.
- B. Drawings and general provisions of the Contract apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Electrical demolition.
 - 7. Cutting and patching for electrical construction.
 - 8. Touchup painting.

1.03 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. IMC: Intermediate metal conduit.
- D. LFMC: Liquidtight flexible metal conduit.
- E. RNC: Rigid nonmetallic conduit.

1.04 SUBMITTALS

- A. Product Data: For Raceways, conductors, supporting devices, grade boxes, identification, etc.
- B. Shop Drawings: Dimensioned plans and sections or elevation layouts of electric equipment.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.05 ITEMS NOT SHOWN OR SPECIFIED

- A. Any item of material not indicated on the drawings and/or not specified, but which is required for the complete and proper installation and/or operation of any part of the work, shall be provided as if indicated and specified, at no additional cost to the Owner.
- B. Any work not indicated on the drawings and/or not specified, but which is required for compliance with applicable codes and regulations, shall be provided as if indicated and specified, at no additional cost to the Owner.

1.06 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. The contractor shall be fully responsible in the coordination and installation of all electrical products as per the manufacturer's recommendations. Should the contractor alter or change the manufacturer's installation recommendations, the contractor shall submit a certified installation report from the manufacturer's representative stating the installed is acceptable. Any discrepancies in the installation shall be corrected per the manufacturer's requirements at no additional cost to the owner and before final closeout of the project.

1.07 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.

2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- F. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 - PRODUCTS

2.01 RACEWAYS

- A. EMT: ANSI C80.3, zinc-coated steel, with compression fittings.
- B. FMC: Zinc-coated steel.
- C. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
- D. LFMC: Zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
- E. RNC: NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.
- F. Raceway Fittings: Specifically designed for the raceway type with which used.

2.02 CONDUCTORS

- A. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
- B. Conductors, Larger than No. 10 AWG: Stranded copper.
- C. Insulation: Thermoplastic, rated at 75 deg C minimum.
- D. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.03 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.
- B. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs.
- D. Slotted-Steel Channel Supports: Comply with Division 5 Section "Metal Fabrications" for slotted channel framing.
 1. Channel Thickness: Selected to suit structural loading.

2. Fittings and Accessories: Products of the same manufacturer as channel supports.
- E. Nonmetallic Channel and Angle Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (203 mm) o.c., in at least one surface.
1. Fittings and Accessories: Products of the same manufacturer as channels and angles.
 2. Fittings and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
- F. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.
- G. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.
- H. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.
- I. Expansion Anchors: Carbon-steel wedge or sleeve type.
- J. Toggle Bolts: All-steel springhead type.
- K. Powder-Driven Threaded Studs: Heat-treated steel.

2.04 ELECTRICAL IDENTIFICATION

- A. Identification Devices: A single type of identification product for each application category. Use colors prescribed by ANSI A13.1, NFPA 70, and these Specifications.
- B. Raceway and Cable Labels: Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.
1. Type: Pretensioned, wraparound plastic sleeves. Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item it identifies.
 2. Type: Preprinted, flexible, self-adhesive, vinyl. Legend is overlaminated with a clear, weather- and chemical-resistant coating.
 3. Color: Black letters on orange background.
 4. Legend: Indicates voltage.

- C. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape, not less than 1 inch wide by 3 mils thick (25 mm wide by 0.08 mm thick).
- D. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:
 - 1. Not less than 6 inches wide by 4 mils thick (150 mm wide by 0.102 mm thick).
 - 2. Compounded for permanent direct-burial service.
 - 3. Embedded continuous metallic strip or core.
 - 4. Printed legend that indicates type of underground line.
- E. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
- G. Engraved-Plastic Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch (1.6-mm) minimum thickness for signs up to 20 sq. in. (129 sq. cm) and 1/8-inch (3.2-mm) minimum thickness for larger sizes. Engraved legend in black letters on white background.
- H. Interior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.
- I. Exterior Warning and Caution Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm), galvanized-steel backing, with colors, legend, and size appropriate to the application. 1/4-inch (6-mm) grommets in corners for mounting.
- J. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.05 EQUIPMENT FOR LOCAL UTILITY ELECTRICITY METERING

- A. Meter Sockets: Provide local metering equipment integral with the Main Distribution Panel.

2.06 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.

- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.07 SMOKE AND CARBON MONOXIDE DETECTOR

- A. Battery Powered: First Alert Model No. PRC700-6 or approved equal.
- B. Hardwired: First Alert Model No. SC9120B-6 or approved equal.

PART 3 – EXECUTION

3.01 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.02 RACEWAY APPLICATION

- A. Use the following raceways for outdoor installations:
 - 1. Exposed: IMC.
 - 2. Concealed: IMC.
 - 3. Underground, Single Run: RNC.
 - 4. Underground, Grouped: RNC.
 - 5. Connection to Vibrating Equipment: LFMC.
 - 6. Boxes and Enclosures: NEMA 250, Type 3R or Type 4.
- B. Use the following raceways for indoor installations:
 - 1. Exposed: EMT.
 - 2. Concealed: EMT.
 - 3. Connection to Vibrating Equipment: FMC; except in wet or damp locations, use LFMC.
 - 4. Damp or Wet Locations: IMC.
 - 5. Boxes and Enclosures: NEMA 250, Type 1, unless otherwise indicated.

3.03 RACEWAY AND CABLE INSTALLATION

- A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
- B. Install raceways and cables at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
- C. Use temporary raceway caps to prevent foreign matter from entering.
- D. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- E. Use raceway and cable fittings compatible with raceways and cables and suitable for use and location.
- F. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch (25-mm) concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Install conduit larger than 1-inch trade size (DN27) parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
 - 5. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for exposed parallel raceways.
- G. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of the pull wire.
- H. Install telephone and signal system raceways, 2-inch trade size (DN53) and smaller, in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.
- I. Connect motors and equipment subject to vibration, noise transmission, or movement with a maximum of 72-inch (1830-mm) flexible conduit. Install LFMC in wet or damp locations. Install separate ground conductor across flexible connections.
- J. Set floor boxes level and trim after installation to fit flush to finished floor surface.

3.04 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Feeders: Type THHN/THWN insulated conductors in raceway.
- B. Underground Feeders and Branch Circuits: Type THWN or single-wire, Type UF insulated conductors in raceway.
- C. Branch Circuits: Type THHN/THWN insulated conductors in raceway.
- D. Branch Circuits: Type THHN/THWN insulated conductors in raceway where exposed. Metal-clad cable where concealed in ceilings and gypsum board partitions.
- E. Remote-Control Signaling and Power-Limited Circuits: Type THHN/THWN insulated conductors in raceway for Classes 1, 2, and 3, unless otherwise indicated.

3.05 WIRING INSTALLATION

- A. Install splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- B. Install wiring at outlets with at least 12 inches (300 mm) of slack conductor at each outlet.
- C. Connect outlet and component connections to wiring systems and to ground. Tighten electrical connectors and terminals, according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

3.06 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Support Clamps for PVC Raceways: Click-type clamp system.
- D. Selection of Supports: Comply with manufacturer's written instructions.
- E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb (90-kg) design load.

3.07 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install ¼-inch- (6-mm-) diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch (38-mm) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches (610 mm) from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

- M. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
1. Wood: Fasten with wood screws or screw-type nails.
 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 3. New Concrete: Concrete inserts with machine screws and bolts.
 - a. Existing Concrete: Expansion bolts.
 4. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used in existing concrete.
 5. Steel: Welded threaded studs or spring-tension clamps on steel.
 6. Field Welding: Comply with AWS D1.1.
 7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 8. Light Steel: Sheet-metal screws.
 9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.08 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Self-Adhesive Identification Products: Clean surfaces before applying.
- D. Identify raceways and cables with color banding as follows:
 1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (8-m) maximum intervals in congested areas.
 3. Colors: As follows:
 - a. Fire Alarm System: Red.
 - b. Security System: Blue and yellow.
 - c. Telecommunication System: Green and yellow.

- E. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- F. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate 6 to 8 inches (150 to 200 mm) below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm), overall, use a single line marker.
- G. Color-code 208/120-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Black.
 - 2. Phase B: Red.
 - 3. Phase C: Blue.
- H. Color-code 480/277-V system secondary service, feeder, and branch-circuit conductors throughout the secondary electrical system as follows:
 - 1. Phase A: Yellow.
 - 2. Phase B: Brown.
 - 3. Phase C: Orange.
- I. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- J. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

3.09 FIRESTOPPING

- A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Firestopping."

3.10 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from Project site.
- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.11 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.12 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Raceways.
 - 2. Building wire and connectors.
 - 3. Supporting devices for electrical components.
 - 4. Electrical identification.
 - 5. Electricity-metering components.
 - 6. Concrete bases.
 - 7. Electrical demolition.
 - 8. Cutting and patching for electrical construction.
 - 9. Touchup painting.
- B. Test Department's electricity-metering installation for proper operation, accuracy, and usability of output data.
 - 1. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
 - 2. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.

3. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
4. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.
5. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

3.13 REFINISHING AND TOUCHUP PAINT

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Section 09900 "Painting."
 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.14 CLEANING AND PROTECTING

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

PART 4 - QUANTITY AND PAYMENT

4.01 REPLACE EXISTING WALL SWITCH AND COVER PLATE, IF AND WHERE DIRECTED

- A. Quantity of "Replace Existing Wall Switch and Cover Plate, If and Where Directed" will be measured for Each (EA) wall switch installed at the direction of the Engineer.
- B. Payment for "Replace Existing Wall Switch and Cover Plate, If and Where Directed" will be made for Each (EA) wall switch installed and include all materials, equipment, and labor necessary to furnish and install the wall switches.

4.02 REPLACE EXISTING OUTLET AND COVER PLATE, IF AND WHERE DIRECTED

- A. Quantity of “Replace Existing Outlet and Cover Plate, If and Where Directed” will be measured for Each (EA) outlet installed.
- B. Payment for “Replace Existing Outlet and Cover Plate, If and Where Directed” will be made for Each (EA) outlet installed and include all materials, equipment, and labor necessary to furnish and install the outlets.

4.03 REPLACE EXISTING PHONE JACK AND COVER PLATE, IF AND WHERE DIRECTED

- A. Quantity of “Replace Existing Phone Jack and Cover Plate, If and Where Directed” will not be measured for this project, but the work shall be performed as necessary.
- B. Payment for “Replace Existing Phone Jack and Cover Plate, If and Where Directed” will not be made for this project, but the cost shall be included in the various items of the proposal.

4.04 REPLACE EXISTING CABLE JACK AND COVER PLATE, IF AND WHERE DIRECTED

- A. Quantity of “Replace Existing Cable Jack and Cover Plate, If and Where Directed” will be measured for Each (EA) outlet installed.
- B. Payment for “Replace Existing Cable Jack and Cover Plate, If and Where Directed” will be made for Each (EA) cable jack installed and includes all materials, equipment, and labor necessary to furnish and install the cable jacks.

4.05 FURNISH AND INSTALL HARDWIRED SMOKE/CO DETECTOR

- A. Quantity of “Furnish and Install Hardwired Smoke/CO Detector” will be measured for Each (EA) detector installed.
- B. Payment for “Furnish and Install Hardwired Smoke/CO Detector” will be made for each (EA) detector installed and include all materials, equipment, and labor necessary to furnish and install the detectors.

4.06 REPLACE EXISTING HARDWIRED SMOKE/CO DETECTOR

- A. Quantity of “Replace Existing Hardwired Smoke/CO Detector” will be measured for Each (EA) detector installed.

- B. Payment for “Replace Existing Hardwired Smoke/CO Detector” will be made for each (EA) detector installed and include all materials, equipment, and labor necessary to furnish and install the detectors.

4.07 REPLACE EXISTING THERMOSTAT

- A. Quantity of “Replace Existing Thermostat” will be measured for Each (EA) thermostat installed.
- B. Payment for “Replace Existing Thermostat” will be made for each (EA) thermostat installed and include all materials, equipment, and labor necessary to furnish and install the thermostats.

4.08 FURNISH AND INSTALL LED LIGHTS

- C. Quantity of “Furnish and Install LED Lights” will be measured for Each (EA) overhead LED light installed.
- D. Payment for “Furnish and Install LED Lights” will be made for each (EA) overhead LED light installed and include all materials, equipment, and labor necessary to furnish and install the overhead LED lights.

END OF SECTION

SECTION I:
Minimum Wage Rate Schedule

Superseded General Decision Number: PA20240087

State: Pennsylvania

Construction Type: Building

County: Delaware County in Pennsylvania.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 14026 generally applies to the contract.. The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul style="list-style-type: none">. Executive Order 13658 generally applies to the contract.. The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/03/2025
1	02/21/2025

2	02/28/2025
3	03/07/2025
4	03/21/2025
5	05/23/2025

* ASBE0014-002 05/01/2025

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR (MECHANICAL- Duct, Pipe & Mechanical System Insulation).....	\$ 60.84	48.38

BOIL0013-008 01/01/2025

	Rates	Fringes
BOILERMAKER.....	\$ 55.00	35.48

BRPA0001-016 05/01/2024

	Rates	Fringes
BRICKLAYER (Including Pointing, Caulking, and Cleaning).....	\$ 48.70	31.42
MASON - STONE.....	\$ 48.40	31.95

BRPA0001-017 05/01/2024

	Rates	Fringes
TILE FINISHER.....	\$ 26.05	21.00
TILE SETTER.....	\$ 51.36	30.02

CARP0219-005 05/01/2024

	Rates	Fringes
MILLWRIGHT.....	\$ 53.54	36.94

CARP0251-004 05/01/2024

	Rates	Fringes
CARPENTER (Floor Laying - Hardwood, Carpet and Vinyl Only).....	\$ 50.52	30.88

CARP0255-008 05/01/2024

	Rates	Fringes
CARPENTER (Includes, Acoustical Ceiling Installation, Batt Insulation, Drywall Hanging, Metal Stud Installation, Firestopping, Form Work, Gutter Installation, Metal Flashing Installation, Metal Roof Installation, Scaffold Building and Siding Installation- Metal,		

Aluminum, and Vinyl).....	\$ 45.21	29.53
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CARP0474-004 05/01/2024

	Rates	Fringes
PILEDRIVERMAN.....	\$ 47.50	43.42

ELEC0098-009 05/03/2021

	Rates	Fringes
ELECTRICIAN (Alarm Installation Only).....	\$ 52.31	43.44%+17.72

ELEC0126-008 06/03/2024

	Rates	Fringes
LINE CONSTRUCTION Lineman.....	\$ 62.54	34.25%+11.50

ELEC0654-005 06/03/2024

	Rates	Fringes
ELECTRICIAN (Includes HVAC/Temperature Controls Installation, Solar Panel Wiring and Installation; Excludes Low Voltage Wiring, Installation of Sound and Communication Systems and Alarm Installation).....	\$ 50.17	27.85%+24.79

ELEV0005-002 01/01/2025

	Rates	Fringes
ELEVATOR MECHANIC.....	\$ 71.85	38.435+a+b

FOOTNOTES FOR ELEVATOR MECHANICS:

A. PAID VACATION: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% for 6 months to 5 years of service.

B. Eight Paid Holidays (provided employee has worked 5 consecutive days before and the working day after the holiday): New Years's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day and the Friday after Thanksgiving Day, and Christmas Day.

ENGI0066-047 07/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR Mechanic.....	\$ 28.37	15.66

ENGI0542-034 05/01/2023

	Rates	Fringes
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POWER EQUIPMENT OPERATOR

Crane, Gradall, Bulldozer, Bobcat/Skid Steer/ Skid Loader, Grader/Blade, Loader, Paver (Asphalt, Aggregate, and Concrete), Backhoe/ Excavator/ Trackhoe, Boom, Concrete Pump, Crusher, Drill Rig Caissons, Milling Machine....	\$ 51.95	32.74
Hoist (Single Drum), Forklift (all types).....	\$ 47.87	31.53
Hoist (With Two Towers).....	\$ 51.95	32.74
Oiler, Articulating Truck Operator.....	\$ 44.85	30.65
Pump.....	\$ 51.95	32.74
Roller.....	\$ 47.87	31.53

IRON0401-006 07/01/2024

	Rates	Fringes
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IRONWORKER (Reinforcing and Structural).....	\$ 53.20	44.60
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LAB00135-001 05/01/2024

	Rates	Fringes
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LABORER (Mason Tender- Brick)....	\$ 36.37	25.32
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* LAB00413-007 05/01/2025

	Rates	Fringes
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LABORER

Common or General; Concrete Worker.....	\$ 37.25	25.42
Mason Tender- Cement/Concrete.....	\$ 37.77	25.42

PAIN0021-029 05/01/2023

	Rates	Fringes
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PAINTER

Brush and Roller.....	\$ 41.24	28.10
Drywall Finisher.....	\$ 38.77	30.72
Spray.....	\$ 42.49	28.10

PAIN0252-007 05/01/2022

	Rates	Fringes
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GLAZIER.....	\$ 46.09	34.83
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PLAS0008-003 05/01/2022

	Rates	Fringes
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PLASTERER.....	\$ 38.57	32.19
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PLAS0592-037 05/01/2023

	Rates	Fringes
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CEMENT MASON/CONCRETE FINISHER...	\$ 44.20	32.76

PLUM0420-012 05/01/2024		
	Rates	Fringes
PIPEFITTER (Including HVAC Pipe and HVAC Unit Installation).....	\$ 70.32	42.78

PLUM0420-013 05/01/2024		
	Rates	Fringes
PIPEFITTER Mechanical Equipment Serviceman (HVAC Pipe and Unit Installation Only).....	\$ 70.32	42.78

PLUM0690-011 05/01/2023		
	Rates	Fringes
PLUMBER.....	\$ 64.73	37.21

ROOF0030-013 05/01/2021		
	Rates	Fringes
ROOFER (Includes Waterproofing, Excludes Metal Roof Installation).....	\$ 40.33	32.62

SFPA0692-003 01/01/2025		
	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 66.22	34.25

SHEE0019-020 05/01/2024		
	Rates	Fringes
SHEET METAL WORKER (Includes HVAC Duct Installation).....	\$ 59.22	49.06

FOOTNOTE: Paid Holiday: Election Day		

* UAVG-PA-0036 01/01/2025		
	Rates	Fringes
ELECTRICIAN (Installation of Sound and Communication Systems Only).....	\$ 56.00	34.42
ELECTRICIAN (Low Voltage Wiring Only).....	\$ 54.87	34.49

SUPA2011-045 08/20/2014		
	Rates	Fringes
IRONWORKER, ORNAMENTAL.....	\$ 34.27	22.55

OPERATOR: Drill.....\$ 28.55 15.78

TRUCK DRIVER: Dump Truck.....\$ 21.31 0.00

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the

classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE:

UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on

a wage determination matter
d) an initial conformance (additional classification
and rate) determination

On survey related matters, initial contact, including requests
for summaries of surveys, should be directed to the WHD Branch
of Wage Surveys. Requests can be submitted via email to
davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as
conformance decisions, requests for initial decisions should be
directed to the WHD Branch of Construction Wage Determinations.
Requests can be submitted via email to BCWD-Office@dol.gov or
by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested
party (those affected by the action) that disagrees with the
decision can request review and reconsideration from the Wage
and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7).
Requests for review and reconsideration can be submitted via
email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the
interested party's position and any information (wage payment
data, project description, area practice material, etc.) that
the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an
interested party may appeal directly to the Administrative
Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

=====
END OF GENERAL DECISION"

SECTION J: Lump Sum Contract Agreement

**CHESTER HOUSING AUTHORITY
LUMP SUM CONTRACT AGREEMENT**

CONTRACTOR:	NAME
CONTRACTOR'S STATE:	STATE
CONTRACTOR'S ADDRESS:	ADDRESS
TYPE OF ORGANIZATION:	Construction Company
WORK DESCRIPTION:	NAICS Number
FUNDING SOURCE:	
LINE ITEM NO.:	
ACCOUNT CODE:	
CONTRACT NO.:	CHA Contract Number
CONTRACT AMOUNT:	\$0.00
PROJECT:	2024-2025 Unit Renovations Project
PROJECT NO.:	PDCAT153
PROJECT ADDRESS:	William Penn Homes, Chester, PA 19013
AGREEMENT DATE:	_____

This **Lump Sum Contract Agreement** (hereinafter called the "Agreement"), made on the above-listed **Agreement Date** by and between ----- (hereinafter called the "Contractor"), as the above-listed **Type of Organization**, organized and existing under the laws of the above-listed **Contractor's State**, and the Chester Housing Authority, (hereinafter called the "**Authority**").

Witnesseth: That the **Contractor** and the **Authority**, for the consideration stated herein, each intending to be bound hereby, do mutually covenant and agree as follows:

ARTICLE 1. Statement of Work.

The **Contractor** shall furnish all labor and materials and perform all work required for the above listed work description, at the above listed project for the **Authority**, in strict accordance with the Solicitation and Specifications, which are incorporated herein by reference.

ARTICLE 2. Time of Completion

The **Contractor** shall commence work under this contract on a date to be specified in a Notice to Proceed from the **Authority** and shall fully complete all work hereunder as per the specifications.

ARTICLE 3. Contract Price

The **Contractor** shall be paid by the **Authority** for the satisfactory performance and completion of the work and all of the duties, obligations and responsibilities of the **Contractor** under this agreement in an amount to exceed ----- (\$-----.00).

ARTICLE 4. Billing and Payment

The **Contractor** agrees to make prompt payment for all materials furnished, for labor supplied or performed, equipment rented, and services rendered by public utilities in connection with the prosecution

of the work, whether or not said material, labor, equipment or services enter into and become a component part of the work or improvement contemplated.

The **Contractor** shall be paid by the **Authority** after receipt of an acceptable invoice; provided, however, the **Contractor** has fulfilled all of the obligations under this Agreement for the period of such invoice.

ARTICLE 5. Contract Documents

The Contract Documents shall consist of the following component parts:

1. Contract Agreement (this instrument).
2. Addenda later date takes precedence).
3. Special Contract Requirements.
4. HUD 5370 – General Conditions of the Contract for Construction (as amended).
5. CHA Supplementary General Conditions (as amended).
6. General Requirements Section of the Technical Specifications.
7. Detailed Technical Specifications.
8. Drawings, if any.
9. Contractor's Bid as Accepted by CHA.
10. CHA Solicitation (excluding the Technical Specifications).
11. Affirmative Action Program and Section 3 Program.
12. HUD 5369-Instructions to Bidders and CHA Supplementary Instructions To Bidders.
13. HUD 5369-A Certifications, Representations and Other Statements Of Bidders.
14. Executed Performance and Payment Bonds.
15. Certificate(s) of Insurance(s).
16. Labor Standard Compliance and Minimum Wage Rate Schedule.

This Agreement, all schedules and exhibits attached hereto, and all agreements and instruments to be delivered by the **Authority** and the **Contractor** pursuant hereto represent the entire understanding and agreement between the **Authority** and the **Contractor** with respect to the subject matter hereof and supercede all prior oral and written and all contemporaneous oral negotiations, commitments and understandings between the **Authority** and the **Contractor**. The **Authority** and the **Contractor** may amend or modify this Agreement, in such manner as may be agreed upon, by a written instrument executed by both the **Authority** and the **Contractor**. This instrument, together with the documents enumerated in this Article 5, incorporated herein by reference, form the Agreement. Any inconsistency in the Agreement shall be resolved by giving precedence in the order listed above.

ARTICLE 6. Insurance Requirements

Before commencing work, the **Contractor** shall furnish to the **Authority** and cause each of its Subcontractors to furnish to the **Authority** Certificates-of-Insurance showing that the required insurance is in force as of the date this Agreement is executed in accordance with CHA's Supplementary General Conditions.

ARTICLE 7. Further Conditions.

- A. The **Contractor** shall be responsible to the **Authority** for acts and omissions of all of the **Contractor's** employees, agents and all Subcontractors, their employees, agents and all other persons performing any work for the **Contractor**.
- B. The **Authority**, or its Representative, may order changes in the work consisting of additions, deletions, or other revisions. The contract price and the contract time will be adjusted in accordance with the Provisions of General Conditions of the Contract for Construction, Form HUD-5370 (3-97). All such changes in the work shall be authorized only by a written Contract Modification.

- C. The **Contractor** shall obtain all licenses and permits that may be necessary for the proper performances of this work. The **Contractor** and all acting under its direction or control, shall take all necessary precautions for the safety of employees performing the work, and shall at all times comply with all Local, State and Federal statutes, ordinances, rules and regulations as well as those of any other public body having authority concerning the work.
- D. This Agreement shall not be assigned by the **Contractor** without permission in writing from the **Authority**.
- E. The **Contractor** agrees to assign and transfer to the **Authority** all its rights to sales and use tax that may be refunded as a result of a claim. For refund for materials purchased in connection with this Agreement. The **Contractor** further agrees that it will not file a claim for refund for any sales tax that is subject to this assignment.
- F. This is not an exclusive Agreement.
- G. The **Contractor** shall indemnify and hold harmless the **Authority** and the **Authority's** Representative from any and all claims, demands, obligations, and costs including attorney's fees, arising from, and/or resulting from, or in any way connected with the performance hereunder by the **Contractor**, its agents, servants, employees and/or subcontractors. Also, the **Contractor** shall cause its subcontractors to indemnify and hold harmless the **Authority**, the **Authority's** Representative and the **Contractor** from any and all claims, demands, obligations, and costs including attorney's fees, arising from, and/or resulting from, or in any way connected with the performance hereunder by the subcontractors, their agents, servants, employees and/or lower tier subcontractors.
- H. It is agreed and understood that none of the **Contractor's** employees, or agents' employees, shall be deemed or construed as the employees of the **Authority**. Furthermore, the **Contractor** shall be deemed for all purposes under this Agreement to be an independent contractor.
- I. Notices
1. All notices, demands, requests, instructions, approvals, claims and orders between the **Authority** and the **Contractor** must be in writing.
 2. All notices and correspondence to the parties hereunder shall be delivered by hand or sent by registered or certified or by Federal Express, Express Mail or other overnight mail service that provides a receipt to the sender. Receipt of notice by the party to whom the notice is transmitted shall be deemed to have occurred: (i) upon receipt, if hand delivered; (ii) three days from the date of mailing, if mailed; or (iii) the next Business Day after transmittal by Federal Express, Express Mail or other overnight delivery service that provides a receipt to the sender.
 3. Delivery to the **Contractor**. All notices and correspondence to the **Contractor** shall be sufficiently given if delivered to the office of the **Contractor** specified in the Form of Proposal or to such other office as the **Contractor** may notify the **Authority** of in writing from time to time or if delivered to the superintendent of the **Contractor**.
 4. Delivery to the **Authority**. All notices and correspondence to the **Authority** shall be delivered to the following address and addressee or to such other address or addressee as the **Authority** may notify from time to time:

Chester Housing Authority
1111 Avenue of the States
Chester, PA 19013
Attn: Contracting Officer (with a copy to General Counsel)

- J. Assignment of Agreement. The **Contractor** shall not assign or transfer any interest in this Agreement; except that claims for monies due to become due from the **Authority** under the Agreement may be assigned to a bank, trust company, or other financial institution. Such assignments of claims shall only be made with the written concurrence of the Contracting Officer as defined in the General Conditions of the Contract for Construction, form HUD 5370. If the **Contractor** is a partnership, this Agreement shall inure to the benefit of the surviving or remaining member(s) of such partnership as approved by the Contracting Officer.
- K. Provisions of Law Deemed Inserted; Severability
1. Each and every provision of law and clause required by law to be inserted in the Agreement shall be deemed to be inserted herein and the Agreement shall be read and enforced as though it were included herein.
 2. If any provision of this Agreement shall be held to be invalid, illegal or unenforceable, the validity, legality and enforceability of the remaining provisions shall in no way be affected or impaired thereby, and such remaining provisions shall remain in full force and effect, and the invalid, illegal or unenforceable provision shall be replaced by a mutually acceptable provision, which, being valid, legal and enforceable, comes closest to the intention of the parties underlying the invalid, illegal or unenforceable provision.
- L. Site Investigation and Conditions Affecting the Work
1. The **Contractor** acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the work or its costs, including but not limited to, (1) conditions bearing upon transportation, disposal, handling, and storage of materials; (2) the availability of labor, water, electric power, and roads; (3) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (4) the confirmation and conditions of the ground; and (5) the character of equipment and facilities needed preliminary to and during work performance. The **Contractor** also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the **Authority**, as well as from the drawings and specifications made a part of this contract. Any failure of the **Contractor** to take the actions described and acknowledged in this paragraph will not relieve the **Contractor** from the responsibility for estimating properly the difficulty and cost of successfully performing the work without additional expense to the **Authority**.
 2. The **Authority** assumes no responsibility for any conclusions or interpretations made by the **Contractor** based on the information made available by the **Authority**. Further, the **Contractor** is instructed that the **Authority** assumes no responsibility for any understanding reached or representation made concerning conditions which can affect the work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this contract.
- M. Governing Law; Jurisdiction. This Agreement shall be governed by and all questions relating to its validity, interpretations, enforcement and performance (including, without limitation, provisions concerning limitations of actions) shall be construed in accordance the laws of the Commonwealth of Pennsylvania, but excluding all choice of law provisions. This Agreement shall be construed without the aid of any canon, custom or rule of law required in construction against the drafter.
- N. Waiver of Jury Trial. **IN ANY LEGAL PROCEEDINGS UNDER, ARISING OUT OF OR RELATING TO THIS AGREEMENT AND/OR ANY OTHER AGREEMENT OR DOCUMENT NOW OR HEREAFTER DELIVERED IN CONNECTION HERewith AND/OR ANY AGREEMENT, SUPPLEMENT AND/OR RESTATEMENT HEREOF AND/OR THEREOF AND/OR THE TRANSACTIONS CONTEMPLATED HEREBY AND THEREBY, EACH PARTY**

HERETO HEREBY AGREES THAT ANY SUCH PROCEEDING SHALL BE TRIED BEFORE A JUDGE AND NOT BEFORE A JURY, IRRESPECTIVE OF WHICH PARTY COMMENCES SUCH ACTION.

- O. Headings. The descriptive headings used in this Agreement are for purposes of convenience only and do not constitute a part of this Agreement.
- P. No Estoppels or Waiver
 - 1. The **Authority** shall not be precluded or stopped by any acceptance, certificate of payment, final or otherwise, made by any of its officers, agents or employees, from showing the true amount and character of the work performed or that such acceptance, certificate or payment is incorrect or improperly made, and to recover on such amount any monies paid in excess of those the **Contractor** is entitled to or any damages it may have sustained by reason of the **Contractor's** failure to comply with the Agreement. Further, the **Authority** shall not be precluded or stopped by any acceptance, certificate of payment, final or otherwise, made by any of its officers, agents, or employees, from showing the true amount and character of the Work performed or that such acceptance, certificate or payment is incorrect or improperly made, and to recover on such amount any monies paid in excess of those the **Contractor** is entitled to or any damages it may have sustained by reason of the **Contractor's** failure to comply with the Agreement.
 - 2. No act done or permitted to be done by any member, officer, agent or employee of the **Authority** at any time shall be deemed to be a waiver of any provision of the Agreement, excepting only an amendment to this Agreement expressly providing for such waiver.
- Q. Counterparts. This Contract may be executed in one or more counterparts, each of which shall be deemed an original, but all of which shall be one and the same document.

IN WITNESS WHEREOF, the parties hereto have caused This Instrument to be executed in two original counterparts as of the day and year written in the Notice-to-Proceed

CONTRACTOR

Attest: _____

By: _____

Date: _____

Title: _____

BUSINESS ADDRESS:

(STREET)

(CITY) (STATE) (ZIP CODE)

CHESTER HOUSING AUTHORITY

Attest: _____

By: _____

Date: _____

Title: _____

BUSINESS ADDRESS:
1111 Avenue of the States
Chester, PA 19013

SECTION K: Performance Bond

SAMPLE PERFORMANCE BOND

CONTRACTOR:
CONTRACTOR'S STATE (1):
CONTRACTOR'S ADDRESS:
TYPE OF ORGANIZATION:

WORK DESCRIPTION:
SPECIFICATION DATE:
CONTRACT NO.:
CONTRACT AMOUNT:

PROJECT:
PROJECT NO.:
PROJECT ADDRESS:

AGREEMENT DATE:

KNOW ALL BY THESE PRESENTS, That we, the above listed CONTRACTOR, as the above listed TYPE OF ORGANIZATION, organized and existing under the laws of the above listed CONTRACTOR'S STATE, located at the above listed CONTRACTOR'S ADDRESS, hereafter referred to as the "Principal,"

and _____
hereafter referred to as the "Surety" are held and firmly bound to **THE CHESTER HOUSING AUTHORITY**, hereinafter referred to as the "Authority," or to its successors and assigns, in the penal sum of _____
(\$ _____) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the Authority for the above listed WORK-DESCRIPTION a copy of which Contract is annexed to and hereby made a part of this bond as though herein set forth in full.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, shall well and faithfully perform the said Contract and all modifications, amendments, additions and alterations thereto that may hereafter be made, according to its terms and its true intent and meaning, and shall fully indemnify and save harmless Authority and the Owner from
all cost and damage which they may suffer by reason of failure so to do, and shall fully reimburse and repay the Authority for all outlay and expense which the Authority may incur in making good any such default; and

FURTHER, shall pay or cause to be paid all lawful claims of Subcontractors, Materialmen, and workingmen and all lawful claims of third persons arising out of or in connection with or because of the performance of Work at the site of the Project, then this obligation shall be void, otherwise the same to remain in full force and effect.

This undertaking is for the benefit of all Subcontractors, Materialmen, and workingmen having just claims and for the benefit of all other third persons having just claims arising out of or in

connection with the said Contract and Work performed thereunder, as well as for the benefit of Authority themselves, but the rights and equities of all other beneficiaries hereunder shall be subject and subordinate to those of the Authority. Should any beneficiary or assignee hereunder, other than the Authority, file or make claims against the Principal or Surety, the said Principal and Surety shall promptly thereafter, or in any event at least fifteen (15) days prior to the payment of such claims, notify the Authority by certified or registered mail of such Work.

The Surety, for value received, hereby stipulates and agrees, if requested to do so by the Authority, to fully perform and complete the Work to be performed under Contract, pursuant to the terms, conditions, and covenants thereof, if for any cause, the Principal fails or neglects to so fully perform and complete such Work. The Surety further agrees to commence such Work of completion within twenty (20) days after written notice thereof from Authority, and to complete Work within twenty (20) days from the expiration of the time allowed the Principal in the Contract for the completion of such Work.

The Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due or to become due thereunder, and said Surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees Subcontractors, and other transferees shall have the same effect as to said Surety as though done or omitted to be done by or in relation to said Principal.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be affixed and these presents to be signed by their proper officers this _____ day of _____, 20_____.

Principal

(SEAL)

By: _____

Surety

BY: _____

The rate of premium for this bond is \$

Total amount of premium charged for this bond is \$

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

STATE OF _____)

:SS:

COUNTY OF _____)

On this _____ day of _____, 20_____, before me personally came _____, to me known, who, being by me duly sworn, did depose and say that he/she resides at _____; that he/she is the _____ of _____ the corporation described in and which executed the foregoing instrument; that he/she knows the seals of such corporation; that one of the seals affixed to such instrument is such seal; that it was so affixed by order of the board of directors of such corporation, and that he/she signed his name thereto by like order.

Notary Public or Commissioner of deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

STATE OF _____)

:SS:

COUNTY OF _____)

On this _____ day of _____, 20_____, before me personally came _____, to me known and know to me to be the members of the firm of _____ described in and who executed the foregoing instrument and they acknowledged to me that they executed the same as and for the act and deed of such firm.

Notary Public or Commissioner of deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF _____)
:SS:

COUNTY OF _____)

On this _____ day of _____, 20_____, before me personally
came _____, to me known and know to me to be the person described
firm of _____ in and
who executed the foregoing instrument and acknowledged that he/she executed the same.

Notary Public or Commissioner of deeds

AFFIX ACKNOWLEDGMENTS AND AUTHORIZATION OF SURETIES

SECTION L: Payment Bond

SAMPLE PAYMENT BOND

CONTRACTOR:
CONTRACTOR'S STATE (1):
CONTRACTOR'S ADDRESS:
TYPE OF ORGANIZATION:

WORK DESCRIPTION:
SPECIFICATION DATE:
CONTRACT NO.:
CONTRACT AMOUNT:

PROJECT:
PROJECT NO.:
PROJECT ADDRESS:

AGREEMENT DATE:

KNOW ALL MEN BY THESE PRESENTS, That we, the above-listed CONTRACTOR (hereafter referred to as the "Principal") as the above-listed TYPE OF ORGANIZATION, organized and existing under the laws of the above-listed CONTRACTOR'S STATE, and located at the above-listed CONTRACTOR'S ADDRESS and _____ hereafter referred to as the "Surety" are held and firmly bound to **THE CHESTER HOUSING AUTHORITY**, hereinafter referred to as the "Authority," or to its successors and assigns, in the penal sum of _____ (\$ _____) Dollars, lawful money of the United States, for the payment of which said sum of money well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to enter, or has entered, into a Contract in writing with the Authority to perform all work required for the above-listed WORK DESCRIPTION, a copy of which Contract is annexed to and hereby made a part of this bond as through herein set forth in full.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal, his or its representatives or assigns, and other Sub-contractors to whom Work under this Contract is sublet and his or their successors and assigns shall promptly pay or cause to be paid all lawful claims for:

(a) Wages and compensation for labor performed and services rendered by all persons engaged in the prosecution of the Work under said Contract, and by any amendment or extension thereof, or addition thereto, whether such persons be agents, servants or employees of the Principal or of any such Subcontractor, including all persons so engaged who perform the work of laborers or mechanics at or in the vicinity of the site of the Project regardless of any contractual relationship between the Principal or such Subcontractors, or his or their successors or assigns, on the one hand and such laborers or mechanics on the other, but not including office employees not regularly stationed at the site of the Project; and

(b) Materials and supplies (whether incorporated in the permanent structure or not), as well as equipment, fuels, oils, implements or machinery furnished, used or consumed by said Principal or any Subcontractor at or in the vicinity of the site of the Project in the prosecution of the Work under said Contract and any amendment or extension thereof or addition thereto: then this obligation shall be void; otherwise to remain in full force and effect.

This bond is subject to the following additional conditions, limitations and agreements:

(a) The Principal and Surety agree that this bond shall be for the benefit of any Materialmen or laborer having a just claim, as well as Authority themselves.

(b) All persons who have performed labor, rendered services or furnished materials and supplies, as aforesaid, shall have a direct right of action against the Principal and his, its or their successors and assigns, and the Surety herein, or against either or both or any of them and their successors and assigns. Such persons may sue in their own name, and may prosecute their suit to judgement and execution without the necessity of joining with any other person as party plaintiff.

(c) The Principal and Surety agree that neither of them will hold the Authority liable for any judgment for costs or otherwise, obtained by either or both of them against a laborer or Materialmen in a suit brought by either a laborer or Materialmen under this bond for moneys allegedly due for performing work or furnishing material.

(d) The Surety or its successors and assigns shall not be liable for any compensation recoverable by an employee or laborer under the Workmen Compensation Law.

(e) In no event shall the Surety, or its successors or assigns, be liable for a greater sum than the penalty of this bond or be subject to any suit, action or proceeding hereon that is instituted by any person, firm, or corporation hereunder later than two years after the complete performance of said Contract and final settlement thereof.

The Principal, for himself and his successors and assigns, and the Surety, for itself and its successors and assigns, do hereby expressly waive any objection that might be interposed as to the right of Authority to require a bond containing the foregoing provisions, and they do hereby further expressly waive any defense which they or either of them might interpose to an action brought hereon by any person, firm or corporation, including sub-contractors, Materialmen and third persons, for work, labor, services, supplies or material performed, rendered, or furnished as aforesaid upon the ground that there is no law authorizing the Authority to require the foregoing provisions to be placed in this bond.

And the Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of said Surety and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition, or change in or to the said Contract or the Work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any part thereof, or of any Work to be performed, or any moneys due or to become due thereunder, and said Surety does hereby waive notice of any and all of such extensions, modifications, omissions, additions, changes payments, waivers, assignments, subcontracts and transfers, and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees Subcontractors, and other

transferees shall have the same effect as to said Surety as though done or omitted to be done by or in relation to said Principal.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be affixed and these presents to be signed by their proper officers this _____ day of _____, 20____.

Principal

By:_____

(SEAL)

Surety

By:_____

The rate of premium for this bond is \$

Total amount of premium charged for this bond is \$

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

STATE OF _____)
:SS:

COUNTY OF _____)

On this _____ day of _____, 20____, before me personally came _____, to me known, who, being by me duly sworn, did depose and say that he\she resides at _____; that he\she is the _____ of _____ the corporation described in and which executed the foregoing instrument; that he she knows the seals of such corporation; that one of the seals affixed to such instrument is such seal; that it was so affixed by order of the board of directors of such corporation, and that he\she signed his name thereto by like order.

Notary Public or Commissioner of deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP

STATE OF _____)

:SS:

COUNTY OF _____)

On this _____ day of _____, 20_____, before me personally came _____, to me known and know to me to be the members of the firm of _____ described in and who executed the foregoing instrument and they acknowledged to me that they executed the same as and for the act and deed of such firm.

Notary Public or Commissioner of deeds

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF _____)

:SS:

COUNTY OF _____)

On this _____ day of _____, 20_____, before me personally came _____, to me known and know to me to be the person described firm of _____ in and who executed the foregoing instrument and acknowledged that he\she executed the same.

Notary Public or Commissioner of Deeds

AFFIX ACKNOWLEDGMENTS AND AUTHORIZATION OF SURETIES