TACOMA PUBLIC UTILITIES/TACOMA WATER DIVISION
REQUEST FOR BIDS
HEADWORKS OPERATIONS REMODEL
AND HVAC REPLACEMENT
SPECIFICATION NO. TW24-0097F
Specification TW24-0097F

HEADWORKS OPERATIONS REMODEL AND HVAC REPLACEMENT

May 14, 2024

Prepared by
Carol Powers, P.E.
HEADWORKS OPERATIONS REMODEL AND HVAC REPLACEMENT

REQUEST FOR BIDS

TW24-0097F

City of Tacoma
Tacoma Water

Submittal Deadline: 11:00 a.m., Pacific Time, Tuesday, June 4, 2024

Submittals must be received by the City’s Procurement and Payables Division prior to 11:00 a.m. Pacific Time.

For electronic submittals, the City of Tacoma will designate the time of receipt recorded by our email, sendbid@cityoftacoma.org, as the official time of receipt. This clock will be used as the official time of receipt of all parts of electronic bid submittals. For in person submittals, the City of Tacoma will designate the time of receipt recorded by the timestamp located at the lobby security desk, as the official time of receipt. Late submittals will be returned unopened and rejected as non-responsive.

Submittal Delivery: Sealed submittals will be received as follows:

<table>
<thead>
<tr>
<th>By Email:</th>
<th>In Person:</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:sendbid@cityoftacoma.org">sendbid@cityoftacoma.org</a></td>
<td>Tacoma Public Utilities Administration Building North, Main Floor, Lobby Security Desk</td>
</tr>
<tr>
<td>Maximum file size: 35 MB. Multiple emails may be sent for each submittal</td>
<td>3628 South 35th Street</td>
</tr>
<tr>
<td>Tacoma, WA 98409</td>
<td>Monday – Friday 8:00 am to 4:30 pm</td>
</tr>
</tbody>
</table>

Bid Opening: Submittals must be received by the City’s Procurement and Payables Division prior to 11:00 a.m. Pacific Time. Sealed submittals in response to a RFB will be opened Tuesday’s at 11:15 a.m. by a purchasing representative and read aloud during a public bid opening held at the Tacoma Public Utilities Administrative Building North, 3628 S. 35th Street, Tacoma, WA 98409, conference room M-1, located on the main floor. They will also be held virtually Tuesday’s at 11:15 a.m. Attend via this link or call 1 (253) 215 8782. Submittals in response to an RFP, RFQ, or RFI will be recorded as received. As soon as possible, after 1:00 p.m. on the day of submittal deadline, preliminary results will be posted to www.TacomaPurchasing.org.

- Register for the Bid Holders List to receive notices of addenda, questions and answers and related updates.
- Click here to see a list of vendors registered for this solicitation.

Pre-Proposal Meeting: A pre-proposal meeting will be held at 11:00 a.m., Thursday, May 16th, 2024 via TEAMS.

Walk Through: an optional onsite walk through will be held on Friday, May 17th at 9:00 a.m. at 36932 Green River Headworks Road, Ravensdale, WA 98051. Attendees must stop at the Gate House before proceeding to the assembly location. Assemble on sidewalk in front of operations building. The onsite walk through is expected to conclude by 10:00 am.

Project Scope: The project consists of the remodel of restrooms, locker room, kitchen, lobby, mechanical room, server room and various other areas for finishes in the Headworks Operations Building. The project also includes the demolition of the existing Variable Air Volume (VAV) HVAC system (propane) and installation of a new Variable Refrigerant Flow (VRF) HVAC system (electric). Base bid of project shall include all necessary upgrades to electrical services and systems.

Estimate: $1,129,250.00
Paid Sick Leave: The City of Tacoma requires all employers to provide paid sick leave as set forth in Title 18 of the Tacoma Municipal Code and in accordance with State of Washington law.

Americans with Disabilities Act (ADA Information): The City of Tacoma, in accordance with Section 504 of the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA), commits to nondiscrimination on the basis of disability, in all of its programs and activities. Specification materials can be made available in an alternate format by emailing the contact listed below in the Additional Information section.

Title VI Information: “The City of Tacoma” in accordance with provisions of Title VI of the Civil Rights Act of 1964, (78 Stat. 252, 42 U.S.C. sections 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin in consideration of award.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Brandon Snow, Senior Buyer by email to BSnow@cityoftacoma.org.

Protest Policy: City of Tacoma protest policy, located at www.tacomapurchasing.org, specifies procedures for protests submitted prior to and after submittal deadline.

Meeting sites are accessible to persons with disabilities. Reasonable accommodations for persons with disabilities can be arranged with 48 hours advance notice by calling 253-502-8468.

No. SPEC-040C Revised: 04/17/2023
TABLE OF CONTENTS – PART 1

DIVISION 00: BIDDING & CONTRACT REQUIREMENTS

Special Notice to Bidders

A. **BID PERIOD FORMS:**
   1. SUBSTITUTION REQUEST FORM

B. **PROPOSAL FORMS (MUST BE SUBMITTED WITH BID):**
   1. BID PROPOSAL AND SIGNATURE PAGE
   2. BID BOND
   3. SUBCONTRACTOR CATEGORIES OF WORK FORM
   4. STATE RESPONSIBILITY FORM
   5. GENERAL CONTRACTOR QUALIFICATION SUBMITTAL
   6. CERTIFICATION OF COMPLIANCE WITH WAGE PAYMENT STATUTES FORM
   7. EIC UTILIZATION FORM

C. **CONTRACT FORMS (POST AWARD):**
   1. CONTRACT
   2. INSURANCE CERTIFICATE REQUIREMENTS
   3. PERFORMANCE BOND TO THE CITY OF TACOMA
   4. PAYMENT BOND TO THE CITY OF TACOMA
   5. GENERAL RELEASE TO THE CITY OF TACOMA

D. **WASHINGTON STATE PREVAILING WAGE RATES**
   1. STATE PREVAILING WAGE RATES FOR KING COUNTY

E. **CITY PROGRAMS:**
   1. EIC REQUIREMENTS
   2. LEAP REQUIREMENTS

F. **GENERAL CONDITIONS AND OTHER CONTRACT TERMS & CONDITIONS:**
   1. CITY OF TACOMA, GENERAL PROVISIONS
   2. CITY OF TACOMA MODIFICATIONS TO THE GENERAL CONDITIONS FOR WASHINGTON STATE FACILITY CONSTRUCTION.
   3. GENERAL CONDITIONS FOR WASHINGTON STATE FACILITY CONSTRUCTION

END OF TABLE OF CONTENTS PART 1
Public works and improvement projects for the City of Tacoma are subject to Washington state law and Tacoma Municipal Code, including, but not limited to the following:

I. STATE OF WASHINGTON

A. RESPONSIBILITY CRITERIA – STATE OF WASHINGTON

In order to be considered a responsible bidder the bidder must meet the following mandatory state responsibility criteria contained in RCW 39.04.350:

1. Have a current certificate of registration as a contractor in compliance with chapters 18.27 RCW, 18.106 RCW, 70.87 RCW, 19.28 RCW, which must have been in effect at the time of bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable:
   a. Have Industrial Insurance (workers’ compensation) coverage for the bidder’s employees working in Washington, as required in Title 51 RCW;
   b. Have a Washington Employment Security Department number, as required in Title 50 RCW;
   c. Have a Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW and;
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 (unlicensed or unregistered contractors) or 39.12.065(3) (prevailing wage).
5. Have received training on the requirements related to public works and prevailing wage under this chapter and chapter 39.12 RCW and must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection.

B. RECIPROCAL PREFERENCE FOR RESIDENT CONTRACTORS:

Effective March 30, 2012, RCW 39.04.380 imposes a reciprocal preference for resident contractors. Any bid received from a non-resident contractor from a state that provides an in-state percentage bidding preference is subject application of a comparable percentage disadvantage.

A non-resident contractor from a state that provides an in-state percentage bidding preference means a contractor that:

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works projects, and
2. Does not have a physical office located in Washington at the time of bidding on the City of Tacoma public works project.

The state of residence for a non-resident contractor is the state in which the contractor was incorporated, or if not a corporation, the state in which the contractor’s business entity was formed.
The City of Tacoma will evaluate all non-resident contractors for an out of state bidder preference. If the state of the non-resident contractor provides an in state contractor preference, a comparable percentage disadvantage will be applied to the non-resident contractor’s bid prior to contract award. The responsive and lowest and best responsible bidder after application of any non-resident disadvantage will be awarded the contract.

The reciprocal preference evaluation does not apply to public works procured pursuant to RCW 39.04.155, RCW 39.04.280, federally funded competitive solicitations where such agencies prohibit the application of bid preferences, or any other procurement exempt from competitive bidding.

Bidders must provide the City of Tacoma with their state of incorporation or the state in which the business entity was formed and include whether the bidder has a physical office located in Washington.

The bidder shall submit documentation demonstrating compliance with above criteria on the enclosed State Responsibility and Reciprocal Bidder Information form.

C. SUBCONTRACTOR RESPONSIBILITY

1. The Contractor shall include the language of this subcontractor responsibility section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. The requirements of this section apply to all subcontractors regardless of tier.

2. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

   a. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;

   b. Have a current Washington Unified Business Identifier (UBI) number;

   c. If applicable, have:

      a. Have Industrial Insurance (workers’ compensation) coverage for the bidder’s employees working in Washington, as required in Title 51 RCW;
      b. A Washington Employment Security Department number, as required in Title 50 RCW;
      c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;
      d. An electrical contractor license, if required by Chapter 19.28 RCW;
      e. An elevator contractor license, if required by Chapter 70.87 RCW and;

3. Not be disqualified from bidding on any public works contract under RCW 39.06.010 (unlicensed or unregistered contractors) or 39.12.065(3) (prevailing wage).
II. CITY OF TACOMA

A. SUPPLEMENTAL RESPONSIBILITY CRITERIA – CITY OF TACOMA:

In order to be considered a responsible bidder, the prospective bidder shall have all of the following qualifications set forth in Tacoma Municipal Code 1.06.262:

1. Adequate financial resources or the ability to secure such resources;
2. The necessary experience, stability, organization and technical qualifications to perform the proposed contract;
3. The ability to comply with the required performance schedule, taking into consideration all existing business commitments;
4. A satisfactory record of performance, integrity, judgment and skills; and
5. Be otherwise qualified and eligible to receive an award under applicable laws and regulations.

In addition to the mandatory bidder responsibility criteria listed immediately above, the City may, in addition to price, consider any or all of the following criteria contained in Tacoma Municipal Code Chapter 1.06.262 in determining bidder responsibility:

1. The ability, capacity, experience, stability, technical qualifications and skill of the respondent to perform the contract;
2. Whether the respondent can perform the contract within the time specified, without delay or interference;
3. Integrity, reputation, character, judgment, experience, and efficiency of the respondents, including past compliance with the City’s Ethics Code;
4. Quality of performance of previous contracts;
5. Previous and existing compliance with laws and ordinances relating to contracts or services;
6. Sufficiency of the respondent’s financial resources;
7. Quality, availability, and adaptability of the supplies, purchased services or public works to the particular use required;
8. Ability of the respondent to provide future maintenance and service on a timely basis;
9. Payment terms and prompt pay discounts;
10. The number and scope of conditions attached to the submittal;
11. Compliance with all applicable City requirements, including but not limited to the City’s Ethics Code and its Equity in Contracting and Local Employment and Apprenticeship Training programs;
12. Other qualification criteria set forth in the specification or advertisement that the appropriate department or division head determines to be in the best interests of the City.

The City may require bidders to furnish information, sworn or certified to be true, to demonstrate compliance with the City responsibility criteria set forth above. If the city manager or director of utilities is not satisfied with the sufficiency of the information provided, or if the prospective respondent does not substantially meet all responsibility requirements, any submittal from such respondent must be disregarded.
B. ADDITIONAL SUPPLEMENTAL CRITERIA – NOT APPLICABLE

C. MODIFICATIONS TO SUPPLEMENTAL CRITERIA

Potential bidders may request modifications to the City’s supplemental criteria by submitting a written request to the Purchasing Division via email to bids@cityoftacoma.org no later than 5:00 p.m. Pacific Time, three days prior to the submittal deadline. Please include the Specification No. and Title when submitting such requests. Requests must include justification for why certain criteria should be modified. Requests received after this date and time will not be considered.

The City will respond to a timely submitted request prior to the bid opening date. Changes to the supplemental criteria, if warranted, will be issued by addendum to the solicitation documents and posted to the City’s website for the attention of all prospective bidders.

D. DETERMINATION OF BIDDER RESPONSIBILITY

If the City determines the bidder does not meet the criteria above and is therefore not a responsible bidder, the City shall notify the bidder in writing with the reasons for its determination. If the bidder disagrees, the bidder may appeal the determination in a manner consistent with the City’s Protest Policy. Appeals are coordinated by the Purchasing Division heard by the Procurement and Payables Division manager for contracts less than or equal to $500,000 and by Contracts and Awards Board for contracts greater than $500,000.
BID PERIOD FORMS

The following forms shall be used during the bidding process to request substitutions. These forms are not required to be submitted with the Bid.

- Substitution Request Form
SUBSTITUTION REQUEST FORM

Headworks Operations Remodel and HVAC Replacement
SPECIFICATION NO.: TW24-0097F

Prospective bidders may request substitutions in writing on this form. Substitutions shall be submitted on this form via e-mail to:

Brandon Snow, Senior Buyer.
E-mail address: BSnow@cityoftacoma.org

All e-mails must be received by Noon (12:00 pm) on Wednesday, May 22, 2024. Where changes in the project documents are required, an addendum will be issued to everyone on the plan holder’s list and posted on www.tacomapurchasing.org.

Submitted By
Signature ____________________________________________
Company ____________________________________________
Mailing Address _______________________________________
City ___________________________ State ________ Zip ___________
Phone ____________ Fax ____________ E-mail ____________
☐ Please check if there are attachments

1. We hereby submit for your consideration the following product instead of the specified item for the above project:

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
<th>Line/Paragraph</th>
<th>Specified Item</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

2. Proposed Substitution. ____________________________________________

3. Reason for Substitution. __________________________________________

4. Attach complete technical data, catalog cuts, drawings, samples, etc. Exact models and description of products shall be noted with any deviation noted.

5. Include complete information on changes to Drawings, and/or Specifications which proposed substitution will require for its proper installation.

6. Does the substitute affect dimensions shown on Drawings? ____________________________

6a. If so, how? ____________________________________________________

7. Describe the effect substitution has on other trades. ____________________________

8. Describe differences between proposed substitution and specified item. ____________________________

9. Manufacturer’s warranties of the proposed and specified items are: ☐ Same ☐ Different (explain on attachment)

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item. The undersigned agrees to pay for changes to the building and systems design, including engineering and detailing costs caused by the requested substitution.
SUBSTITUTION REQUEST FORM

Headworks Operations Remodel and HVAC Replacement
SPECIFICATION NO.: TW24-0097F

For Reviewer

☐ Approved for Bidding subject to review and approval of Submittals (and as noted below)  ☐ Rejected - Inadequate Information

☐ Not Accepted  ☐ Received Too Late

By ___________________________ Date ______________________

Remarks
PROPOSAL FORMS

The following forms must be completed in their entirety and submitted with the bid. Bidders must use the forms provided. Do not modify or substitute forms. Failure to complete and submit all the forms in this section may result in the bid being declared unresponsive and rejected.

1. SUBMITTAL CHECKLIST
2. BID PROPOSAL
3. SIGNATURE PAGE
4. BID BOND
5. SUBCONTRACTOR CATEGORIES OF WORK
6. STATE RESPONSIBILITY FORM
7. GENERAL CONTRACTOR QUALIFICATION SUBMITTAL
8. CERTIFICATION OF COMPLIANCE WITH WAGE PAYMENT STATUTES FORM
9. EIC UTILIZATION FORM
SUBMITTAL CHECK LIST

This checklist identifies items to be included with your submittal. Any submittal received without these required items may be deemed non-responsive and not be considered for award.

Submittals must be received by the City of Tacoma Purchasing Division by the date and time specified in the Request for Bids page.

<table>
<thead>
<tr>
<th>The following items make up your submittal package:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid Proposal Sheet</td>
</tr>
<tr>
<td>Signature Page</td>
</tr>
<tr>
<td>Bid Bond</td>
</tr>
<tr>
<td>List of Subcontractor Categories of Work</td>
</tr>
<tr>
<td>State Responsibility and Reciprocal Bid Preference Information</td>
</tr>
<tr>
<td>General Contractor Qualification Submittal</td>
</tr>
<tr>
<td>Certification of Compliance with Wage Payment Statutes</td>
</tr>
<tr>
<td>EIC Utilization Form</td>
</tr>
</tbody>
</table>

After award, the following documents will be executed:

| Contract                                           |
| Certificate of Insurance and related endorsements |
| Performance and Payment Bond                       |
BID PROPOSAL

City of Tacoma
Tacoma Water
Facilities Management

Name of Firm: ________________________________________________

(Write in company name)

In compliance with the contract documents, the following bid proposal is submitted:

BASE BID:
Lump sum base bid is inclusive of the Scope of Work described in the Contract Documents.

BASE BID: $_________________

WA STATE SALES TAX @ 8.8%: $_________________

GRAND TOTAL: $_________________
Headworks Operations Remodel and HVAC Replacement
SPECIFICATION NO.: TW24-0097F

BID PROPOSAL

UNIT PRICES: (Not used)

INTENT AND AFFIDAVIT OF WAGES PAID:
In compliance with Chapter 296-127 WAC the Contractor shall pay all fees associated with the Intent and Affidavit of Wages Paid to the Department of Labor and Industries. These costs shall be included in the base bid.

CITY OF TACOMA PROGRAMS:
The City of Tacoma’s Equity in Contracting (EIC) Program has 6% MBE, 3% WBE, and a 6% SBE or DBE requirement assigned to this project. There are LEAP requirements on this project, 15 percent of total labor hours. Reference the LEAP section in the project manual.

TIME FOR COMPLETION:
The undersigned hereby agrees to substantially complete all the work under the Base Bid (and accepted alternates and/or unit prices) within 112 calendar days after the Notice to Proceed.

LIQUIDATED DAMAGES:
The undersigned agrees to pay the Owner as liquidated damages the sum of $500 for each consecutive calendar day beyond the SUBSTANTIAL COMPLETION date. Liquidated damages shall be deducted from the contract by change order.
All submittals must be in ink or typewritten, executed by a duly authorized officer or representative of the bidding/proposing entity, and received and time stamped as directed in the Request for bids. If the bidder/proposer is a subsidiary or doing business on behalf of another entity, so state, and provide the firm name under which business is hereby transacted.

**REQUEST FOR BIDS SPECIFICATION NO. TW24-0097F**

Headworks Operations Remodel and HVAC Replacement

The undersigned bidder/proposer hereby agrees to execute the proposed contract and furnish all materials, labor, tools, equipment and all other facilities and services in accordance with these specifications.

The bidder/proposer agrees, by submitting a bid/proposal under these specifications, that in the event any litigation should arise concerning the submission of bids/proposals or the award of contract under this specification, Request for Bids, Request for Proposals or Request for Qualifications, the venue of such action or litigation shall be in the Superior Court of the State of Washington, in and for the County of Pierce.

**Non-Collusion Declaration**

The undersigned bidder/proposer hereby certifies under penalty of perjury that this bid/proposal is genuine and not a sham or collusive bid/proposal, or made in the interests or on behalf of any person or entity not herein named; and that said bidder/proposer has not directly or indirectly induced or solicited any contractor or supplier on the above work to put in a sham bid/proposal or any person or entity to refrain from submitting a bid/proposal; and that said bidder/proposer has not, in any manner, sought by collusion to secure to itself an advantage over any other contractor(s) or person(s).

<table>
<thead>
<tr>
<th>Bidder/Proposer’s Registered Name</th>
<th>Signature of Person Authorized to Enter into Contracts for Bidder/Proposer</th>
<th>Date</th>
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<tr>
<th>Address</th>
<th>Printed Name and Title</th>
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<tr>
<th>City, State, Zip</th>
<th>(Area Code) Telephone Number / Fax Number</th>
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<thead>
<tr>
<th>Authorized Signatory E-Mail Address</th>
<th>State Business License Number in WA, also known as UBI (Unified Business Identifier) Number</th>
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<tr>
<th>E.I.No. / Federal Social Security Number Used on Quarterly Federal Tax Return, U.S. Treasury Dept. Form 941</th>
<th>State Contractor’s License Number (See Ch. 18.27, R.C.W.)</th>
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</table>

| E-Mail Address for Communications |                                                                 |
|-----------------------------------|                                                               |

Addendum acknowledgement #1#2#3#4#5

**THIS PAGE MUST BE SIGNED AND RETURNED WITH SUBMITTAL.**
Herewith find deposit in the form of a cashier’s check in the amount of $______________ which amount is not less than 5-percent of the total bid.

SIGN HERE______________________________

---

BID BOND

KNOW ALL MEN BY THESE PRESENTS:
That we,____________________________, as Principal, and ________________________, as Surety, are held and firmly bound unto the City of Tacoma, as Obligee, in the penal sum of __________________________ dollars, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

The condition of this obligation is such that if the Obligee shall make any award to the Principal for

according to the terms of the proposal or bid made by the Principal therefor, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for faithful performance thereof, with Surety or Sureties approved by the Obligee; or if the Principal shall, in case of failure to do so, pay and forfeit to the Obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Obligee, as penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS_______________DAY OF____________________, 20____.

PRINCIPAL: _______________________________ SURETY: _______________________________

_______________________________ _______________________________

_______________________________ _______________________________

_______________________________, 20____

Received return of deposit in the sum of $ ______________________________

---------------------------------
# List of Subcontractor Categories of Work

Project Name  

Subcontractor(s) that are proposed to perform the work of heating, ventilation and air conditioning, and/or plumbing, as described in Chapter 18.106 RCW, and electrical as described in Chapter 19.28 RCW must be listed below. **This information must be submitted with the bid proposal or within one hour of the published bid submittal time via email to bids@cityoftacoma.org.**

Subcontractor(s) that are proposed to perform the work of structural steel installation and/or rebar installation must be listed below. **This information must be submitted with the bid proposal or within forty-eight hours of the published bid submittal time via email to bids@cityoftacoma.org.**

Failure to list subcontractors or naming more than one subcontractor to perform the same work will result in your bid being non-responsive. Contractors self-performing must list themselves below. The work to be performed is to be listed below the subcontractor(s) name.

<table>
<thead>
<tr>
<th>Subcontractor Name</th>
<th>Work to be Performed</th>
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State Responsibility and Reciprocal Bid Preference Information

Certificate of registration as a contractor
(Must be in effect at the time of bid submittal):

Number: __________________________
Effective Date: ______________________
Expiration Date: ______________________

Current Washington Unified Business Identifier (UBI) Number:

Number: __________________________

Do you have industrial insurance (workers’ compensation) Coverage nor your employees working in Washington?

☐ Yes  ☐ No  ☐ Not Applicable

Washington Employment Security Department Number

Number: __________________________

☐ Not Applicable

Washington Department of Revenue state excise tax Registration number:

Number: __________________________

☐ Not Applicable

Have you been disqualified from bidding any public works contracts under RCW 39.06.010 or 39.12.065(3)?

☐ Yes  ☐ No
If yes, provide an explanation of your disqualification on a separate page.

Do you have a physical office located in the state of Washington?

☐ Yes  ☐ No

If incorporated, in what state were you incorporated?

State: ____________ ☐ Not Incorporated

If not incorporated, in what state was your business entity formed?

State: ____________

Have you completed the training required by RCW 39.04.350, or are you on the list of exempt businesses maintained by the Department of Labor and Industries?

☐ Yes  ☐ No

Revised: 07/20/2007, 04/12/2012, 06/21/2019
Tacoma Water
Headworks Operations Remodel and HVAC Replacement

SPECIFICATION NO.: TW24-0097F
General Contractor Qualification Submittal

This form shall be completed in its entirety, submitted with the bid, and shall be used to demonstrate the General Contractor’s minimum experience. Failure to submit this form may be grounds for bid rejection.

The City shall be the sole judge in determining if the prospective Contractor meets the bidder minimum experience requirements. The City reserves the right to take whatever action it deems necessary to ascertain the ability of the bidder to perform the work satisfactorily.

Qualification of General Contractor: General Contractor shall have a minimum of five (5) projects, of similar size and scope within the last five (5) years, demonstrating an ability to meet the contract schedule and requirements. General Contractor shall meet all Local and State Certifications and License requirements prior to bidding. Copies of the required Certificates and Licenses shall be made available upon request.

HVAC Contractor shall have a minimum of five (5) projects, of similar size and scope within the last five (5) years, demonstrating an ability to meet the contract schedule and requirements. If General Contractor is the same as the HVAC Contractor then the General contractor must show HVAC replacements of similar size and scope in provided qualifications section below. Copies of the required Certificates and Licenses shall be made available upon request.

Name: ____________________________________________________________
Address: __________________________________________________________
Contact Person: ___________________________ Phone: ____________________

Project Experience – General Contractor:

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<tr>
<th>Project No. 1 Name:</th>
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<tbody>
<tr>
<td>Project Owner:</td>
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<td>Owner Contact / Phone No.:</td>
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<td>Date Work Completed:</td>
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<td>Description of Work:</td>
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<th>Project No. 2 Name:</th>
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<td>Project Owner:</td>
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<th>Project No. 3 Name:</th>
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<td>Project Owner:</td>
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<th>Project No. 4 Name:</th>
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<td>Project Owner:</td>
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# Tacoma Water

Headworks Operations Remodel and HVAC Replacement

**SPECIFICATION NO.:** TW24-0097F  
**General Contractor Qualification Submittal**

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<th>Project No. 5 Name:</th>
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<td>Description of Work:</td>
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**Project Experience – HVAC Contractor**

(Completed by General Contractor if performed by the General Contractor):

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<tr>
<th>Project No. 1 Name:</th>
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Tacoma Water
Headworks Operations Remodel and HVAC Replacement

SPECIFICATION NO.: TW24-0097F
General Contractor Qualification Submittal
Certification of Compliance with Wage Payment Statutes

The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date, May 14th, 2024, that the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify under penalty of perjury under the laws of the state of Washington that the foregoing is true and correct.

Bidder

Signature of Authorized Official*

Printed Name

Title

Date

City

State

Check One:

Individual ☐ Partnership ☐ Joint Venture ☐ Corporation ☐

State of Incorporation, or if not a corporation, the state where business entity was formed:

If a co-partnership, give firm name under which business is transacted:

* If a corporation, proposal must be executed in the corporate name by the president or vice-president (or any other corporate officer accompanied by evidence of authority to sign). If a co-partnership, proposal must be executed by a partner.
CITY OF TACOMA EQUITY IN CONTRACTING (EIC) PROGRAM

Bidders Special Instructions

As part of the City of Tacoma's ongoing work to address past disparities and to increase the City’s contracting with and utilization of historically underutilized businesses, the Equity in Contracting (EIC) Program places requirements on City contracts for utilization of businesses certified by the Washington State Office of Minority and Women’s Business Enterprise (OMWBE) and approved by the Equity in Contracting Program (“Certified Businesses”). The EIC Program also provides guidance and technical assistance to Certified Businesses who are interested in providing supplies, services and public works to the City of Tacoma.

The EIC Program requirements are contained in Tacoma Municipal Code Chapter 1.07.

Contractors bidding on City of Tacoma projects are required to meet the stated EIC requirements. Bids will be evaluated on an individual basis to determine EIC compliance. **A contractor who fails to meet the stated EIC requirements will be considered non-responsible.** Bidders are also subject to the City’s Equal Employment Opportunity policies prohibiting discrimination.

The stated EIC requirements may be met by the contractor or by identified subcontractors. All EIC Requirements may be met by using MBEs, WBEs, DBEs or SBEs from the OMWBE certified list ([OMWBE website](http://omwbe.wa.gov)). It is the bidder’s responsibility to ensure that their firm or identified subcontractors are certified by OMWBE and approved by the City of Tacoma EIC Program at the time of bid submittal. Business certification may be verified by contacting the EIC Office*.

*For the OMWBE list, be sure to look for businesses in Pierce, King, Lewis, Mason, Grays Harbor, Thurston, or any counties adjacent to the county in which the work is performed per 1.07.050(2)(b-c). Contact the EIC Office* if you have any questions.

The Equity in Contracting (EIC) forms included in these bid documents must be fully completed (including attachments) and included with bid submittals. Failure to include the required forms will result in the submittal being rejected as nonresponsive.

**Post-Award Important Information**

For all contracts that have requirements related to the EIC policy, the City of Tacoma is utilizing a cloud-based software system:

**B2Gnow** - Contractors and subcontractors must report payment information in the B2Gnow System on a monthly basis. The EIC Staff will monitor/audit that retainage is paid by the prime contractor to the subcontractor(s) within 10 [working] days after the subcontractors’ work is satisfactorily completed. This will be monitored/audited using the B2Gnow System.
The system is monitored/audited by EIC staff to ensure contract compliance, proactively identify potential issues, and track contract progress.

*EIC STAFF Contact Information*

For questions regarding Certifications, EIC Compliance and B2GNow support, contact EIC Staff:

- Call EIC Office at (253) 591-5630 or (253) 591-5826
- Email EIC Office at EICOFFice@cityoftacoma.org
STOP! READ Instructions to Bidders/Proposers for completing EIC Utilization Form.

Failure to complete all sections of this form according to the instructions provided or failure to submit this form shall render the bid or proposal non-responsive. (If necessary, use additional forms to list the requirements of Columns A-D). City reserves the right to make minor, non-material corrections to completed Forms, such as to correct obvious data entry errors. No corrections will be made that alter the proposed Certified Business participation percentages and dollar amounts.

Please note: Certified Businesses MUST be certified at time of or prior to bid opening.

---

<table>
<thead>
<tr>
<th>Column A. Certified Business Name</th>
<th>Column B. Business Cert. Type</th>
<th>Column C. Bid Item(s) Number(s) performed by the Certified Business(es)</th>
<th>Column D. Subcontract Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBE</td>
<td>WBE</td>
<td>SBE/DBE</td>
<td>If Material supplier, only 20% of the subcontract amount can be counted towards the EIC Requirements</td>
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</table>

Representative Name & Contact # below:

What is the Certified Firm Project Role: Subcontractor ☐ Material Supplier (20%) ☐

Representative Name & Contact # below:

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Representative Name & Contact # below:

What is the Certified Firm Project Role: Subcontractor ☐ Material Supplier (20%) ☐

* For EIC Requirements on this Project, refer to *EIC Requirements (EIC Reqs) Memo in the Bid Package

---

* EIC Office at (253) 591-5630 for additional information
**EQUITY IN CONTRACTING (EIC) UTILIZATION FORM**

**STOP! READ Instructions to Bidders/Proposers for completing EIC Utilization Form.**

Failure to complete all sections of this form according to the instructions provided or failure to submit this form shall render the bid or proposal non-responsive. (If necessary, use additional forms to list the requirements of Columns A-D). City reserves the right to make minor, non-material corrections to completed Forms, such as to correct obvious data entry errors. No corrections will be made that alter the proposed Certified Business participation percentages and dollar amounts.

Please note: Certified Businesses MUST be certified at time of or prior to bid opening.

**Example of a COMPLETED EIC UTILIZATION FORM**

**Initial Information:**

1. **Bidder Name:** ABC Construction, Inc.
2. **Project Title:** Downtown Restoration and Street Maintenance Project
3. **SPEC #:** PW23-0011F
4. **Base Bid – No Sales Tax (Must match Bid Proposal amount):** $359, 670.00

| Column A. Certified Business Name | Column B. Business Cert. Type | Column C. Bid Item(s) Number(s) performed by the Certified Business(es) | Column D. Subcontract Amount (If Material supplier, only 20% of the subcontract amount can be counted towards the EIC Requirements) |
|----------------------------------|-----------------------------|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------
| Traffic ABC                      | ☒                          | Bid Item #4- Pedestrian Traffic Control                                 | $30,000 (What is the Certified Firm Project Role? Subcontractor ☒ Material Supplier (20%) ☐) |
| Representative Name & Contact # below: Beth Bell – (253) 555-3333 | ☒                          |                                                                       |                                                                                                                                  |
| Survey 101, Inc.                 | ☒                          | Bid Item #1 – Roadway Surveying                                         | $9,500.00 (What is the Certified Firm Project Role? Subcontractor ☒ Material Supplier (20%) ☐) |
| Representative Name & Contact # below: John Doe – (253) 111-2233 | ☒                          |                                                                       |                                                                                                                                  |
| Hello Manufacturer               | ☒                          | Bid Item #66- Green Durable Product                                    | $10,000 (In this example, Total subcontract amount is $10,000- Only 20% of total will be applied towards *EIC Reqs) |
| Representative Name & Contact # below: Sam Jam – (253) 555-7899 | ☒                          |                                                                       |                                                                                                                                  |

* For EIC Requirements on this Project, refer to *EIC Requirements (EIC Reqs) Memo in the Bid Package
INSTRUCTIONS TO BIDDERS FOR COMPLETING THE EQUITY IN CONTRACTING (EIC) UTILIZATION FORM

Complete Initial Information Section:

1. Enter Bidder firm name
2. Enter Project Title as it appears on the Specification
3. Enter Spec # as it appears on the Specification
4. State the Base Bid, which is the Bidder’s bid amount, plus any alternates, additives, and deductive selected by the City. Do not include sales tax.

Complete Column “A”: List all Certified Businesses with whom you will execute a subcontract if you are the successful Bidder. Provide a contact person for the Certified Business and the contact phone number.

Complete Column "B": State if the identified Certified Business is certified as an MBE, WBE, and/or SBE/DBE. Note: One Certified Business may count towards multiple requirements; check all applicable certifications

Complete Column “C”: Specify the role of each listed Certified Business by checking Subcontractor or Material Supplier. Note: Each role counts differently towards EIC Utilization Requirements.

- Subcontractor: 100% of subcontract amount counts towards the EIC Utilization Requirement
- Material Supplier: 20% of supply expenditure amount counts towards the EIC Utilization Requirement

EXAMPLE Material cost = $100,000 equates to ($100,000 X 20%) = $20,000 to be applied towards the EIC Requirements

Note: The work description for each Certified Business listed on the EIC Utilization form must match the Certified Business’s OMWBE Profile. This ensures that the Certified Business is able to perform the work scope or role for which they have been listed.

Complete Column “D”: Enter the subcontract amount for each Certified Business listed. This amount is the price that Bidder and Certified Business have agreed upon prior to submittal.

ADDITIONAL IMPORTANT INSTRUCTIONS:

- Bidders must contact and solicit bids from Certified Businesses prior to listing them on the EIC Utilization Form. EIC staff will contact all listed Certified Businesses to verify that they have been contacted by Bidder regarding participation and subcontract amounts prior to being listed on this form. If the listed Certified Businesses have not been contacted prior to being listed on this form, Bidders will be deemed non-responsive.
- Include the completed EIC Utilization form with bid submittal. Incomplete, incorrect, or missing forms will render a bid nonresponsive.
- If awarded the Contract from the Specification bidders must execute subcontracts or supply agreements with Certified Businesses listed on the EIC Utilization Form. Failure to enter into an agreement with the Certified Businesses listed in Column A for at least the corresponding dollar amount listed in Column D, may result in penalties authorized by the Tacoma Municipal Code (TMC) 1.07.110.
CONTRACT FORMS (POST AWARD)

1. CONTRACT
2. INSURANCE CERTIFICATE REQUIREMENTS
3. PERFORMANCE BOND TO THE CITY OF TACOMA
4. PAYMENT BOND TO THE CITY OF TACOMA
5. GENERAL RELEASE TO THE CITY OF TACOMA
CONTRACT

This Contract is made and entered into effective as of [Month], [Day], [Year] (“Effective Date”) by and between the City of Tacoma, a Municipal Corporation of the State of Washington (“City”), and [supplier name as it appears in Ariba, including dbas or trade names] (“Contractor”).

That in consideration of the mutual promises and obligations hereinafter set forth the Parties hereto agree as follows:

I. Contractor shall fully execute and diligently and completely perform all work and provide all services and deliverables described herein and in the items listed below each of which are fully incorporated herein and which collectively are referred to as “Contract Documents”:

1. Specification No. [Spec Number] [ Spec Title] together with all authorized addenda.
2. Contractor’s submittal [or specifically described portions thereof] dated [Enter Submittal Date] submitted in response to Specification No. [Spec Number] [Spec Title].
3. Describe with specific detail and list separately any other documents that will make up the contract (fee schedule, work schedule, authorized personnel, etc.) or any other additional items mutually intended to be binding upon the parties.

II. If federal funds will be used to fund, pay or reimburse all or a portion of the services provided under the Contract, the terms and conditions set forth at this Appendix A are incorporated into and made part of this Contract and CONTRACTOR will comply with all applicable provisions of Appendix A and with all applicable federal laws, regulations, executive orders, policies, procedures, and directives in the performance of this Contract.

If CONTRACTOR’s receipt of federal funds under this Contract is as a sub-recipient, a fully completed Appendix B, “Sub-recipient Information and Requirements” is incorporated into and made part of this Contract.

III. In the event of a conflict or inconsistency between the terms and conditions contained in this document entitled Contract and any terms and conditions contained the above referenced Contract Documents the following order of precedence applies with the first listed item being the most controlling and the last listed item the least controlling:

1. Contract, inclusive of Appendices A and B.
2. List remaining Contract Documents in applicable controlling order.

IV. The Contract terminates on xxxxx, and may be renewed for xxxxxxxx

V. The total price to be paid by City for Contractor’s full and complete performance hereunder, including during any authorized renewal terms, may not exceed: $[Dollar Amount], plus any applicable taxes.

VI. Contractor agrees to accept as full payment hereunder the amounts specified herein and in Contract Documents, and the City agrees to make payments at the times and in the manner and upon the terms and conditions specified. Except as may be otherwise provided herein or in Contract Documents Contractor shall provide and bear the expense of all equipment, work and labor of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work and providing the services and deliverables required by this Contract.

VII. The City’s preferred method of payment is by ePayables (Payment Plus), followed by credit card (aka procurement card), then Electronic Funds Transfer (EFT) by Automated Clearing House (ACH), then check or other cash equivalent. CONTRACTOR may be required to have the capability of accepting the City’s ePayables or credit card methods of payment. The City of Tacoma will not accept price changes or pay additional fees when ePayables (Payment Plus) or credit card is used. The City, in its sole discretion, will determine the method of payment for this Contract.
VIII. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with the insurance requirements contained in the Contract Documents shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

IX. Contractor and for its heirs, executors, administrators, successors, and assigns, does hereby agree to the full performance of all the requirements contained herein and in Contract Documents.

It is further provided that no liability shall attach to City by reason of entering into this Contract, except as expressly provided herein.

IN WITNESS WHEREOF, the Parties hereto have accepted and executed this Contract, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable.

CITY OF TACOMA: CONTRACTOR:
Signature: Signature:

Name: Name:
Title: Title:

(City of Tacoma use only - blank lines are intentional)

Director of Finance: ____________________________

Deputy/City Attorney (approved as to form): ____________________________

Approved By: ____________________________

Approved By: ____________________________

Approved By: ____________________________

Approved By: ____________________________

Approved By: ____________________________
1. **Termination for Breach**

CITY may terminate this Contract in the event of any material breach of any of the terms and conditions of this Contract if CONTRACTOR’s breach continues in effect after written notice of breach and 30 days to cure such breach and fails to cure such breach.

2. **Prevailing Wages**

1. If federal, state, local, or any applicable law requires CONTRACTOR to pay prevailing wages in connection with this Contract, and CONTRACTOR is so notified by the CITY, then CONTRACTOR shall pay applicable prevailing wages and otherwise comply with the Washington State Prevailing Wage Act (RCW 39.12) in the performance of this Contract.

2. If applicable, a Schedule of Prevailing Wage Rates and/or the current prevailing wage determination made by the Secretary of Labor for the locality or localities where the Contract will be performed is made of part of the Contract by this reference. If prevailing wages apply to the Contract, CONTRACTOR and its subcontractors shall:

   i. Be bound by and perform all transactions regarding the Contract relating to prevailing wages and the usual fringe benefits in compliance with the provisions of Chapter 39.12 RCW, as amended, the Washington State Prevailing Wage Act and/or the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable, including the federal requirement to pay wages not less than once a week.

   ii. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule and/or specified in a wage determination made by the Secretary of Labor (unless specifically preempted by federal law, the higher of the Washington state prevailing wage or federal Davis-Bacon rate of wage must be paid.

   iii. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington and/or the federal Department of Labor, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages and/or other or additional documentation required by applicable federal law, must be submitted by CONTRACTOR and its subcontractors to the CITY, in the manner requested by the CITY, prior to any payment by the CITY hereunder, and an Affidavit of Wages Paid and/or other or additional documentation required by federal law must be received or verified by the CITY prior to final Contract payment.

3. **COPELAND ANTI-KICKBACK ACT**

For Contracts subject to Davis Bacon Act the following clauses will be incorporated into the Contract:

A. CONTRACTOR shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this Contract.

B. CONTRACTOR or subcontractor shall insert in any subcontracts the clause above and such other clauses federal agencies may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts.
The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these Contract clauses.

C. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

4. EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this Contract, CONTRACTOR will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. If the CONTRACTOR does over $10,000 in business a year that is funded, paid or reimbursed with federal funds, CONTRACTOR will take specific and affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

A. Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. CONTRACTOR agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

B. CONTRACTOR will, 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, sexual orientation, gender identity, or national origin.

C. CONTRACTOR will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee’s essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor’s legal duty to furnish information.

D. CONTRACTOR will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers’ representatives of the contractor’s commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

E. CONTRACTOR will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

F. In the event of CONTRACTOR’s noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further federally funded contracts in accordance with procedures
authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

G. CONTRACTOR will include the portion of the sentence immediately preceding paragraph (A) and the provisions of paragraphs (A) through (G) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. CONTRACTOR will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event CONTRACTOR becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the CONTRACTOR may request the United States to enter into such litigation to protect the interests of the United States.

5. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

A. Overtime requirements. Neither CONTRACTOR or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty 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 forty hours in such workweek.

B. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (3)(A) of this section 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 clause set forth in paragraph (3)(A) of this section, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (3)(A) of this section.

C. Withholding for unpaid wages and liquidated damages. The CITY 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 other 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 sub-contractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (3)(B) of this section.

D. Subcontracts. The Contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (3)(A) through (D) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime CONTRACTOR shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (3)(A) through (D) of this section.

6. CLEAN AIR ACT
A. CONTRACTOR agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

B. CONTRACTOR agrees to report each violation to the CITY and understands and agrees that the CITY will, in turn, report each violation as required to assure notification to the Federal Emergency Management Agency, and the appropriate Environmental Protection Agency Regional Office.

CONTRACTOR agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with federal funds.

7. FEDERAL WATER POLLUTION CONTROL ACT
A. CONTRACTOR agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

B. CONTRACTOR agrees to report each violation to the CITY and understands and agrees that the CITY will, in turn, report each violation as required to assure notification to the appropriate federal agency.

C. CONTRACTOR agrees to include these requirements in each subcontract exceeding $150,000 financed in whole or in part with federal funding.

8. DEBARMENT AND SUSPENSION
A. This Contract is a Covered Transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the CONTRACTOR is required to verify that none of the contractor’s principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).

B. CONTRACTOR must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier Covered Transaction it enters into.
C. This certification is a material representation of fact relied upon by the CITY. If it is later determined that the CONTRACTOR did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to CITY, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.

D. CONTRACTOR agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C throughout the period of this Contract and to include a provision requiring such compliance in its lower tier covered transactions.

9. BYRD ANTI-LOBBYING AMENDMENT

A. Contractors who apply or bid for an award of $100,000 or more shall file the required certification with CITY. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the CITY.

B. If applicable, CONTRACTOR must sign and submit to the CITY the certification required by Appendix A to 44 CFR Part 18 contained at Appendix A-1 to this Contract.

10. PROCUREMENT OF RECOVERED MATERIALS

A. In the performance of this Contract, CONTRACTOR shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:

   i. Competitively within a timeframe providing for compliance with the contract performance schedule;

   ii. Meeting contract performance requirements; or

   iii. At a reasonable price.

B. Information about this requirement, along with the list of EPA-designated items, is available at EPA’s Comprehensive Procurement Guidelines web site, https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program.

C. CONTRACTOR also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.
APPENDIX A-1

APPENDIX A to 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with 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, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds 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 this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, __________, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap.38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

__________________________
Signature of Contractor’s Authorized Official

__________________________
Name and Title of Contractor’s Authorized Official

__________________________ Date
APPENDIX B—Sub-recipient information and requirements

Pursuant to 2 CFR 200.332(a)(1) Federal Award Identification

<table>
<thead>
<tr>
<th>(i) Agency Name (must match the name associated with its unique entity identifier)</th>
<th>(ii) Unique Entity Identifier (i.e., DUNS)</th>
<th>City of Tacoma Number for This Agreement</th>
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<th>(iii) Federal Award Identification Number (FAIN)</th>
<th>(iv) Federal Award Date</th>
<th>(v) Federal Period of Performance Start and End Date</th>
<th>(vi) Federal Budget Period Start and End Date</th>
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<th>(vii) Amount of Federal Funds Obligated to the agency by this action:</th>
<th>(viii) Total Amount of Federal Funds Obligated to the agency</th>
<th>(ix) Total Amount of the Federal Award Committed to the agency</th>
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(x) Federal Award Project Description:

CORONAVIRUS STATE AND LOCAL FISCAL RECOVERY FUNDS—City of Tacoma

(xi) Federal Awarding Agency: DEPARTMENT OF THE TREASURY

Pass-Through Entity: City of Tacoma

Awarding Official Name and Contact Information:

(xii) Assistance Listing Number and Name (the pass-through entity must identify the dollar amount made available under each Federal award and the Assistance Listing number at time of disbursement)

(xiii) Identification of Whether the Award is R&D

(xiv) Indirect Cost Rate for the Federal Award

Award Payment Method (lump sum payment or reimbursement)

REIMBURSEMENT
This Insurance Requirements shall serve as an attachment and/or exhibit form to the Contract. The Agency entering a Contract with City of Tacoma, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise referred to as “Contractor”.

1. GENERAL REQUIREMENTS

The following General Requirements apply to Contractor and to Subcontractor(s) performing services and/or activities pursuant to the terms of this Contract. Contractor acknowledges and agrees to the following insurance requirements:

1.1. Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the City of Tacoma.

1.2. Contractor shall keep in force during the entire term of the Contract, at no expense to the City of Tacoma, the insurance coverage and limits of liability listed below and for Thirty (30) calendar days after completion of all work required by the Contract, unless otherwise provided herein.

1.3. Liability insurance policies, except for Professional Liability and Workers’ Compensation, shall:
   1.3.1. Name the City of Tacoma and its officers, elected officials, employees, and agents as additional insured
   1.3.2. Be considered primary and non-contributory for all claims with any insurance or self-insurance or limits of liability maintained by the City of Tacoma
   1.3.3. Contain a “Waiver of Subrogation” clause in favor of City of Tacoma
   1.3.4. Include a “Separation of Insureds” clause that applies coverage separately to each insured and additional insured
   1.3.5. Name the “City of Tacoma” on certificates of insurance and endorsements and not a specific person or department
   1.3.6. Be for both ongoing and completed operations using Insurance Services Office (ISO) form CG 20 10 04 13 and CG 20 37 04 13 or the equivalent
   1.3.7. Be satisfied by a single primary limit or by a combination of a primary policy and a separate excess umbrella

1.4. A notation of coverage enhancements on the Certificate of Insurance shall not satisfy these requirements below. Verification of coverage shall include:
   1.4.1. An ACORD certificate or equivalent
   1.4.2. Copies of requested endorsements

1.5. Contractor shall provide to City of Tacoma Procurement & Payable Division, prior to the execution of the Contract, Certificate(s) of Insurance and endorsements from the insurer certifying the coverage of all insurance required herein. Contract or Permit number and the City of Tacoma Department must be shown on the Certificate of Insurance.

1.6. A renewal Certificate of Insurance shall be provided electronically prior to coverage expiration via email sent annually to coi@cityoftacoma.org.
CITY OF TACOMA
INSURANCE REQUIREMENTS FOR CONTRACTS

1.7. Contractor shall send a notice of cancellation or non-renewal of this required insurance within Thirty (30) calendar days to coi@cityoftacoma.org.

1.8. “Claims-Made” coverages, except for pollution coverage, shall be maintained for a minimum of three years following the expiration or earlier termination of the Contract. Pollution coverage shall be maintained for six years following the expiration of the Contract. The retroactive date shall be prior to or coincident with the effective date of the Contract.

1.9. Each insurance policy must be written by companies licensed or authorized (or issued as surplus line by Washington surplus line broker) in the State of Washington pursuant to RCW 48 with an (A-) VII or higher in the A.M. Best key rating guide.

1.10. Contractor shall not allow any insurance to be cancelled, voided, suspended, or reduced in coverage/limits, or lapse during any term of this Contract. Otherwise, it shall constitute a material breach of the Contract.

1.11. Contractor shall be responsible for the payment of all premiums, deductibles and self-insured retentions, and shall indemnify and hold the City of Tacoma harmless to the extent such a deductible or self-insured retained limit may apply to the City of Tacoma as an additional insured. Any deductible or self-insured retained limits in excess of Twenty Five Thousand Dollars ($25,000) must be disclosed and approved by City of Tacoma Risk Manager and shown on the Certificate of Insurance.

1.12. City of Tacoma reserves the right to review insurance requirements during any term of the Contract and to require that Contractor make reasonable adjustments when the scope of services changes.

1.13. All costs for insurance are included in the initial Contract and no additional payment will be made by City of Tacoma to Contractor.

1.14. Insurance coverages specified in this Contract are not intended and will not be interpreted to limit the responsibility or liability of Contractor or Subcontractor(s).

1.15. Failure by City of Tacoma to identify a deficiency in the insurance documentation or to verify coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

1.16. If Contractor is a government agency or self-insured for any of the above insurance requirements, Contractor shall be liable for any self-insured retention or deductible portion of any claim for which insurance is required. A certification of self-insurance shall be attached and incorporated by reference and shall constitute compliance with this Section.
2. **SUBCONTRACTORS**

It is Contractor's responsibility to ensure that each subcontractor obtain and maintain adequate liability insurance coverage that applies to the service provided. Contractor shall provide evidence of such insurance upon City of Tacoma’s request. Failure of any subcontractor to comply with insurance requirements does not limit Contractor’s liability or responsibility.

3. **REQUIRED INSURANCE AND LIMITS**

The insurance policies shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve Contractor from liability in excess of such limits.

3.1 **Commercial General Liability Insurance**

Contractor shall maintain Commercial General Liability Insurance policy with limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) annual aggregate. This policy shall be written on ISO form CG 00 01 04 13 or its equivalent and shall include product liability especially when a Contract is solely for purchasing supplies. It includes Products and Completed Operations for three years following the completion of work related to performing construction services. It shall be endorsed to include: A per project aggregate policy limit (using ISO form CG 25 03 05 09 or equivalent endorsement).

3.2 **Commercial (Business) Automobile Liability Insurance**

Contractor shall maintain Commercial Automobile Liability policy with limits not less than One Million Dollars ($1,000,000) each accident for bodily injury and property damage and bodily injury and property damage coverage for owned (if any), non-owned, hired, or leased vehicles. Commercial Automobile Liability Insurance shall be written using ISO form CA 00 01 or equivalent. Contractor must also maintain MCS 90 and CA 99 48 endorsements or equivalent if “Pollutants” are to be transported unless in-transit Pollution coverage is covered under required Contractor’s Pollution Liability Insurance.

3.3 **Workers’ Compensation**

Contractor shall comply with Workers’ Compensation coverage as required by the Industrial Insurance laws of the State of Washington, as well as any other similar coverage required for this work by applicable federal laws of other states. Contractor must comply with their domicile State Industrial Insurance laws if it is outside the State of Washington.

3.4 **Employers’ Liability Insurance**

Contractor shall maintain Employers’ Liability coverage with limits not less than One Million Dollars ($1,000,000) each employee, One Million Dollars ($1,000,000) each accident, and One Million Dollars ($1,000,000) policy limit.

3.5 **Professional Liability Insurance or Errors and Omissions**

For contracts with professional licensing, design, or engineering services. Contractor and/or its subcontractor shall maintain Professional Liability or Errors and Omissions with limits of One Million Dollars ($1,000,000) per claim and Two Million Dollars ($2,000,000) in the aggregate covering acts, errors and omissions arising out of the professional services under this Contract. Contractor shall maintain this coverage for Two Million Dollars ($2,000,000) if the policy limit includes the payment of claims or defense costs, from the policy limit. If the scope of such design-related professional services includes work related to pollution conditions, the Professional Liability policy shall include Pollution Liability coverage.
3.6 **Excess or Umbrella Liability Insurance**
Contractor shall provide Excess or Umbrella Liability Insurance with limits not less than Three Million Dollars ($3,000,000) per occurrence and in the aggregate. This coverage shall apply, at a minimum, in excess of primary underlying Commercial General Liability, Employer’s Liability, Pollution Liability, Marine General Liability, Protection and Indemnity, and Automobile Liability if required herein.

3.7 **Installation Floater Insurance**
Contractor shall maintain during the term of the Contract, at its own expense, Installation Floater Insurance covering Contractor’s labor, materials, and equipment to be used for completion of the work performed under this Contract against all risks of direct physical loss, excluding earthquake and flood, for an amount equal to the full amount of the Contract improvements.

3.8 **Builder's Risk Insurance**
Contractor shall maintain during the term of the Contract and until final acceptance of the work by the City of Tacoma, a policy of Builder’s Risk Insurance providing coverage for all-risk of physical injury to all structures to be constructed according to the Contract. City of Tacoma shall be included as a named insured (not named as additional insured) on the policy. Builder’s Risk Insurance policy shall:

3.8.1 Have a deductible of no more than Five Thousand Dollars ($5,000) for each occurrence, the payment of which will be the responsibility of Contractor. Any increased deductibles accepted by City of Tacoma will remain the responsibility of Contractor.

3.8.2 Be on an ISO Special Form Causes of Loss or the equivalent and also include coverage for Collapse, Earthquake and Flood. The deductible for Earthquake and Flood may be higher than the $5,000 deductible required in 3.18.1.

3.8.3 Include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site.

3.8.4 Be written in the amount of the completed value of the structures, with no coinsurance provisions exposure on the part of Contractor or City of Tacoma.

3.8.5 Contain a Waiver of Subrogation provision whereby each insured waives their subrogation rights to the extent the loss is covered by this insurance.

3.8.6 Grant permission to occupy, allowing the building or structure to be partially occupied prior to completion, without detrimental effect to the coverage provided.

3.8.7 Include coverage for the testing and startup of the building’s operating systems.

3.8.8 Include coverage for City of Tacoma’s loss of use or business interruption arising out of a covered loss which delays completion.

3.8.9 Include resultant damage coverage for loss due to faulty workmanship and defective material.

3.8.10 Include coverage for startup and testing.

3.8.11 Include coverage for resultant damage coverage for loss due to faulty workmanship and defective material.

Contractor and City of Tacoma waive all rights against each other, their respective subcontractors, agents, and representatives for damages caused by fire or other perils to the extent covered by Builder’s Risk Insurance or other property insurance applicable to the work. The policies shall provide such waivers by endorsement or otherwise.
3.9 Other Insurance
Other insurance may be deemed appropriate to cover risks and exposures related to the scope of work or changes to the scope of work required by City of Tacoma. The costs of such necessary and appropriate Insurance coverage shall be borne by Contractor.
That we, the undersigned, [Supplier Name] as principal, and ___________________________ as a surety, are jointly and severally held and firmly bound to the CITY OF TACOMA, in the penal sum of $[dollar value], plus any applicable tax, for the payment whereof Contractor and Surety bind themselves, their executors, administrators, legal representatives, successors and assigns, jointly and severally, firmly by these presents.

This obligation is entered into in pursuance of the statutes of the State of Washington, the Ordinances of the City of Tacoma.

WHEREAS, under and pursuant to the City Charter and general ordinances of the City of Tacoma, the said City has or is about to enter with the above bounden principal, a contract, providing for [Specify #], Specification Title: [Enter Spec Title Here], Contract No. [Enter Contract # Here].

(which contract is referenced to herein and is made a part hereof as though attached hereto), and

WHEREAS, the said principal has accepted, the said contract, and undertake to perform the work therein provided for in the manner and within the time set forth.

This statutory performance bond shall become null and void, if and when the principal, its heirs, executors, administrators, successors, or assigns shall well and faithfully perform all of the Principal’s obligations under the Contract and fulfill all terms and conditions of all duly authorized modifications, additions and changes to said Contract that may hereafter be made, at the time and in the manner therein specified; and if such performance obligations have not been fulfilled, this bond shall remain in force and effect.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the specifications accompanying the Contract, or to the work to be performed under the Contract shall in any way affect its obligation on this bond, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this bond and notice to Surety is not required for such increase.

If the City shall commence suit and obtain judgment against the Surety for recovery hereunder, then the Surety, in addition to such judgement, shall pay all costs and attorney’s fees incurred by the City in enforcement of its rights hereunder. Venue for any action arising out of in connection with this bond shall be in Pierce County, Washington.

Surety companies executing bonds must be authorized to transact business in the State of Washington as surety and named in the current list of “Surety Companies Acceptable in Federal Bonds” as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Department of the Treasury.

One original bond shall be executed, and signed by the parties’ duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed power of attorney for the office executing on behalf of the surety.

Principal: [Supplier name]

By: ________________________________

Surety:

By: ________________________________

Agent’s Name: ________________________________

Agent’s Address: ________________________________

Resolution No. [Enter Reso # Here]
Bond No.

Form No. SPEC-100A 10/03/2023
PAYMENT BOND
TO THE CITY OF TACOMA

Resolution No. [Enter Reso # Here]
Bond No.

That we, the undersigned, as principal, and
as a surety, are jointly and severally held and firmly bound to the CITY OF TACOMA, in the penal sum of,
$[dollar value], plus any applicable taxes, for the payment whereof Contractor and Surety bind themselves,
their executors, administrators, legal representatives, successors and assigns, jointly and severally, firmly by these presents.

This obligation is entered into in pursuance of the statutes of the State of Washington, the Ordinances of the City of Tacoma.

WHEREAS, under and pursuant to the City Charter and general ordinances of the City of Tacoma, the said City has or is
about to enter with the above bounden principal, a contract, providing for

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<tr>
<td>Contract No.</td>
<td>[Enter Contract # Here]</td>
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(which contract is referenced to herein and is made a part hereof as though attached hereto), and

WHEREAS, the said principal has accepted, the said contract, and undertake to perform the work therein provided for in
the manner and within the time set forth.

This statutory payment bond shall become null and void, if and when the Principal, its heirs, executors, administrators,
successors, or assigns shall pay all persons in accordance with RCW 39.08, 39.12, and 60.28, including all workers, laborers,
mechanics, subcontractors, and materialmen, and all person who shall supply such contractor or subcontractor with provisions
and supplies for the carrying on of such work, and all taxes incurred on said Contract under Titles 50 and 51 RCW and all
taxes imposed on the Principal under Title 82 RCW; and if such payment obligations have not been fulfilled, this bond shall
remain in full force and effect.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract shall
in any way affect its obligation on this bond, and waives notice of any changes, extension of time, alteration or addition to the
terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of
the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on
this bond and notice to Surety is not required for such increased obligation.

No suit or action shall be commenced hereunder by any claimant unless claimant shall have given the written notices to the
City, and where required, the Contractor, in accordance with RCW 39.08.030.

The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder,
inclusive of the payment by Surety of claims which may be properly filed in accordance with RCW 39.08 whether or not suit is
commenced under and against this bond.

If any claimant shall commence suit and obtain judgment against the Surety for recovery hereunder, then the Surety, in
addition to such judgment and attorney fees as provided by RCW 39.08.030, shall also pay such costs and attorney fees as
may be incurred by the City as a result of such suit. Venue for any action arising out of or in connection with this bond shall be
in Pierce County, WA.

Surety companies executing bonds must be authorized to transact business in the State of Washington as surety and named
in the current list of “Surety Companies Acceptable in Federal Bonds” as published in the Federal Register by the Audit Staff
One original bond shall be executed, and be signed by the parties’ duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed power of attorney for the office executing on behalf of the surety.

Principal: [Supplier name]

By: ________________________________

Surety:

By: ________________________________

Agent’s Name: ________________________________

Agent’s Address: ________________________________
GENERAL RELEASE TO THE CITY OF TACOMA

The undersigned, named as the contractor for the ______________________________ between __________________________ and the City of Tacoma, Contract No. ________________ dated ________, 20___, hereby releases the City of Tacoma, its departmental officers and agents from any and all claim or claims whatsoever in any manner whatsoever at any time whatsoever arising out of and/or in connection with and/or relating to said contract, excepting only the equity of the undersigned in the amount now retained by the City of Tacoma under said contract, to-wit the sum of ______________________________ excluding sales tax.

Signed at __________, Washington this __________ day of ____________, 20__. 

______________________________
Contractor

By

Title __________________________

STATE OF WASHINGTON)
COUNTY OF ____________

I, ________________, a Notary Public in and for the said State, do hereby certify that on this ____________, day of ____________, 20__, that __________________________, executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said company, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in this certificate first above written.

Notary Public in and for the State of Washington
My appointment expires ________________
WASHINGTON STATE PREVAILING WAGE RATES

- STATE PREVAILING WAGE RATES FOR KING COUNTY
PREVAILING WAGE RATES

This project requires prevailing wages under 39.12 RCW. Any worker, laborer, or mechanic employed in the performance of any part of the work shall be paid not less than the applicable prevailing rate of wage.

The project site is located in King County.

The effective date for prevailing wages on this project will be the submittal deadline with these exceptions:
   a. If the project is not awarded within six months of the submittal deadline, the award date is the effective date.
   b. If the project is not awarded pursuant to a competitive solicitation, the date the contract is executed is the effective date.
   c. Janitorial contracts follow WAC 296-127-023.

Except for janitorial contracts, these rates shall apply for the duration of the contract unless otherwise noted in the solicitation.

Look up prevailing rates of pay, benefits, and overtime codes from this link: https://secure.lni.wa.gov/wagelookup/

REQUIRED FILINGS

The contractor and all subcontractors covered under 39.12 RCW shall submit to the Department of Labor and Industries (L&I) for work provided under this contract:

1. A Statement of Intent to Pay Prevailing Wages must be filed with and approved by L&I upon award of contract.

2. An Affidavit of Wages Paid must be filed with and approved by L&I upon job completion.

Payments cannot be released by the City until verification of these filings are received by the engineer. Additional information regarding these filings can be obtained by calling the Department of Labor & Industries, Prevailing Wage at 360-902-5335, https://www.lni.wa.gov or by visiting their MY L&I account.
CITY PROGRAMS

- EQUITY IN CONTRACTING – EIC REQUIREMENTS
- LEAP REQUIREMENTS
EQUITY IN CONTRACTING (EIC) REQUIREMENTS MEMO

CCD/EIC: 20000114103
Date of Record: 5/3/2024
Project Spec#: TW24-0097F
Project Title: Headworks Operations Remodel & HVAC Replacement

EQUITY IN CONTRACTING REQUIREMENTS

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All bidders must complete and submit with their bid the EIC Utilization form contained in the bid submittal package.

A list of EIC-eligible companies is available at www.omwbe.wa.gov

IMPORTANT NOTE:
It is the bidder’s responsibility to ensure that the subcontractor(s) listed on the EIC Utilization Form are currently certified by the State of Washington’s Office of Minority and Women Business Enterprises (OMWBE) at the time of bid opening. This may be verified by contacting the EIC Office at (253) 344-6632 between 8 AM and 5 PM, Monday through Friday or the OMWBE Office at (866) 208-1064. Please refer to the City of Tacoma EIC code.

MATERIAL MISSTATEMENTS CONCERNING COMPLETED ACTIONS BY THE BIDDER IN ANY SWORN STATEMENT OR FAILURE TO MEET COMMITMENTS AS INDICATED ON THE EIC UTILIZATION FORM MAY RENDER THE BIDDER IN DEFAULT OF CITY ORDINANCE 1.07

1 For the OMWBE list, be sure to look for businesses in Pierce, King, Lewis, Mason, Grays Harbor, Thurston, or any counties adjacent to the county in which the work is performed per 1.07.050(2)(b-c). Contact the EIC Office if you have any questions.
CITY OF TACOMA

EQUITY IN CONTRACTING (EIC) PROGRAM REGULATIONS
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I. Introduction

Tacoma Municipal Code (TMC) Chapter 1.07 authorizes the City of Tacoma’s Equity in Contracting (EIC) Program (Program) to address the historical underutilization and lack of participation of small, women and minority owned businesses in City contracts for supplies, services, and public works. TMC 1.07.040 authorizes the Community and Economic Development Department (CEDD) Director to adopt these administrative EIC Program Regulations (Regulations).

For questions, observations or recommendations related to these Regulations, please contact the EIC office at (253) 591-5826 or by email at EICoffice@cityoftacoma.org.

II. Objectives, Applicability and Overall Annual EIC Goal

The purpose of the EIC Program and of these Regulations is to advance the policy set forth in TMC 1.07.010: to “facilitate a substantial procurement, education, and mentorship program designed to promote equitable participation by historically underutilized businesses in the provision of supplies, services, and public works to the City.” These Regulations are intended to aid and guide City staff, Certified Businesses, Contractors and Suppliers and other stakeholders, to ensure the Program is implemented clearly and consistently and to encourage, facilitate and assist the participation of Certified Businesses in City of Tacoma contracts.

The current annual EIC goal is 20%, which was reached by utilizing the City of Tacoma’s most recent disparity study to determine the level of Certified Business participation in City Contracts expected in the absence of persistent effects of discrimination. The dollar value of all contracts awarded to or performed by Certified Businesses shall be counted toward the annual EIC goal. The EIC goal may be updated or changed in alignment with future disparity studies.

Currently the EIC Program is requiring participation by Certified Businesses only on contracts for public works. The Program is intended to apply to all City contracts for supplies, services, and public works (other than those contracts subject to exemption, exception, or waiver) and these Regulations will be updated as the City develops specific requirements and processes for Certified Business participation in contracts for supplies and services.
III. Definitions

Terms used in these Regulations shall have the following meanings unless defined differently in Tacoma Municipal Code Chapter 1.07, in which case the definition contained in TMC controls.

“B2Gnow” is the system utilized by the City of Tacoma Equity in Contracting (EIC) Staff to track payments to Contractors and all Subcontractors on all Public Works and Improvements projects including Equity in Contracting (EIC) Requirements.

“Bid” means an offer submitted by a Respondent to furnish Supplies, Services, and/or Public Works in conformity with the Specifications and any other written terms and conditions included in a City request for such offer.

“Bidder” means an entity or individual who submits a Bid, Proposal or Quote. See also “Respondent.”

“Certified Business” means an entity that has been certified as a Disadvantaged Business Enterprise (“DBE”), Small Business Enterprise (“SBE”), Minority Business Enterprise (“MBE”), Women Business Enterprise (“WBE”), or Minority and Women’s Business Enterprise (“MWBE”) by the Washington State Office of Minority and Women’s Business Enterprise.

“City” means all Departments, Divisions, and agencies of the City of Tacoma.

“Change Order” means a reduction or change to the contracted scope of work potentially affecting the Equity in Contracting Requirements initially set on a project.

“Contract” means any type of legally binding agreement regardless of form or title that governs the terms and conditions for procurement and performance of Public Works and Improvements and/or Non-Public Works and Improvements, Supplies and Services.

“Contractor” or “Supplier” or “Bidder” means any Person that presents a Submittal to the City, enters into a Contract with the City, and/or performs all or any part of a Contract awarded by the City, for the provision of Public Works, or Non-Public Works and Improvements, Supplies or Services.

“Disparity Study” is a study that determines whether a government entity, either in the past or currently, engages in exclusionary practices in the solicitation and award of contracts to small, minority, women-owned, and disadvantaged business enterprises. The primary goal of the study is to assess, quantify, and evaluate the prevalence, significance (degree and weight) and scope of discrimination in the marketplace.

“Exception” or “Exemption” means the limited circumstances in which EIC Requirements do not apply or will not be applied to a Contract.

“EIC Manager” is the individual authorized by TMC to administer the Equity in Contracting Program.

“EIC Requirements” or “Contract Requirements” are the specified Requirements for Certified Business participation applied to a Contract using the EIC Requirements Setting Methodology.

“EIC Requirement Setting Methodology” is as defined in Appendix No. 1 to these Regulations.

“EIC Staff” means Equity in Contracting Program staff.
“Exception Request” means a request that no EIC requirements be applied to a Contract. See Appendix No. 3 to these Regulations.

“Goal” means the annual level of participation by Certified Businesses in City Contracts as established in The Tacoma Municipal Code TMC 1.07.020G, the Program Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations.

“LCPtracker” is the system used by the Local Employment and Apprenticeship Program (LEAP) Staff to monitor compliance with LEAP workforce utilization requirements and prevailing wage law.

“Non-Public Works and Improvements” means procurement of and contracting for Supplies and/or Services not solicited as Public Works.

“Notice of physical completion” means all physical work is done and the contractor has left the site. However, there may still be some outstanding paperwork or documentation remaining.

“Notice of substantial completion” means all physical work is complete except for punch list items. Only minor incidental work remains, such as minor corrections or repairs.

“Person” means individuals, companies, corporations, partnerships, associations, cooperatives, any other legally recognized business entity, legal representative, trustee, or receivers.

“Program Manager” means the individual appointed by the City’s Community and Economic Development Director to administer the Program and these Regulations.

“Program Regulations” or “Regulations” means these Regulations.

“Project Delivery Team” refers to the City of Tacoma personnel working on the project from the Department or Division awarding and administering the Contract.

“Proposal” means a written offer to furnish Supplies or Services in response to a Request for Proposals. This term may be further defined in the Purchasing Policy Manual and/or in competitive solicitations issued by the City.

“Public Works (or “Public Works and Improvements)’ means all work, construction, alteration, repair, or improvement other than ordinary maintenance, executed at the cost of the City, or that is by law a lien or charge on any property therein, as is defined in RCW Chapter 39.04 and as may be hereinafter amended. This term includes all Supplies, materials, tools, and equipment to be furnished in accordance with the Contract for such work, construction, alteration, repair, or improvement.

“Responsive or Responsible Bidder” is as defined within the City of Tacoma Purchasing Policy.

“Quote” means a competitively solicited written offer to furnish Supplies or Services by a method of procurement that is less formalized than a Bid or a Proposal.

“Respondent” means any entity or Person that provides a Submittal in response to a Request for Bids, Request for Proposals, Request for Qualifications, Request for Quotes or other request for information, as such terms are defined in TMC Chapter 1.06 and in Purchasing Policy and Procedures.
“Requirements” means the level of required participation by Certified Businesses in City Contracts as established by TMC Chapter 1.07, the Program Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations.

“Services” means non-Public Works and Improvements services and includes professional services, personal services, and purchased services, as such terms are defined in Chapter 1.06. TMC and in Purchasing Policy and Procedures.

“Specification” means the document and any subsequent addenda, including terms and conditions that describes the physical or functional characteristics, or the nature of the required Supplies, Services, or Public Works; commonly referred to as the Bid document or Bid Specification.

“Submittal” means Bids, Proposals, Quotes, Qualifications, or other information submitted in response to Requests for Bids, Requests for Proposals, Requests for Qualifications, Requests for Quotations, or other City requests for information, as such terms are defined in Chapter1.06 TMC and in Purchasing Policy and Procedures.

“Supplies” means materials, supplies, and other products that are procured and contracted for by the City.

“Tacoma Public Utilities Service Area” means any ZIP code in which Tacoma Public Utilities maintains infrastructure or provides retail services.

“Undue hardship” means an action that places a significant burden on a business.

“Waiver”, with regards to the Post-Bid EIC Waiver Process, means a discretionary decision made by the City after Bids are received that EIC Requirements, in whole or in part, will not be applied to a Contract or Contracts.

IV. Exemptions or Exceptions to EIC Program Requirements

A. Contracts that are not competitively solicited by the City of Tacoma.

No EIC Requirements will apply to contracts awarded in the manners listed below. These contracts are exempt from EIC Requirements, and no Exception Request is needed to be completed:

1. Emergency (TMC 1.06.257.C). Situations where breakage or loss of equipment has or is about to interrupt necessary services, where public health or safety may be jeopardized, or when required by regulatory agency, or state law. If the supplies, services, or public works must be provided with such immediacy that neither the City nor the contractor can comply with the EIC Requirements, none will be applied. Such emergency will be deemed
documented whenever a waiver of competitive solicitation for emergency situations is authorized under Tacoma Municipal Code Chapter 1.06.257 or as may be hereinafter amended.

2. **Sole Source** (TMC 1.06.257.A and 1.06.258). If the supplies, services, or public works are available from only one feasible source, and subcontracting possibilities do not reasonably exist as documented by the Department or Division awarding the Contract. Such circumstance is documented by the approval of the Procurement and Payables Division Manager or delegatee and for Contracts where the estimated cost is over $500,000 (excluding sales tax) by the approval of the Contracts and Awards (C&A) Board.

3. **Not Practicable to Bid** (TMC 1.06.257.B). An immediate and important need for proposed construction, installation, repair, materials, supplies, equipment, or services where the delay that would result from following competitive solicitation process would cause financial loss to the City or an interruption of vital services to the public. Such circumstance is documented by the approval of the Procurement and Payables Division Manager or delegatee and for Contracts where the estimated cost is over $500,000 (excluding sales tax) by the approval of the C&A Board.

4. **Direct Solicitation and Negotiation** (1.06.256.B). Contracts for Professional or Personal Services, excluding architectural and engineering services. When City Manager or Director of Utilities or their delegates determine use of direct solicitation and negotiation process to be in the best interests of the City no EIC requirements will be applied to the resulting contract.

5. **Government or Cooperative Purchasing.**
   The Contract is the result of a federal, state, or inter-local government purchasing agreement and the use of such agreement in lieu of a bid solicitation conducted by the City is in accordance with TMC Chapter 1.06 and Purchasing Policy and Procedures.

**B. Lack of Certified Businesses**

If it is determined there are an insufficient number of Certified Businesses to perform the work scopes listed in the Contract, no EIC Requirement will be applied. The process for requesting and approving an exception for lack of Certified Businesses is as follows:

1. **If after Program review of a project using the established EIC Requirement setting methodology, it is determined by EIC Staff that there will be an insufficient number (3 or less) of Certified Business available to meet the requirement, EIC Staff sends an Exception Request to EIC Manager for review and approval.**
2. If, after EIC Staff has set EIC Requirements on a project, the Project Delivery Team determines that additional information justifies an exception for lack of Certified Business, the Project Delivery Team sends an Exception Request via email to the EIC Team who will then forward it to the EIC Program Manager with necessary project background information for final review and approval.

C. Public Works and Improvement Projects with a Value of $150,000 or Less

EIC Requirements will not be set on public works and improvement projects with an engineer’s estimate value of $150,000 or less. However, EIC Staff will collaborate with the Project Delivery Team to proactively outreach to Certified Businesses and provide technical assistance to encourage participation.

D. Documentation of Granted Exceptions

All exceptions must be documented in the Program’s reporting and goal spreadsheet database. Analysis will be done by the EIC Manager to understand what measures the City can take to ensure that exceptions to the EIC Requirements occur only when necessary.

V. EIC Requirements for Contracts for Public Work

All City contracts for Public Work – except for projects with an engineer’s estimate value of $150,000 or less – are subject to EIC Requirements. In no case will EIC Requirements exceed a total of 20 percent (20%) of the Engineer’s estimate. If a contract is federally funded, any federal program supersedes the Equity in Contracting Program and these regulations.

A. EIC Pre-Award Process

1. EIC Contract Requirements Set

Using the EIC Requirements Setting Methodology contained in Appendix No. 1 to these Regulations, EIC Staff will set requirements for the use of Certified Businesses using two potential options.

Option 1: EIC Staff applies three (3) separate requirements (MBE, WBE, SBE) in accordance with the EIC Requirements Setting Methodology. Each stated Requirement must be fulfilled by using the specified category of Certified Business.
Option 2: If after setting the EIC Requirements, reviewing the OMWBE directory, and discussing with the Project Delivery Team, it is determined that fulfilling each requirement separately might present undue hardship for contractors, EIC staff will apply an overall EIC Requirement. The overall EIC Requirement is the sum of the 3 separate requirements initially established as a result of using the EIC Requirement Setting Methodology. Under Option 2 Bidders can use any combination of MBEs, WBEs, SBEs or DBEs to fulfill the overall EIC Requirement.

Staff guidance for determining if an overall EIC Requirement Option 2 is appropriate can be found in Appendix No. 2 to these Regulations.

After utilizing Option 1 or Option 2 to set the EIC Requirements, EIC staff will send an EIC Memo to the Project Delivery Team informing of the EIC Requirements for the project.

B. EIC Bid Review Process

Contracts for Public Work must be awarded to the lowest responsive and responsible Bidder. EIC Program Staff conducts a review of Submittals for EIC compliance.

1. Review for Bidder Responsiveness

i. Bids must list Certified Businesses. If a listed business is not certified with OMWBE as of the date of bid opening the bid will be recommended to be rejected as non-responsive.

ii. All sections of the EIC Utilization form located in Appendix No. 3 to these Regulations must be completed according to the stated instructions and the properly completed form must be included with bid submittal.

iii. Submittals that do not include a properly completed EIC Utilization form will be recommended by EIC Staff to be rejected as non-responsive bids. To be considered “completed”, the required forms must be filled out with all the information required to be provided. No fields should be left incomplete or designated N/A or otherwise lacking a required response. EIC Staff reserves the right to make minor non-material corrections to the form, such as to correct obvious data entry errors. No corrections will be made that alter the proposed Certified Business participation percentages and dollar amounts.

iv. The work description for each Certified Business listed on the EIC Utilization form must match the Certified Business’s OMWBE Profile. This ensures that the Certified Business is able to complete the work scope or role for which they have been listed.

v. Bidder must contact and solicit bids from Certified Businesses prior to listing them on the EIC Utilization Form and prior to bid submittal. EIC Staff will contact all listed Certified Businesses. If a listed Certified Business has not been contacted by the Bidder prior to being listed, the bid will be rejected as non-responsive.
2. Review for Bidder Responsibility

i. The EIC Utilization Form must demonstrate that the bidder has obtained enough EIC participation to meet or exceed the EIC Requirements for that contract. Submittals that do not meet or exceed the stated requirements will be recommended to be rejected as non-responsible bids.

3. Self-Performing Bidders

Bidders who are themselves Certified Businesses can meet the EIC requirements by self-performance. When a Certified Business is the prime bidder, an adjustment may be made to the EIC Requirements. In such cases, the self-performing Certified Business can be found to be a responsible bidder even if the bid did not satisfy all three stated EIC Requirements (SBE, MBE and WBE). For example, if a bidder is certified as an MBE and an SBE, the WBE Requirements may be deemed waived since the Contractor’s self-performance as an MBE and an SBE achieves the total Requirement.

4. EIC Recommendation

i. If the apparent low bidder is deemed non-responsive or non-responsible, EIC Staff will review the next lowest bidder’s submittal.

ii. Once EIC Staff has reviewed the EIC portion of the submittal, a bid review memo is sent to the Project Delivery Team to notify them of the status of the apparent low bidder and will include any recommendation to reject submittals as non-responsive or non-responsible.

VI. Post-Bid EIC Waiver Requests Process

Per TMC 1.07.060 (C), if, after receipt of submittals but prior to Contract award, it is determined that due to unforeseen circumstances (which may be demonstrated by bidder(s) failure to meet the stated Requirements) waiver of the stated EIC Requirements in whole or in part for the project is in the best interest of the City, the Director or Superintendent of the Project Delivery Team may request the stated EIC Requirements be waived in full or in part.

The waiver request must be made using the EIC Waiver Request Form shown in Appendix No. 4 to these Regulations and initiated by the applicable Director or Superintendent of the Project Delivery Team. The form is then forwarded to the Procurement and Payables Division Manager for review and signature,
followed by the City Manager or the Director of Utilities for review and signature. EIC Staff notifies the Project Team of the decision made.

If the Waiver Request is approved by the City Manager or Utilities Director, any new EIC Requirements will be equal to the EIC Utilization percentage listed on the successful bidder’s EIC Utilization form (which could be zero).

If the Waiver Request is not approved by the City Manager or Utilities Director, the Project Delivery Team must re-bid the project or award to the next lowest bidder who has satisfied the stated EIC Requirements.

In all instances where a Waiver is approved by the City Manager or Utilities Director, analysis will be done by the EIC Manager to understand what measures the City can take to ensure that waivers of the EIC requirements are granted only when absolutely necessary.

VII. EIC Contract Monitoring and Compliance

All contracts will be monitored by the Program to ensure compliance with the stated EIC Requirements throughout the term of the Contract including as follows:

A. Coordination between Project Delivery Team and Program

During the term of the contract, the Project Delivery Team will include EIC Staff in the pre-bid, pre-construction, and progress meetings. Additionally, the Project Delivery Staff will send Contract & Award (C&A) Letters, Notice to Proceed and Notice of Physical Completion to EIC Staff.

B. Utilization of B2Gnow System

1. Once EIC Staff receives the Notice to Proceed, the Project is created in B2Gnow.
2. Once the Project has been created in B2Gnow by EIC Staff, a letter is automatically sent from B2Gnow to the Contractor and all Certified Businesses included in the project to notify them of the new project and what is expected of them in the B2Gnow System.
3. Contractors must utilize B2GNow by entering their monthly payment reports in the system. EIC Staff tracks EIC utilization by ensuring all payment reports are entered monthly by the Project Delivery Team and the Contractor and payments are confirmed by the Subcontractors.
C. B2Gnow Monitoring

1. Prompt Payment
For the full lifecycle of the project, on a monthly basis, EIC Staff must ensure the following actions have occurred in the B2Gnow system:
   a. The Department/Division in charge of the contract has entered payment submitted to the Contractor.
   b. The Contractor has entered payments submitted to all Certified Businesses.
   c. The Certified Businesses have confirmed prompt receipt of payments from the Contractor for work performed. In compliance with the WA State Legislature Revised Code of WA (RCW) 39.04.250 (1)*, EIC Staff will verify that subcontractors are paid no later than 10 days after the Prime receives payment from the City of Tacoma Department/Division in charge of the contract.

*RCW 39.04.250 (1) “When payment is received by a contractor or subcontractor for work performed on a public work, the contractor or subcontractor shall pay to any subcontractor not later than ten days after the receipt of the payment, amounts allowed the contractor on account of the work performed by the subcontractor, to the extent of each subcontractor's interest therein.

2. If the above actions have not taken place or if there are any discrepancies in the system, EIC Staff will reach out to the parties involved via a notice generated from the B2Gnow System, via email or via phone call to address any discrepancies. Any notes related to the projects will be entered in the B2Gnow system.

3. For support using B2GNow, please contact EIC Staff at (253) 591-5826 or email at EICoffice@cityoftacoma.org.

D. Contractor Request for Certified Business Termination and Substitution

A Contractor’s noncompliance by failure to utilize a Certified Business required by the Contract can be excused if Contractor has properly requested to terminate, reduce, or substitute the participation of a Certified Business on an awarded Contract and such request has been approved by the EIC Program consistent with TMC 1.07.080 A. The process for termination and substitution request and approval is initiated by the Contractor following the instructions outlined in the EIC Certified Business Termination and Substitution Form located in Appendix No. 5 to these Regulations.

Upon receipt of the completed EIC Certified Business Termination and Substitution Form, the Project Delivery Team will forward the request to EIC Staff along with supporting documentation received from the Contractor.
1. **EIC Staff will proceed with the following steps:**
   a. Review the request, including any response or objection from the Certified Business, to determine if the grounds for termination (or substitution) contained in TMC 1.07.080 A 1 (Certified Business refusal to execute necessary agreements with Contractor, Certified Business defaults on agreements with Contractor or other reasonable excuse) and the process required by these Regulations have been satisfied. EIC staff review will utilize the criteria for reasonable excuse contained in these Regulations.

   b. Contact the Certified Business(es) proposed to be terminated as well as the Certified Business(es) proposed to be substituted.

   c. If Contractor has indicated on the Certified Business Termination and Substitution Form that it does not have a substitution plan, EIC staff will review the Contractor’s explanation for not proposing a substitute Certified Business according to the criteria in TMC 1.07.080 A 2. Where it is shown by Contractor that no other Certified Business is available as a substitute and that failure to secure participation by the Certified Business identified in the solicitation is not the fault of the Contractor, EIC staff will approve substitution with a non-Certified Business; provided, that, the substitution does not increase the dollar amount of the bid.

   d. If EIC staff determines that the process has been followed and that one or more of the grounds in TMC 1.07.080 have been satisfied to allow termination and substitution, the Contractor will be notified of the approval.

   e. Contractor has 3 business days of receipt of the approved termination request to confirm to EIC Staff that it has substituted with another Certified Business, or with a non-Certified Business if the EIC Program has approved.

If the Termination and Substitution Request submitted by the Contractor is denied, the Contractor must utilize the Certified Business on the project as initially listed on the EIC Utilization Form or be found in noncompliance.

2. **Reasonable justifications for Termination**
   For purpose of the EIC Program, reasonable justifications for termination are included in this list below but not limited to:

   a. The listed Certified Business refuses or fails to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that reasonable excuse does not exist if the failure of the Certified Business to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor.

   b. Failure or refusal of the Certified Business to perform work for reasons other than contract term or pricing disputes.
c. The listed Certified Business fails or refuses to meet the Contractor’s reasonable, nondiscriminatory bond requirements.

d. The listed Certified Business is ineligible to work on City of Tacoma projects because of suspension or debarment.

e. The listed Certified Business voluntarily withdraws from the project and provides The City of Tacoma written notice of its withdrawal.

f. Death or disability of the principal of the Certified Business rendering it unable to perform the work.

g. Dissolution of the Certified Business.

h. A change in scope of the contract requested by the City which removes the work scope for the Certified Business from the project.

i. The Certified Business does not execute an offered contract that reflects the terms and pricing agreed upon as a condition of participation in the project. The Contractor must provide evidence that the Certified Business failed to execute a contract offered which reflected such agreements, after the Certified Business was given adequate time to execute the offered contract.

3. Decertification

When a Certified Business is “decertified” by OMWBE the participation of that Certified Business shall continue to count as EIC participation so long as the subcontract with the Certified Business was executed prior to the effective date of decertification.

If the Certified Business did not have an executed contract with the Contractor at effective date of decertification, the Contractor must demonstrate to the satisfaction of the Project Delivery team and to the EIC Program that it has substituted a different Certified Business.
VIII. NON-COMPLIANCE: FINDING OF VIOLATION AND PENALTIES

A. Circumstances for finding a Contractor in Violation

The following circumstances, if found by the EIC Program Manager, are grounds for a determination by the Community and Economic Development Department (CEDD) Director of Contractor violation and a recommendation by the CED Director to the City Manager or the Director of Utilities that a penalty be imposed consistent with TMC 1.07.010:

1. A Contractor’s failure to utilize a Certified Business required by an awarded Contract (unless the Certified Business participation is properly terminated or substituted by application of the process contained in these Regulations) for at least the corresponding dollar amount listed on the submitted EIC Utilization Form.

2. A Contractor’s failure to utilize the B2Gnow system in the manner required by these Regulations. Before a violation will be found for Contractor’s failure to utilize B2Gnow the following process steps will be taken:
   a. If a Contractor does not report payment in the B2Gnow system within the first 2 months of the start of the project, EIC Staff will give the Contractor a verbal notice, followed by an email offering assistance with B2Gnow if needed.
   b. If in the third month following the start of the project Contractor still does not report payment in the B2Gnow system EIC Staff will send a second notice via email with a copy to the Project Delivery Team.
   c. If the Contractor has failed to report payment in the B2Gnow system within 14 days of the second notice, a third notice will be sent with a copy to the Project Delivery Team.
   d. If after three notices, Contractor fails to report payment in the B2Gnow system, EIC Staff will notify the Project Delivery Team that the EIC Staff intends to recommend to the City Manager or Utilities Director that a violation be found, and a penalty imposed.

3. A Contractor’s failure to pay their subcontractor within 10 days after receipt of payment per RCW 39.04.250 (1)
   i. If a contractor fails to pay their subcontractor within 10 days, EIC Staff will send 3 notices (via email).
ii. If after three notices Contractor fails to pay their subcontractor, EIC Staff will notify the Project Delivery Team that the EIC Staff intends to recommend to the City Manager or Utilities Director that a violation be found, and a penalty imposed.

B. Contractor Non-Compliance, Finding of Violation and Enforcement

If the EIC Program Manager, in collaboration with the Project Delivery Team, determines a Contractor is non-compliant with the EIC Requirements of the Contract or any other requirements contained in TMC Chapter 1.07 or these Regulations and therefore in violation of the EIC Program requirements, the following process for enforcement will be followed:

1. EIC Staff will send a Notice of Violation to the Contractor via USPS Certified Mail®, with a courtesy copy sent to Contractor via email and with a copy to the Project Delivery Team. The Notice of Violation will specify the non-compliance that is the basis for the finding of violation and will state the City’s intent to exercise all applicable remedies, including penalties authorized by TMC 1.07.110.

2. The Notice of Violation will specify that the Contractor can appeal the finding of Violation to the Hearing Examiner pursuant to Chapter 1.23 TMC and will state that, unless appealed or remedied, each specified violation becomes final on the 10th business day from the day the Notice has been received by the Contractor.

3. The Notice of Violation will inform the Contractor that the Violation may be remedied, and no penalty will be sought, if, within 10 business days of the date of the Notice of Violation, the Contractor achieves compliance or submits a plan to achieve compliance and receives EIC Staff approval of the plan. A document for guidance on how to achieve compliance can be located in Appendix No. 6 to these Regulations.

4. Compliance plans shall be submitted to EIC Staff and reviewed by EIC Staff and the Project Delivery Team. EIC Staff will recommend valid compliance plans to the CEDD Director for approval.

5. If the Contractor does not respond to the notice by achieving compliance or by appealing the violation within 10 days or if Contractor’s timely submitted compliance plan is not approved, the EIC Program Manager in collaboration with the CEDD Director and the Project Delivery Team will request the City Manager or Director of Utilities to impose one or more of the following penalties contained in TMC 1.07.110 A.

   a. Publish notice of the contractor’s noncompliance on the City of Tacoma Equity in Contracting webpage.
   b. Cancel, terminate, or suspend the contractor’s contract, or portion thereof.
   c. Withhold funds due contractor until compliance is achieved; and/or
d. Disqualification of eligibility for future contract awards by the City (debarment) per Section 1.06.279 TMC.

e. Other appropriate recommended penalty

6. Approval of City Manager or Director of Utilities to Impose Penalties

   a. The EIC Program Manager and CEDD Director will utilize the Prime Contractor Sanction Request Form found in Appendix No. 6 to these Regulations to inform the City Manager or the Director of Utilities that a Notice of Violation has become final (not appealed, not reme­died by compliance or an approved compliance plan) and request the City Manager or Director of Utilities to approve the recommended penalty authorized by TMC 1.07.110 and/or to im­pose any different or additional appropriate penalty.

   b. If the request for penalty is approved, the EIC Staff will notify the Contractor and the Project Delivery Team of the imposition of the penalty by sending the Prime Contractor Notice of Violation form contained in Appendix No. 7 to these Regulations to the Contractor by US Mail and with a courtesy copy sent by email. The Notice of Penalty form will inform the Contractor that the stated penalty becomes effective on the tenth business day following receipt of the Notice of Penalty unless Contractor appeals the penalty to the Hearing Examiner pursuant to Chapter 1.23 TMC or achieves compliance.

7. Publication of Contractor’s Non-Compliance

   If the penalty of publication of notice of Contractor’s noncompliance (TMC 1.07.110 A 2) is imposed, the non-compliant Contractor’s firm name and the nature of the violation will be posted on the City of Tacoma Equity in Contracting Program website Equity in Contracting – City of Tacoma.

8. Cancellation of Penalty upon approved Contractor’s Correction of Violation

   a. A Contractor has 10 business days from receipt of a Notice of Penalty to achieve compliance or submit a plan to achieve compliance. EIC Staff in consultation with the Project Delivery Team will determine if compliance is achieved or if the compliance plan is recommended for approval by the CEDD Director.

   b. If it is determined that the Contractor has come into compliance with the EIC Requirements, or has an approved plan to achieve compliance, the penalty may be cancelled at the discretion of the CEDD Director.

   c. If a penalty is cancelled, other applicable steps will follow. For example, if the Contract had been suspended, it will be resumed. If notice of Contractor’s violation has been published, the notice will be removed from City’s website. If funds have been withheld, payments will be resumed etc.
d. If Contractor’s compliance plan is not approved, the penalty will remain in place, however, EIC Staff will continue to work with Contractor and Project Delivery Team to attempt to achieve compliance.

IX. EIC Project Closeout Process

Upon receipt of notice from the Project Delivery Team that the project is physically completed, EIC Staff will:

A. Run B2Gnow Contract Summary Report to ensure that EIC Contract Requirements have been satisfied.
B. Check with Local Employment & Apprenticeship Training Program (LEAP) Staff to ensure LEAP Requirements have been satisfied and the project is ready to close on LCPtracker.
C. If EIC Contract Requirements are not met, EIC Staff will contact the Contractor via email with copy to the Project Delivery Team and request the Contractor provide an explanation in writing of the discrepancy between EIC Contract Requirements and the final outcomes via email to the Project Delivery Team and to EIC Staff at EICOFFICE@CITYOFTACOMA.ORG. EIC Staff and the Project Delivery Team will review and file explanation in B2Gnow files.
D. If Contract Requirements are not met by the final outcomes and Contractor’s explanation for the discrepancy is not satisfactory EIC Staff and the Project Delivery Team may recommend a violation be found and penalty requested.
E. If Contract Requirements are met, send email to Contractor from EICOFFICE@CITYOFTACOMA.ORG with a copy to the Project Delivery Team.

X. Certified Business Complaint Process

A. A Certified Business may submit a complaint regarding any EIC related issues utilizing three options listed below:
   - By sending an email to the EIC Staff at EICOFFICE@CITYOFTACOMA.ORG.
   - By filling out the EIC Complaint Form available on The City of Tacoma Equity in Contracting webpage. See EIC Complaint Form as shown at Appendix No. 9 to these Regulations.
   - By calling the EIC Office line at (253) 591-5630

When a complaint has been received, EIC Staff will take the following steps:

- Record the complaint in the EIC Complaint log Database
- Send a message to the complainant acknowledging the receipt and recording of the complaint and informing complainant that an investigation will take place.
- As deemed appropriate, perform an investigation
- If an investigation is conducted, a report will be produced including a timeline of events and findings.
- Submit any final report to the EIC Program Manager for action as appropriate.
APPENDICES
Available upon request to EICOOffice@cityoftacoma.org

1. EIC Requirement Setting Methodology
2. Guidance on selecting Option 2: EIC overall Requirements
3. EIC Utilization Form
4. EIC Post Submittal Waiver Request Form
5. EIC Certified Business Termination and Substitution Request
6. EIC Guidance on Compliance Achievement Plan
7. Notice of Contractor’s Violation Form
8. EIC Sanction(s) Request Form
9. Subcontractor Complaint Form
TITLE 1

Administration and Personnel
CHAPTER 1.07
EQUITY IN CONTRACTING

Sections:
1.07.010 Policy and purpose.
1.07.020 Definitions.
1.07.030 Discrimination prohibited.
1.07.040 Program administration.
1.07.050 Repealed.
1.07.060 Program requirements.
1.07.070 Evaluation of submittals.
1.07.080 Contract compliance.
1.07.090 Program monitoring.
1.07.100 Enforcement.
1.07.110 Remedies.
1.07.120 Unlawful acts.
1.07.130 Severability.
1.07.140 Review of program.

1.07.010 Policy and purpose.
It is the policy of the City of Tacoma that citizens be afforded an opportunity for full participation in our free enterprise system and that historically underutilized business enterprises shall have an equitable opportunity to participate in the performance of City contracts. The City finds that in its contracting for supplies, services and public works, there has been historical underutilization of small and minority-owned businesses located in certain geographically and economically disfavored locations and that this underutilization has had a deleterious impact on the economic well-being of the City. The purpose of this chapter is to remedy the effects of such underutilization through use of narrowly tailored contracting requirements to increase opportunities for historically underutilized businesses to participate in City contracts. It is the goal of this chapter to facilitate a substantial procurement, education, and mentorship program designed to promote equitable participation by historically underutilized businesses in the provision of supplies, services, and public works to the City. It is not the purpose of this chapter to provide any person or entity with any right, privilege, or claim, not shared by the public, generally, and this chapter shall not be construed to do so. This chapter is adopted in accordance with Chapter 35.22 RCW and RCW 49.60.400.

(Ord. 28625 Ex. A; passed Nov. 5, 2019; Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.020 Definitions.
Terms used in this chapter shall have the following meanings unless defined elsewhere in the Tacoma Municipal Code (“TMC”), or unless the context in which they are used clearly indicates a different meaning.

1.07.020.B
A. “Bid” means an offer submitted by a Respondent to furnish Supplies, Services, and/or Public Works in conformity with the Specifications and any other written terms and conditions included in a City request for such offer.

B. “Bidder” means an entity or individual who submits a Bid, Proposal or Quote. See also “Respondent.”

1.07.020.C
“A Certified Business” means an entity that has been certified as a Disadvantaged Business Enterprise (“DBE”), Small Business Enterprise (“SBE”), Minority Business Enterprise (“MBE”), Women Business Enterprise (“WBE”), or Minority and Women’s Business Enterprise (“MWBE”) by the Washington State Office of Minority and Women’s Business Enterprise.

“City” means all Departments, Divisions and agencies of the City of Tacoma.

“Contract” means any type of legally binding agreement regardless of form or title that governs the terms and conditions for provision of supplies, services, or public works to the City. Contracts include the terms and conditions found in Specifications, Bidder or Respondent Submittals, and purchase orders issued by the City.

“Contractor” means any Person that presents a Submittal to the City, enters into a Contract with the City, and/or performs all or any part of a Contract awarded by the City, for the provision of Public Works, or Non-Public Works and Improvements, Supplies or Services.
1.07.020.G
“Goals” means the annual level of participation by Certified Businesses in City Contracts as established in this chapter, the Program Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations. Goals or requirements for individual Contracts may be adjusted as provided for in this chapter or in regulations and shall not be construed as a minimum for any particular Contract or for any particular geographical area.

1.07.020.N
Reserved.

1.07.020.P
“Person” means individuals, companies, corporations, partnerships, associations, cooperatives, any other legally recognized business entity, legal representative, trustee, or receivers.

“Program Manager” means the individual appointed, from time to time, by the City’s Community and Economic Development Director to administer the Program Regulations.

“Program Regulations” means the written regulations and procedures adopted pursuant to this chapter for procurement of Supplies, Services and Public Works.

“Proposal” means a written offer to furnish Supplies or Services in response to a Request for Proposals. This term may be further defined in the Purchasing Policy Manual and/or in competitive solicitations issued by the City.

“Public Works (or “Public Works and Improvements”)” means all work, construction, alteration, repair, or improvement other than ordinary maintenance, executed at the cost of the City, or that is by law a lien or charge on any property therein. This term includes all Supplies, materials, tools, and equipment to be furnished in accordance with the Contract for such work, construction, alteration, repair, or improvement.

1.07.020.Q
“Quote” means a competitively solicited written offer to furnish Supplies or Services by a method of procurement that is less formalized than a Bid or a Proposal. This term may be further defined in the Purchasing Policy Manual.

1.07.020.R
“Respondent” means any entity or Person, other than a City employee, that provides a Submittal in response to a request for Bids, Request for Proposals, Request for Qualifications, request for quotes or other request for information, as such terms are defined in Section 1.06.251 TMC. This term includes any such entity or Person whether designated as a supplier, seller, vendor, proposer, Bidder, Contractor, consultant, merchant, or service provider that; (1) assumes a contractual responsibility to the City for provision of Supplies, Services, and/or Public Works; (2) is recognized by its industry as a provider of such Supplies, Services, and/or Public works; (3) has facilities similar to those commonly used by Persons engaged in the same or similar business; and/or (4) distributes, delivers, sells, or services a product or performs a Commercially Useful Function.

1.07.020.S
“Services” means non-Public Works and Improvements services and includes professional services, personal services, and purchased services, as such terms are defined in Section 1.06.251 TMC and/or the City’s Purchasing Policy Manual.

“Submittal” means Bids, Proposals, Quotes, qualifications or other information submitted in response to requests for Bids, Requests for Proposals, Requests for Qualifications, requests for Quotations, or other City requests for information, as such terms are defined in Section 1.06.251 TMC.

“Supplies” means materials, Supplies, and other products that are procured by the City through a competitive process for either Public Works procurement or Non-Public Works and Improvements procurement unless an approved waiver has been granted by the appropriate authority.

1.07.020.T
“Tacoma Public Utilities Service Area” means any ZIP code in which Tacoma Public Utilities maintains infrastructure or provides retail services.

1.07.020.W
“Waiver” means a discretionary decision by the City that the one or more requirements of this chapter will not be applied to a Contract or Contracts.

(Ord. 28931 Ex. A; passed Jan. 9, 2024; Ord. 28766 Ex. A; passed June. 8, 2021; Ord. 28625 Ex. A; passed Nov. 5, 2019; Ord. 28274 Ex. A; passed Dec. 16, 2014; Ord. 28141 Ex. A; passed Mar. 26, 2013; Ord. 27867 Ex. A; passed Dec. 15, 2009)
1.07.030 Discrimination prohibited.

A. No person that is engaged in the construction of public works for the City, engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services to the City, shall discriminate against any other person on the basis of race, religion, color, national origin or ancestry, sex, gender identity, sexual orientation, age, marital status, familial status, or the presence of any sensory, mental or physical disability, or “pregnancy outcomes” under TMC 1.29.040, in employment. Such discrimination includes the unfair treatment or denial of normal privileges to a person as manifested in employment upgrades, demotions, transfers, layoffs, termination, rates of pay, recruitment of employees, or advertisement for employment.

B. The violation of the terms of RCW 49.60 or Chapter 1.29 TMC by any person that is engaged in the construction of public works for the City, is engaged in the furnishing of laborers or craftspeople for public works of the City, or is engaged for compensation in the provision of non-public works and improvements supplies and/or services shall result in the rebuttable presumption that the terms of this chapter have also been violated. Such violation may result in termination of any City contract the violator may have with the City and/or the violator’s ineligibility for further City Contracts.

(Ord. 28859 Ex. A; passed Nov. 22, 2022: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.040 Program administration.

A. The Community and Economic Development Director, or their designated Program Manager, shall be responsible for administering this chapter and obtaining compliance with respect to contracts entered into by the City and/or its contractors. It shall be the duty of the Director to pursue the objectives of this chapter by conference, conciliation, persuasion, investigation, or enforcement action, as may be necessary under the circumstances. The Director is authorized to implement an administrative and compliance program to meet these responsibilities and objectives.

B. The Director is hereby authorized to adopt and to amend administrative regulations known as the Program Regulations, to properly implement and administer the provisions of this chapter. The Program Regulations shall be in conformance with City of Tacoma policies and state and federal laws and be designed to encourage achievement of the Goals set forth herein.


1.07.050 Repealed by Ordinance No. 28931. Approval as a Certified Business.


1.07.060 Program requirements.

A. The program shall meet the following requirements:

1. Establishment of Annual Goals.

The Program Regulations adopted pursuant to this chapter shall state reasonably achievable cumulative annual goals for utilization of Certified Businesses in the provision of supplies, services, and public works procured by the City. Cumulative annual goals for the participation of Certified Businesses in City contracts shall be based on the number of qualified Certified Businesses operating within the Tacoma Public Utilities Service Area. The dollar value of all contracts awarded by the City to Certified Businesses in the procurement of supplies, services, and public works shall be counted toward the accomplishment of the applicable goal.

2. Application to Contracts.

The Program Manager shall establish department/division specific requirements for Certified Business participation in City contracts in accordance with this chapter and the Program Regulations.

B. Exceptions:

City departments/divisions or the Program Manager may request an exception to one or more of the requirements of this chapter as they apply to a particular Contract or Contracts. Exceptions may be granted in any one or more of the following circumstances:

1. Emergency:
The supplies, services and/or public works must be provided with such immediacy that neither the City nor the contractor can comply with the requirements herein. Such emergency will be deemed documented whenever a waiver of competitive solicitation for emergency situations is authorized under Tacoma Municipal Code Chapter 1.06.257 or as may be hereinafter amended.

2. Not Practicable:
The Contract involves special facilities or market conditions or specially tailored or performance criteria-based products, such that compliance with the requirements of this chapter would cause financial loss to the City or an interruption of vital services to the public. Such circumstances must be documented by the department/division awarding the Contract and approved by the senior financial manager or, for Contracts where the estimated cost is over $500,000 (excluding sales tax), approved by the Board of Contracts and Awards (“C&A Board”).

3. Sole source:
The supplies, services, and/or public works are available from only one feasible source, and subcontracting possibilities do not reasonably exist as documented by the department/division awarding the Contract and approved by the senior financial manager or, for Contracts where the estimated cost is over $500,000 (excluding sales tax), approved by the C&A Board.

The Contract or Contracts are the result of a federal, state or inter-local government purchasing agreement and the use of such agreement in lieu of a bid solicitation conducted by the City is approved by the senior financial manager.

5. Lack of Certified Businesses:
An insufficient number of qualified contractors exist to create any utilization opportunities as documented by the Program Manager.

C. Waiver:
If, after receipt of Submittals but prior to Contract award, it is determined that due to unforeseen circumstances, a full or partial waiver of requirements is in the best interests of the City, the Director or Superintendent of the department/division awarding the Contract may request in writing that the City Manager or designee, on behalf of General Government, or the Director of Utilities or designee, on behalf of the Department of Public Utilities, approve such waiver.

Waivers may be granted only after determination by the City Manager or Director of Utilities that compliance with the requirements of this chapter would impose unwarranted economic burden on, or risk to, the City of Tacoma as compared with the degree to which the purposes and policies of this chapter would be furthered by requiring compliance.

(Ord. 28931 Ex. A; passed Jan. 9, 2024; Ord. 28766 Ex. A; passed June. 8, 2021; Ord. 28625 Ex. A; passed Nov. 5, 2019; Ord. 28141 Ex. A; passed Mar. 26, 2013; Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.070 Evaluation of submittals.
A. All submittals for supplies, services, or public works and improvements contracts shall be evaluated for attainment of the Certified Business requirements established for that contract in accordance with this chapter and the Program Regulations.

B. The determination of Certified Business usage and the calculation of Certified Business requirements per this section shall include the following considerations:

1. General.
The dollar value of the Contract awarded by the City to a Certified Business in the procurement of supplies, services, or public works shall be counted toward achievement of the annual goal.

2. Supplies.
A Contractor may receive credit toward attainment of the Certified Business requirement(s) applicable to the Contract for expenditures for supplies obtained from a Certified Business; provided such Certified Business assumes the actual and contractual responsibility for delivering the supplies with its resources. The contractor may also receive credit toward attainment of the Certified Business goal for the amount of the commission paid to a Certified Business resulting from a supplies contract with the City; provided the Certified Business performs a commercially useful function in the process.

Any Contract awarded to a Certified Business or a bidder that utilizes a Certified Business as a subcontractor shall receive credit toward attainment of the Certified Business requirement(s) applicable to the Contract based on the percentage of
Certified Business usage stated in the bid. A contractor that utilizes a Certified Business as a subcontractor to provide services or public works shall receive a credit toward the contractor's attainment of the Certified Business requirement applicable to the contract based on the value of the subcontract with the Certified Business.

C. Evaluation of competitively solicited submittals for public works and improvements and for services when a requirement has been established for the contract to be awarded shall be as follows:

1. When contract award is based on price.

The lowest priced bid submitted by a responsive and responsible bidder will be reviewed to determine if it meets the requirement. Certified Businesses may self-count utilization or self-performance on such bids if they will perform the work for the scope the requirement is based upon. The Program Regulations may establish further requirements and procedures for self-utilization or self-performance by a bidder who is a Certified Business.

a. If the low bidder meets the stated Certified Business requirements, the bid shall be presumed the lowest and best responsible bid for contract award.

b. Any bidder that does not meet the stated Certified Business requirements shall be considered a non-responsible bidder unless a waiver of one or more of the requirements of this chapter is granted, in the City's sole discretion, pursuant to the criteria and processes in Tacoma Municipal Code 1.07.060.C.

2. When contract award is based on qualifications or other performance criteria in addition to price, solicitations shall utilize a scoring system that promotes participation by certified contractors. The Program Regulations may establish further requirements and procedures for final selection and contract award, including:

a. Evaluation of solicitations for Architectural and Engineering (A&E) services;

b. Evaluation and selection of submittals in response to requests for proposals; and

c. Selection of contractors from pre-qualified roster(s).


1.07.080 Contract compliance.

A. The contractor awarded a contract based on Certified Business participation shall, during the term of the contract, comply with the requirements established in said contract. To ensure compliance with this requirement following contract award, the following provisions apply:

1. Any substitutions for or failure to utilize or termination of Certified Businesses projected to be used must be approved in advance by the Program Manager. Substitution of one Certified Business with another shall be allowed where there has been a refusal to execute necessary agreements by the original Certified Business, a default on agreements previously made or other reasonable excuse; provided that the substitution does not increase the dollar amount of the bid.

2. Where it is shown that no other Certified Business is available as a substitute and that failure to secure participation by the Certified Business identified in the solicitation is not the fault of the respondent, substitution with a non-Certified Business shall be allowed; provided, that, the substitution does not increase the dollar amount of the bid.

3. If the Program Manager determines that the contractor has not reasonably and actively pursued the use of replacement Certified Business, such contractor shall be deemed to be in non-compliance.

B. Record Keeping.

All contracts shall require contractors to maintain relevant records and information necessary to document compliance with this chapter and the contractor's utilization of Certified Businesses, and shall include the right of the City to inspect such records.


1.07.090 Program monitoring.

A. An Advisory Committee shall monitor compliance with all provisions of this chapter and the related Regulations. The Program Manager shall establish procedures to collect data and monitor the effect of the provisions of this chapter to assure, insofar as is practical, that the remedies set forth herein do not disproportionately favor one or more racial, gender, ethnic, or other protected groups, and that the remedies do not remain in effect beyond the point that they are required to eliminate the
effects of under utilization in City contracting, unless such provisions are supported by a Disparity Study. The Program Manager shall have the authority to obtain from City departments/divisions, respondents, and contractors such relevant records, documents, and other information as is reasonably necessary to determine compliance.

B. The Program Manager shall submit an annual report to the Community and Economic Development Director, Director of Utilities, and the City Manager detailing performance of the program. The report shall document Certified Business utilization levels, waivers, proposed modifications to the program, and such other matters as may be specified in the Program Regulations.


1.07.100  Enforcement.

The Director, or designee, may investigate the employment practices of contractors to determine whether or not the requirements of this chapter have been violated. Such investigation shall be conducted in accordance with the procedures established in the Program Regulations.


1.07.110  Penalties.

A. Upon receipt of a determination of contractor violation by the Program Manager, the City Manager or Director of Utilities, as appropriate, may take the following actions, singly or together, as appropriate:

1. Forfeit the contractor’s bid bond and/or performance bond;
2. Publish notice of the contractor’s noncompliance;
3. Cancel, terminate, or suspend the contractor’s contract, or portion thereof;
4. Withhold funds due contractor until compliance is achieved;
5. Recommend disqualification of eligibility for future contract awards by the City (debarment) per Section 1.06.279 TMC; and/or
6. Any other appropriate action, including a monetary penalty as such penalties may be specified in Program Regulations.

B. Prior to imposing of any of the foregoing penalties, the City shall provide written notice to the contractor specifying the violation and the City’s intent to exercise such remedy or remedies. The notice shall provide that each specified remedy becomes effective within ten business days of receipt unless the contractor appeals said action to the Hearing Examiner pursuant to Chapter 1.23 TMC.

C. When non-compliance with this chapter or the Program Regulations has occurred, the Program Manager and the department/division responsible for enforcement of the contract may allow continuation of the contract upon the contractor’s development of a plan for compliance acceptable to the Director.


1.07.120  Unlawful acts.

It shall be unlawful for any Person to willfully prevent or attempt to prevent, by intimidation, threats, coercion, or otherwise, any Person from complying with the provisions of this chapter.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.130  Severability.

If any section of this chapter or its application to any Person or circumstance is held invalid by a court of competent jurisdiction, then the remaining sections of this chapter, or the application of the provisions to other Persons or circumstances, shall not be affected.

(Ord. 27867 Ex. A; passed Dec. 15, 2009)

(Updated 02/2024)
LEAP
LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM
ABBREVIATED PROGRAM REQUIREMENTS

LEAP is a mandatory City of Tacoma program adopted to provide employment opportunities for City of Tacoma residents and residents of Economically Distressed Areas of the Tacoma Public Utilities Service Area. Based on the dollar amounts and location of projects, it requires Prime Contractors performing qualifying public works projects or service contracts ensure that a percentage of the total labor hours worked on the project are performed by LEAP-Qualified local employees and/or LEAP-Qualified apprentices approved by the Washington State Apprenticeship Council (SAC), residents of Tacoma, residents of surrounding Economically Distressed Areas, and/or TPU Service Areas (as outlined below).

Compliance may be met as outlined in this specification.

Prime Contractors may obtain further information by contacting the City of Tacoma’s LEAP Coordinator, Deborah Trevorrow, at (253) 591-5590 or leap@cityoftacoma.org. The LEAP Coordinator can assist contractors in the recruitment of qualified entry-level workers to work on City of Tacoma Public Works projects. The LEAP Office is in the Tacoma Municipal Building, 747 Market Street, Rm 900.

LEAP PROGRAM REQUIREMENTS for this project:

1. APPRENTICE REQUIREMENT:
The Contractor is required to ensure that 15 percent of the total Labor Hours worked on this project are performed by apprentices approved by the WA State Apprenticeship Council and registered in the Apprenticeship Registration Tracking System.

2. SUBCONTRACTOR NOTIFICATION: Prime Contractors shall notify all Subcontractors of the LEAP Program requirement(s). Subcontractor labor hours may be utilized towards achievement of the LEAP Requirements. Owner/Operator hours may be used for the Local Employment Requirement.

3. FAILURE TO MEET LEAP UTILIZATION REQUIREMENT: Contractors shall be assessed an amount for each hour that is not achieved. The amount per hour shall be based on the percent of the requirement that is met. All rounding shall be done down to the nearest whole percent. The amount per hour that shall be assessed is as follows:

- 100% achievement $0.00 penalty
- 99% to 90% achievement $2.00 penalty
- 89% to 75% achievement $3.50 penalty
- 74% to 50% achievement $5.00 penalty
- 49% to 1% achievement $7.50 penalty
- 0% achievement $10.00 penalty
LEAP DOCUMENT SUBMITTALS**:

1. **LEAP EMPLOYEE VERIFICATION FORM**: upon request, the Contractor must provide the LEAP Office with a form for every person whom the contractor thinks will assist with attaining credit towards meeting the LEAP Utilization Requirements with at least one piece of verifying documentation. The LEAP Office staff will respond regarding whether or not the employee is LEAP-Qualified.

2. **WEEKLY CERTIFIED PAYROLL**: In LCP Tracker: the Prime and Subcontractors must submit weekly Certified Payrolls that include, employee name, address, social security number, craft/trade, class, hours worked on this job, rate of pay, and gross wages paid including benefits for this job.

3. **NO WORK PERFORMED STATEMENTS**: In LCP Tracker, if no work is performed, No Work Performed entries are required of the Prime and Subs.

4. **DEPARTMENT OF LABOR & INDUSTRIES (L&I)**: The Prime must enter the project in the L&I project site under the ‘Tacoma, City of’ account and notify the LEAP Office when this has been completed.

**WITHHOLDING PROGRESS PAYMENTS**: The LEAP Coordinator may withhold progress payments for failure to follow the above-outlined procedures
LEAP

Documents and Submittal Schedule

In the attached packet, you will find the LEAP documentation and forms that are required to be submitted by the Prime and Sub Contractors.

- **LEAP Abbreviated Program Requirements**: brief overview of LEAP Program requirements
- **LEAP Employee Verification Form**: to be submitted, upon request, for each employee who may be a LEAP-qualified employee

In addition, the City of Tacoma will also require from the Prime Contractor and all its Subcontractors:

- **Weekly Certified Payrolls or No Work Performed statements**: to be submitted via LCP Tracker weekly, biweekly or monthly.
- **Statement of Intent to Pay Prevailing Wages**: to be files with the Department of Labor and Industries prior to commencing work
- **Affidavit of Wages Paid**: to be submitted upon completion of each contractor’s work
- **Document Verification**: provide required information when requested from LEAP Office

Please submit above documents as instructed by the LEAP Coordinator.

If you have any questions or request further information, please feel free to contact the City of Tacoma’s LEAP Program at (253) 591-5590 or leap@cityoftacoma.org
CHAPTER 1.90
LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM

Sections:
1.90.010 Purpose.
1.90.020 Scope.
1.90.030 Definitions.
1.90.040 LEAP goals.
1.90.050 Repealed.
1.90.060 Effect of program on prime contractor/subcontractor relationship.
1.90.070 Apprentice utilization requirements – Bidding and contractual documents.
1.90.080 Enforcement.
1.90.090 Compliance with applicable law.
1.90.100 Review and reporting.
1.90.105 Authority
1.90.110 Interpretation.

1.90.010 Purpose.
The purpose of this Chapter is to establish a means of providing for the development of a trained and capable workforce possessing the skills necessary to fully participate in the construction trades.

(Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.020 Scope.
The provisions of this Chapter shall apply to all Public Works or Improvements funded in whole or in part with City funds or funds which the City expends or administers in accordance with the terms of a grant.

(Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.030 Definitions.
As used in this chapter, the following terms shall have the following meanings:
A. “Apprentice” shall mean a person enrolled in a course of training specific to a particular construction trade or craft, which training shall be approved by the Washington State Apprenticeship and Training Council established pursuant to RCW 49.04.010.
B. “Building Projects” shall mean all Public Works or Improvements having an Estimated Cost greater than $750,000.00, and for which a building permit must be issued pursuant to Chapter 1 of the current edition of the state building code (Uniform Building Code).
C. “City” shall mean all divisions and departments of the City of Tacoma, and all affiliated agencies, provided, however, that the Tacoma Community Redevelopment Authority shall not be included within this definition.
D. “Civil Projects” shall mean all Public Works or Improvements that are not defined as a “Building Project,” provided that those projects having an Estimated Cost of less than $250,000.00 shall not be included in this definition.
E. “Contractor or Service Provider” means a person, corporation, partnership, or joint venture entering into a contract with the City to construct a Public Work or Improvement.
F. “Director” shall mean the Director of Community and Economic Development, or the Director’s Designee.
G. “Economically Distressed ZIP Codes” shall mean ZIP codes in the Tacoma Public Utilities Service Area that meet two out of three (2/3) of the thresholds of:
   1. High concentrations of residents living under 200% of the federal poverty line in terms of persons per acre (69th percentile)
   2. High concentrations of unemployed people in terms of persons per acre (45th percentile)
   3. High concentrations of people 25 years or older without a college degree in terms of persons per acre (75th percentile)
Said thresholds shall be updated within 30 days following any Prevailing Wage updates issued by the Washington State Labor and Industry. All updates are to be published on the first business day in August and in February of each calendar year.
H. “Electrical Utility” and “Water Utility” shall mean, respectively, the Light Division of the Department of Public Utilities of the City of Tacoma, and shall include the electrical and telecommunications services of that Division, and the Water Division of the Department of Public Utilities of the City of Tacoma.

I. “Estimated Cost” shall mean the anticipated cost of a Public Work or Improvement, as determined by the City, based upon the expected costs of materials, supplies, equipment, and labor, but excluding taxes and contingency funds.

J. “Estimated Labor Hours” shall mean the anticipated number of Labor Hours determined by the City to be necessary to construct a Public Work or Improvement and set forth in the specifications for the project, or as may be subsequently revised due to contract or project adjustment, or pursuant to an agreed upon change order.

K. “Existing Employee” shall mean an employee whom the Contractor or Service Provider can demonstrate was actively employed by the Contractor or Service Provider for at least 1000 hours in the calendar year prior to bid opening plus one month following bid opening, and who was performing work in the construction trades.

L. “Labor Hours” shall mean the actual number of hours worked by workers receiving an hourly wage who are employed on the site of a Public Work or Improvement, and who are subject to state or federal prevailing wage requirements. The term “Labor Hours” shall include hours performed by workers employed by the Contractor or Service Provider and all Subcontractors, and shall include additional hours worked as a result of a contract or project adjustment or pursuant to an agreed upon change order. The term “Labor Hours” shall not include hours worked by workers who are not subject to the prevailing wage requirements set forth in either RCW 39.12 or the Davis-Bacon Act - 40 U.S.C. 276 (a).

M. “LEAP Coordinator” shall mean the City of Tacoma staff member who administers LEAP.

N. “LEAP Program” or “Program” shall mean the City of Tacoma’s Local Employment and Apprenticeship Training Program, as described in this chapter.

O. “LEAP Regulations” or “Regulations” shall mean the rules and practices established in this document.

P. “LEAP Utilization Plan” shall mean the document submitted by the Contractor to the LEAP Coordinator which outlines how the associated goals will be met on the project.

Q. “Priority Hire Resident” shall mean any resident within the Economically Distressed ZIP Codes.

R. “Project Engineer” shall mean the City employee who directly supervises the engineering or administration of a particular construction project subject to this chapter.

S. “Public Work or Improvement” shall have the same meaning as provided in Section 39.04.010 RCW, as that Section may now exist or hereafter be amended.

T. “Resident of Tacoma” shall mean any person, not defined as a Resident of the Community Empowerment Zone, who continues to occupy a dwelling within the boundaries of the City of Tacoma, has a present intent to continue residency within the boundaries of the City, and who demonstrates the genuineness of that intent by producing evidence that the person’s presence is more than merely transitory in nature.

U. “Service Area - Electrical” or “Electrical Service Area” shall mean that area served with retail sales by the Electrical Utility of the City of Tacoma at the time a bid is published by the Electrical Utility for a Public Work or Improvement to be performed primarily for the Electrical Utility.

V. “Service Area - Water” or “Water Service Area” shall mean that area served with retail sales by the water utility of the City of Tacoma at the time a bid is published by the water utility for a Public Work or Improvement to be performed primarily for the water utility.

W. “Service Contract” shall mean all City contracts relating to a Public Work or Improvement which utilize labor at a City site and which are not within the exceptions to nor defined as “Building Projects” or “Civil Projects.”

X. “Subcontractor” means a person, corporation, partnership, or joint venture that has contracted with the Contractor or Service Provider to perform all or part of the work to construct a Public Work or Improvement by a Contractor.

Y. “Tacoma Public Utilities” means the City of Tacoma, Department of Public Utilities.

Z. “Tacoma Public Utilities Service Area” shall mean every ZIP code listed by Tacoma Public Utilities as an area that either receives services or maintains infrastructure to provide services.

AA. Washington State Labor and Industry Prevailing Wage shall mean the hourly wage, usual benefits and overtime, paid in the largest city in each county, to the majority of workers, laborers, and mechanics. Prevailing wages are established, by the Department of Labor & Industries, for each trade and occupation employed in the performance of public work. They are established separately for each county, and are reflective of local wage conditions.
1.90.040 LEAP goals.

A. Utilization Goals.

1. All Contractors constructing Civil Projects or Building Projects, and all Service Providers involved with the construction of a Public Work or Improvement, shall ensure that at least 15 percent of the total Labor Hours actually worked on the Project are performed by persons having their residence within the boundaries of the City of Tacoma or Economically Distressed ZIP Codes, whether or not any such person is an Apprentice.

a. The thresholds for this section shall be $250,000.00 for Civil Projects and $750,000.00 for Building Projects.

2. Fifteen percent (15%) of the Total Labor Hours on contracts above one-million dollars ($1,000,000.00) shall have work performed by Apprentices who are residents of the Tacoma Public Utilities Service Area consistent with RCW 39.04.320(1)(a), subject to waiver based on exceptions as specified in RCW 39.04.320(2)(a), (b), and (c).

3. Labor Hours performed by non-residents of the State of Washington will be deducted from a project’s total Labor Hours for purposes of determining compliance with the requirements of this chapter.

4. All Contractors and Service Providers shall submit a LEAP Utilization Plan as provided for in the regulations adopted under this chapter, and shall meet with the LEAP Coordinator to review said Plan prior to being issued a Notice to Proceed. Failure to submit a LEAP Utilization Plan may be grounds for the City to withhold remittance of a progress payment until such Plan is received from the responsible Contractor or Provider. A meeting with the LEAP Coordinator prior to issuance of a Notice to Proceed shall be excused only when the LEAP Coordinator is unavailable to meet prior to the scheduled date for issuance of the Notice to Proceed and the Contractor and the LEAP Coordinator have otherwise scheduled a meeting for the coordinator to review the Contractor’s or Provider’s plan.

The Contractor or Service Provider shall be responsible for meeting the LEAP utilization goal requirements of the contract, including all amendments and change orders thereto, and shall be responsible for overall compliance for all hours worked by Subcontractors. To the extent possible, the Contractor or Service Provider shall recruit Apprentices from multiple trades or crafts.

B. Failure to Meet Utilization Goal.

1. Contracts for the construction of Building projects or Civil projects and Service Contracts shall provide that Contractors or Service Providers failing to meet the LEAP utilization goals shall be assessed an amount for each hour that is not achieved. The amount per hour shall be based on the extent the Contractor or Service Provider met its goal. The amount per hour that shall be assessed shall be as follows:

<table>
<thead>
<tr>
<th>Percent of Goal Met</th>
<th>Assessment per unmet hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>$ 0.00</td>
</tr>
<tr>
<td>90% - 99%</td>
<td>$ 2.00</td>
</tr>
<tr>
<td>75% to 89%</td>
<td>$ 3.50</td>
</tr>
<tr>
<td>50% to 74%</td>
<td>$ 5.00</td>
</tr>
<tr>
<td>1% to 49%</td>
<td>$ 7.50</td>
</tr>
<tr>
<td>0%</td>
<td>$10.00</td>
</tr>
</tbody>
</table>

When determining the percent of goal that is met, all rounding shall be down to the nearest whole percent. No penalty shall be waived by the City unless it is determined by the Director to be in the best interests of the City, which determination shall be made after consultation with the LEAP Coordinator.

2. Deposit of Assessments. All assessments imposed pursuant to this section shall be deposited into a separate account and utilized to support the City’s pre-apprenticeship and training program. The policies and regulations adopted by the City Manager and Director of Utilities pursuant to this chapter shall address issues pertaining to a Contractor’s existing workforce. Contributions need not be made for Labor Hours that have been adjusted in accordance with Section 1.90.040(E).

C. LEAP Reports.

Notwithstanding the provisions of TMC 1.90.100, the Director shall, not less than annually, publish a LEAP report setting forth Contractor compliance with this chapter. Said report shall include information on all contracts and all Contractors to which this chapter applies, and shall detail the level and nature of LEAP participation by contract and by Contractor, The
Director’s LEAP report may include such other information as may be helpful to assuring fair and accurate representation of the contracts, Contractors or projects covered in the report. The Director’s LEAP reports may be considered by the Board of Contracts and Awards in its determinations as to bidder responsibility.

D. LEAP Goal Adjustments.

1. LEAP utilization goals may be adjusted prior to bid opening and/or as a result of a contract amendment or change order on a Building Project, Civil Project, or Service Contract.

   a. If LEAP utilization goals are adjusted prior to bid opening, they shall be set forth in the bid or Request For Proposal advertisement and specification documents or in an addendum timely provided to prospective bidders, provided that such adjustment shall be based upon a finding by the Project Engineer that the reasonable and necessary requirements of the contract render LEAP utilization unfeasible at the required levels. The Director shall concur with the Project Engineer’s finding, provided that should the Project Engineer and the Director fail to reach agreement on the Project Engineer’s finding, then in that circumstance the matter shall be referred to the City Manager or the Director of Utilities, as appropriate, for ultimate resolution. Notwithstanding any other provision of this chapter to the contrary, the decision of the City Manager or the Director of Utilities with regard to LEAP goal adjustment may not be appealed.

   b. If LEAP utilization goals are adjusted due to contract amendment or change order, the amount of adjustment shall be consistent with the utilization goals set forth in this chapter and shall be determined pursuant to regulations adopted pursuant to this chapter for administration of LEAP utilization goal adjustments.

2. The methodology of determining the appropriate adjustments to LEAP utilization goals shall be determined in consultation with the LEAP Advisory Committee, established pursuant to this ordinance for so long as the LEAP Advisory Committee remains in existence.

3. LEAP utilization goals shall not apply to those portions of a project that are funded by sources other than (a) City funds, or (b) funds which the City expends or administers in accordance with the terms of a grant to the City, provided that the Project Engineer shall notify the Director of such non-application prior to bid advertisement. For the purposes of this paragraph, credits extended by another entity for the purpose of providing project funding shall not be considered to be City funds.

E. Utilization - Electrical Projects Outside Electrical Service Area.

Civil Projects or Building Projects that are constructed primarily for the benefit or use by the City’s Electrical Utility, which are wholly situated outside the Electrical Service Area, and for which the estimated cost is less than $1,000,000.00, are exempt from the requirements of this chapter.

F. Utilization - Water Projects Outside Water Service Area.

Civil Projects or Building Projects that are constructed primarily for the benefit or use by the City’s water utility, which are wholly situated outside the Water Service Area, and for which the estimated cost is less than $1,000,000.00 are exempt from the requirements of this chapter.

G. Utilization - Projects Outside Tacoma Public Utilities Service Area.

Civil Projects or Building Projects that are constructed primarily for the benefit or use by Tacoma Public Utilities, which are wholly situated outside the retail service area of the Tacoma Public Utilities Service Area, and for which the estimated cost is less than $1,000,000.00 are exempt from the requirements of this chapter. Projects wholly situated outside the Tacoma Public Utilities Service Area, and for which the estimated cost is more than $1,000,000.00, shall be exempt from 15% utilization goal specified in subsection A1. of this section. The 15% utilization goal specified in subsection A2. of this section may be met if project work is performed by Apprentices who are enrolled in a course of training specific to a particular construction trade or craft, provided such training has been approved by the Washington State Apprenticeship and Training Council in accordance with Chapter 49.04, RCW.

H. Emergency.

This chapter shall not apply in the event of an Emergency. For the purposes of this section, an “Emergency” means unforeseen circumstances beyond the control of the City that either: (a) present a real, immediate threat to the proper performance of essential functions; or (b) will likely result in material loss or damage to property, bodily injury, or loss of life if immediate action is not taken.

I. Conflict with State or Federal Requirements.

If any part of this chapter is found to be in conflict with federal or state requirements which are a prescribed condition to the allocation of federal or state funds to the City, then the conflicting part of this chapter is inoperative solely to the extent of the conflict and with respect to the City departments directly affected. This provision does not affect the operation of the
remainder of this chapter. Administrative rules or regulations adopted under this chapter shall meet federal and state requirements which are a necessary condition to the receipt of federal or state funds by the City.

(Ord. 28520 Ex. A; passed Jul. 17, 2018; Ord. 28147 Ex. B; passed May 7, 2013; Ord. 27815 Ex. A; passed Jun. 30, 2009; Ord. 27368 § 2; passed Jun. 21, 2005; Ord. 26992 § 1; passed Oct. 15, 2002; Ord. 26698 § 2; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.050  Repealed by Ord. 27368. Good faith efforts.

(Ord. 27368 § 3; passed Jun. 21, 2005; Ord. 26998 § 3; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.060  Effect of program on prime contractor/service provider - subcontractor relationship.

The LEAP Program shall not be construed so as to modify or interfere with any relationship between any Contractor or Service Provider and Subcontractor. The LEAP Program shall not grant the City any authority to control the manner or method of accomplishing any construction work that is additional to any authority retained by the City in a Public Works contract.

(Ord. 26698 § 4; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.070  A. Apprenticeship utilization requirements – Bidding and contractual documents.

All packages of bid documents for every Building Project and every Civil Project shall incorporate provisions satisfactory to the City Attorney so as to allow enforcement of the provisions contained in this Chapter. Such contractual provisions may include liquidated damages, calculated to reimburse the City for the Contractor’s breach of these performance requirements, which shall be published with the City’s call for bids.

(Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.080  Enforcement.

A. The Director shall review the Contractor’s or Service Provider’s and all Subcontractor’s employment practices during the performance of the work for compliance with LEAP Program requirements. On-site visits may be conducted as necessary to verify compliance with the requirements of the LEAP Program. The Contractor, Service Provider, or Subcontractors shall not deny to the City the right to interview its employees, provided that the Director shall make reasonable efforts to coordinate employee interviews with employers.

B. Any knowing failure or refusal to cooperate in compliance monitoring may disqualify the defaulting Contractor, Service Provider, or Subcontractor from eligibility for other City contracts.

C. The making of any material misrepresentation may disqualify the defaulting Contractor, Service Provider, or Subcontractor from eligibility for other City contracts.

D. Any action by the City, its officers and employees, under the provisions of this Chapter may be reviewed by the Board of Contracts and Awards, upon written application of the party so affected. Application shall be made within twenty (20) days of the date of the action upon which the appeal is based, and provided to the City by certified mail or by personal service. Any action taken by the Board of Contracts and Awards may be appealed to the City Council or Public Utility Board, as appropriate, and thereafter if desired, to the Superior Court of Pierce County, Washington, within fifteen (15) days of the previous decision.

(Ord. 26698 § 5; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.090  Compliance with applicable law.

Nothing in this Chapter shall excuse a Prime Contractor, Service Provider, or Subcontractor from complying with all relevant federal, state, and local laws.

(Ord. 26698 § 6; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

1.90.100  Review and reporting.

The City Manager and Director of Utilities shall review the Program on or before January 1, 2000, and every two (2) years thereafter, and shall report to the City Council and Public Utility Board the Manager’s and Director’s findings, conclusions, and recommendations as to the continued need for the Program, and any revisions thereto that should be considered by the Council and Board.
(Ord. 26301 § 1; passed Oct. 6, 1998)

**1.90.105 Authority.**

The City Manager and the Director of Utilities shall have authority to jointly adopt policies and regulations consistent with this chapter to implement the LEAP program.

(Ord. 26698 § 7; passed Sept. 12, 2000; Ord. 26301 § 1; passed Oct. 6, 1998)

**1.90.110 Interpretation.**

This Chapter shall not be interpreted or construed so as to conflict with any state or federal law, nor shall this Chapter be enforced such that enforcement results in the violation of any applicable judicial order.

(Ord. 26301 § 1; passed Oct. 6, 1998)
LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM (LEAP)

The LEAP office enforces post-award mandatory requirements. Bidders do not have to submit any information in the bid submittal package to be in compliance with LEAP.

Post-award:

- **Provide information to the LEAP Office (see LEAP contact information below).** Provide the name and email address of the person(s) who will oversee LEAP utilization and payrolls.

- **LEAP Employee Verification.** Proof of residency may be requested for employees who may be LEAP-Qualified and may be able to help meet the LEAP Requirements.

- **All certified payrolls and No Work Performed Statements.** The Prime contractor is responsible for ensuring their, and their subcontractors’, payrolls are submitted via LCP Tracker. By submitting payrolls in LCP Tracker before the Labor & Industry’s website, you can reduce data entry.

The City of Tacoma’s LEAP office enforces varying workforce utilization requirements based on project parameters per Tacoma Municipal Code.

If the project is located outside of the retail service area of the Tacoma Public Utilities Service Area, then a 15% Apprentice Utilization Requirement is applied.

This project is subject to the:

**Apprenticeship Only Requirement** - the Prime Contractor performing a qualifying public work or improvement must ensure that 15 percent of the total labor hours worked on the project are performed by apprentices who are registered in the Department of Labor and Industries Apprentice Registration Tracking System.

LEAP staff can assist contractors in identifying qualified City of Tacoma residents, Economically Distressed Area residents, and Apprentices. Contractors may obtain further information by contacting the City’s LEAP Office at (253) 591-5590. The LEAP Office is located in the Tacoma Municipal Building, 747 Market Street, Room 900, Tacoma, WA 98402.

www.cityoftacoma.org/leap

Revised 09-2022   DT
LEAP EMPLOYEE VERIFICATION FORM
Submit upon request from LEAP Office

Contractor/Sub: ______________________________ Specification Number: ______________________________

Project Description: __________________________________________________________________________

Employee Name: ______________________________ Craft: ______________________________

Ethnic Group (optional):    □ Asian/Pac Isl. □ Black □ Hispanic □ Native American □ White □ Other

Gender (optional):    □ MALE     □ FEMALE

Complete Physical Address (No PO Boxes): __________________________________________________________

City:_________ State:_______ Zip:_______ Telephone:_________ Date of Hire:_________

Apprenticeship County:_________ Apprentice Registration I.D. (if applicable): ______________

Age:______ Copy of DD-214:_______

*******Please fill out entire form for tracking LEAP performance*******

LEAP qualified employee categories: (check all that apply and provide evidence for each check)

_____ a. Resident (journey level or certified apprentice) within the geographic boundaries of the City of Tacoma

_____ b. Resident (journey level or certified apprentice) within Economically Distressed ZIP Codes of the Tacoma Public Utilities Service Area

_____ c. WA State Approved Apprentice living in the Tacoma Public Utilities Service Area (Only valid for projects over $1,000,000)

_____ d. WA State Approved Apprentice *
(Only valid for contracts where 100% of work is performed outside of the Tacoma Public Utilities Service Area)

Signature of Employee:_________________________________________ Date:________________________

Contractor Representative:____________________________________ Date:_______________________
LEAP EMPLOYEE VERIFICATION FORM

To be Completed by Contractor or Subcontractor

Please attach a legible copy of one or more of the following document(s) showing the address of residence as proof of local Washington State residency.

...................................................................................................................................................................................

_____ Driver's License with current address

_____ Utility Bill/Phone Bill/Cell Bill/Cable Bill with current address

_____ Copy of current tax form W-4

_____ Rental Agreement/Lease (residential)

_____ Computer Printout From Other Government Agencies

_____ Property Tax Records

_____ Apprentice Registration I.D.

_____ Food Stamp Award Letter

_____ Housing Authority Verification

_____ Insurance Policy (Residence/Auto)

*Any of the above must have a complete physical address verified by the www.govme.org website.

No PO Boxes

Contractor Representative: ___________________________ Date: ________________

Title: ___________________________________________________________________
GENERAL CONDITIONS AND OTHER CONTRACT TERMS & CONDITIONS

1. CITY OF TACOMA, GENERAL PROVISIONS
2. MODIFICATIONS TO THE GENERAL CONDITIONS, AS MODIFIED BY THE CITY OF TACOMA
3. GENERAL CONDITIONS FOR WASHINGTON STATE FACILITY CONSTRUCTION
GENERAL PROVISIONS
(Revised December 15, 2020)

SECTION I - BIDDING REQUIREMENTS
SECTION I REQUIREMENTS ARE BINDING ON ALL RESPONDENTS.

1.01 USE AND COMPLETION OF CITY PROPOSAL SHEETS

A. Respondent’s Proposal

Each Respondent must bid exactly as specified on the Proposal sheets. All proposals must remain open for acceptance by the City for a period of at least 60 calendar days from the date of opening of the bids.

B. Alterations of Proposals Not Allowed

Proposals that are incomplete or conditioned in any way contain alternatives or items not called for in the General Provisions and Specifications, or not in conformity with law may be rejected as being nonresponsive. The City cannot legally accept any proposal containing a substantial deviation from these Specifications.

C. Filling Out City Proposal Sheets

All proposals must be completed using the proposal sheets and forms included with this specification, and the prices must be stated in figures either written in ink or typewritten. No proposal having erasures or interlinearations will be accepted unless initialed by the Respondent in ink.

1.02 CLARIFICATION OF PROPOSAL FOR RESPONDENT

If a prospective Respondent has any questions concerning any part of the Proposal, he/she may submit a written request for answer of his/her questions. Any interpretation of the Proposal will be made by an Addendum duly issued and mailed or delivered to each prospective Respondent. Such addendum must be acknowledged in the proposal. The City of Tacoma will not be responsible for any other explanation or interpretation of the bid documents.

1.03 RESPONDENT’S BOND OR CERTIFIED CHECK

Each bid for construction must be accompanied either by a certified or cashier’s check for 5 percent of the total amount bid, including tax, payable to the City Treasurer, or an approved bid bond, by a surety company authorized to do business in the State of Washington, for 5 percent of the total amount bid. The person legally authorized to sign the bid must sign all bid bonds. The approved bid bond form attached to these Specifications should be used: no substantial variations from the language thereof will be accepted.

If a bid bond is used, the 5 percent may be shown either in dollars and cents, or the bid bond may be filled in as follows, “5 percent of the total amount of the accompanying proposal.”

The check of the successful Respondent will be returned after award of the Contract, acceptance of the Payment and Performance Bond and City’s receipt of the signed Contract. The checks of all other Respondents will be returned immediately upon the award of the Contract. Bid bonds will not be returned.

1.04 DELIVERY OF PROPOSALS TO THE CITY’S PURCHASING OFFICE

A. Proposal packages must be received by the City’s Procurement and Payables Division in SAP Ariba (unless another form of delivery is stated), prior to the scheduled time and date stated in the Solicitation.

B. Supplier is solely responsible for timely delivery of its Submittal.

C. Submittals received after the time stated in the solicitation will not be accepted.

D. For purposes of determining whether a Submittal has been timely received in SAP Ariba, the City’s Procurement and Payables Division will rely on the submittal clock in SAP Ariba.
1.05 LICENSES/PERMITS

A. Suppliers, if applicable, must have a Washington state business license at the time of Submittal and throughout the term of the Contract. Failure to include a Washington state business license may be grounds for rejection of the Submittal or cancellation of contract award. Information regarding Washington state business licenses may be obtained at http://bls.dor.wa.gov.

B. Upon award, it is the responsibility of the Supplier to register with the City of Tacoma's Tax and License Division, 733 South Market Street, Room 21, Tacoma, WA 98402-3768, 253-591-5252. https://www.cityoftacoma.org/government/city_departments/finance/tax_and_license/. Supplier shall obtain a business license as is required by Tacoma Municipal Code Subtitle 6C.20.

C. During the term of the Contract, Supplier, at its expense, shall obtain and keep in force any and all necessary licenses and permits.

1.06 CONTRACTOR'S STATE REGISTRATION NUMBER

Contractors for construction or public works construction are required to be licensed by the state. If the provisions of Chapter 18.27 of the Revised Code of Washington apply to the Respondent, then the Respondent's Washington State Contractor's Registration No. must accompany the bid.

1.07 BID IS NONCOLLUSIVE

The Respondent represents by the submission of the Proposal that the prices in this Bid are neither directly nor indirectly the result of any formal or informal agreement with another Respondent.

1.08 EVALUATION OF BID

A. Price, Experience, Delivery Time and Responsibility

In the evaluation of bids, the Respondent's experience, delivery time, quality of performance or product, conformance to the specifications and responsibility in performing other contracts (including satisfying all safety requirements) may be considered in addition to price. In addition, the bid evaluation factors set forth in City Code Section 1.06.262 may be considered by the City. Respondents who are inexperienced or who fail to properly perform other contracts may have their bids rejected for such cause.

B. Prequalified Electrical Contractor

Certain types of electrical construction require special expertise, experience, and prequalification of the Contractor (or subcontractor) by the City. In such cases, the Respondent must be prequalified or the Respondent must subcontract with a City prequalified electrical contractor for the specialty work.

C. Insertions of Material Conflicting with Specifications

Only material inserted by the Respondent to meet requirements of the Specifications will be considered. Any other material inserted by the Respondent will be disregarded as being nonresponsive and may be grounds for rejection of the Respondent's Proposal.

D. Correction of Ambiguities and Obvious Errors

The City reserves the right to correct obvious errors in the Respondent's proposal. In this regard, if the unit price does not compute to the extended total price, the unit price shall govern.

1.09 WITHDRAWAL OF BID

A. Prior to Bid Opening

Any Respondent may withdraw his/her Proposal prior to the scheduled bid opening time by delivering a written notice to the City’s Procurement and Payables Office. The notice may be submitted in person or by mail; however, it must be received by the City’s Procurement and Payables Office prior to the time of bid opening.

B. After Bid Opening

No Respondent will be permitted to withdraw his/her Proposal after the time of bid opening, as set forth in the Call for Bids, and before the actual award of the Contract, unless the award of Contract is delayed more than sixty (60) calendar days after the date set for bid opening. If a delay of more than 60 calendar days does occur, then the Respondent must submit written notice withdrawing his/her Proposal to the Purchasing Manager.
1.10 OPENING OF BIDS
At the time and place set for the opening of bids, all Proposals, unless previously withdrawn, will be publicly opened and read aloud, irrespective of any irregularities or informalities in such Proposal.

1.11 CITY COUNCIL/PUBLIC UTILITY BOARD FINAL DETERMINATION
The City Council or Public Utility Board of the City of Tacoma shall be the final judge as to which is the lowest and best bid in the interest of the City of Tacoma. The City reserves the right to reject any and all bids, waive minor deviations or informalities, and if necessary, call for new bids.

1.12 RESPONDENT'S REFUSAL TO ENTER INTO CONTRACT
Any Respondent who refuses to enter into a Contract after it has been awarded to the Respondent will be in breach of the agreement to enter the Contract and the Respondent's certified or cashier's check or bid bond shall be forfeited.

1.13 TAXES
A. Include In Proposal All Taxes
Respondent shall include in his/her Proposal all applicable local, city, state, and federal taxes. It is the Respondent's obligation to state on his/her Proposal sheet the correct percentage and total applicable Washington State and local sales tax. The total cost to the City including all applicable taxes may be the basis for determining the low Respondent.

B. Federal Excise Tax
The City of Tacoma is exempt from federal excise tax. Where applicable, the City shall furnish a Federal Excise Tax Exemption certificate.

C. City of Tacoma Business and Occupation Tax
Sub-Title 6A of the City of Tacoma Municipal Code (TMC) provides that transactions with the City of Tacoma, may be subject to the City of Tacoma’s Business and Occupation Tax. It is the responsibility of the Respondent awarded the Contract to register with the City of Tacoma’s Department of Tax and License, 733 South Market Street, Room 21, Tacoma, WA 98402-3768, telephone 253-591-5252. The City’s Business and Occupation Tax amount shall not be shown separately but shall be included in the unit and/or lump sum prices bid.

1.14 FIRM PRICES/ESCALATION
Except as specifically allowed by the Special Provisions, only firm prices will be accepted.

1.15 AWARD
A. Construction and/or Labor Contracts
Unless specifically noted in the Special Provisions or Proposal sheets, all construction and/or labor contracts will be awarded to only one Respondent.

B. Supply/Equipment Contracts
The City reserves the right to award an equipment or supply contract for any or all items to one or more Respondents as the interests of the City will be best satisfied.

1.16 INCREASE OR DECREASE IN QUANTITIES
The City of Tacoma reserves the right to increase or decrease the quantities of any items under this Contract and pay according to the unit prices quoted in the Proposal (with no adjustments for anticipated profit).

1.17 EXTENSION OF CONTRACT
Contracts resulting from this specification shall be subject to extension by mutual agreement per the same prices, terms and conditions.
1.18 PAYMENT TERMS

A. Prices will be considered as net 30 calendar days if no cash discount is shown. Payment discount periods of twenty (20) calendar days or more if offered in the submittal, will be considered in determining the apparent lowest responsible submittal. Discounts will be analyzed in context of their overall cumulative effect. Invoices will not be processed for payment nor will the period of cash discount commence until receipt of a properly completed invoice and until all invoiced items are received and satisfactory performance of the Contractor has been attained. If an adjustment in payment is necessary due to damage or dispute, the cash discount period shall commence on the date final approval for payment is authorized.

B. ePayable/Credit Card Acceptance. Submittals offering ePayable/Credit card acceptance may be compared against submittals offering a prompt payment discount to evaluate the overall cumulative effect of the discount against the advantage to the City of the ePayable/Credit card acceptance, and may be considered in determining the apparent lowest responsible submittal.

1.19 PAYMENT METHOD – EPAYABLES – CREDIT CARD ACCEPTANCE – EFT/ACH ACCEPTANCE

A. Payment methods include:

- EPayables (Payment Plus). This is payment made via a virtual, single use VISA card number provided by the City’s commercial card provider. Suppliers accepting this option will receive “due immediately” payment terms. Two options for acceptance are available to suppliers. Both are accompanied by an emailed advice containing complete payment details:
  - Straight-through processing (buyer initiated). Immediate, exact payments directly deposited to supplier accounts by the City’s provider bank; the supplier does not need to know card account details.
  - Supplier retrieves card account through the secure, on-line portal provided via email notifications sent by the City’s commercial card provider.

- Credit card. Tacoma’s VISA procurement card program is supported by standard bank credit suppliers and requires that merchants abide by the VISA merchant operating rules. It provides “due immediately” payment terms.
  - Suppliers must be PCI-DSS compliant (secure credit card data management) and federal FACTA (sensitive card data display) compliant.
  - Suppliers must be set up by their card processing equipment provider (merchant acquirer) as a minimum of a Level II merchant with the ability to pass along tax, shipping and merchant references information.

- Electronic Funds Transfer (EFT) by Automated Clearing House (ACH). Standard terms are net 30 for this payment method.

- Check or other cash equivalent. Standard terms are net 30 for this payment method.

B. The City’s preferred method of payment is by ePayables (Payment Plus) followed by credit card (aka procurement card). Suppliers may be required to have the capability of accepting the City’s ePayables or credit card methods of payment. The City of Tacoma will not accept price changes or pay additional fees when ePayables (Payment Plus) or credit card is used.

C. The City, in its sole discretion, will determine the method of payment for goods and services as part of the Contract.

1.20 COOPERATIVE PURCHASING

The Washington State Interlocal Cooperative Act RCW 39.34 provides that other governmental agencies may purchase goods and services on this solicitation or contract in accordance with the terms and prices indicated therein if all parties are agreeable.

1.21 PUBLIC DISCLOSURE: PROPRIETARY OR CONFIDENTIAL INFORMATION

A. Respondent’s Submittals, all documents and records comprising any Contract awarded to Respondent, and all other documents and records provided to the City by Respondent are deemed public records subject to disclosure under the Washington State Public Records Act, Chapter 42.56 RCW (Public Records Act). Thus, City may be required, upon request, to disclose the Contract and documents or records related to it unless an exemption under the Public Records Act or other laws applies. In the event CITY receives a request for such disclosure, determines in its legal judgment that no applicable exemption to disclosure applies; and Respondent has complied with the requirements to Respondent has complied with the requirements to mark records considered confidential or proprietary.
as such requirements are stated below, City agrees to provide Respondent 10 days written notice of impending release. Should legal action thereafter be initiated by Respondent to enjoin or otherwise prevent such release, all expense of any such litigation shall be borne by Respondent, including any damages, attorneys’ fees or costs awarded by reason of having opposed disclosure. City shall not be liable for any release where notice was provided and Respondent took no action to oppose the release of information.

B. If Respondent provides City with records or information that Respondent considers confidential or proprietary, Respondent must mark all applicable pages or sections of said record(s) as “Confidential” or “Proprietary.” Further, in the case of records or information submitted in response to a Request for Proposals, an index must be provided indicating the affected pages or sections and locations of all such material identified Confidential or Proprietary. Information not included in the required index will not be reviewed for confidentiality or as proprietary before release. If Supplier fails to so mark or index Submittals and related records, then the City, upon request, may release said record(s) without the need to satisfy the requirements of subsection A above; and Respondent expressly waives its right to allege any kind of civil action or claim against the City pertaining to the release of said record(s). Submission of materials in response to City’s Solicitation shall constitute assent by Respondent to the foregoing procedure and Respondent shall have no claim against the City on account of actions taken pursuant to such procedure.

1.22 FEDERAL AID PROJECTS

The City of Tacoma in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR, part 26, will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

SECTION II - CONTRACT REQUIREMENTS

2.01 CONTRACTOR'S RESPONSIBILITY

A. Contract Documents

The Respondent to whom the Contract is awarded, hereinafter called the Contractor, shall enter into a Contract with the City of Tacoma, , within 10 days after receipt from the City of Tacoma of a properly prepared Contract. In addition, the Contractor will do all things required to promptly perform this Contract pursuant to the terms of this Contract. Certain contracts for supplies, goods or equipment may use the City Purchase Order in place of a formal contract document.

B. Surety Bonds

Except as modified by the Special Provisions, the Respondent to whom the Contract is awarded shall provide a payment and performance bond, including power of attorney, for 100 percent of the amount of his/her bid (including sales taxes), to insure complete performance of the Contract including the guarantee. The bonds must be executed by a surety company licensed to do business in the State of Washington. For a supply-type contract, a cashier’s check or cash may be substituted for the bonds; however, this cash or cashier’s check must remain with the City through the guarantee period and any interest on said amount shall accrue to the City.

C. Independent Contractor

Contractor is an independent contractor; no personnel furnished by the Contractor shall be deemed under any circumstances to be the agent or servant of the City. Contractor shall be fully responsible for all acts or omissions of Subcontractors and its and their suppliers and of persons employed by them, and shall be specifically responsible for sufficient and competent supervision and inspection to assure compliance in every respect with the Contract. There shall be no contractual relationship between any Subcontractors or supplier and the City arising out of or by virtue of this agreement. No provision of the Contract is intended or is to be construed to be for the benefit of any third party.
2.02 CONFLICTS IN SPECIFICATIONS

Anything mentioned in the Specifications and not shown on the Drawings and anything on the Drawings and not mentioned in the Specifications shall be of like effect and shall be understood to be shown and/or mentioned in both. In case of differences between Drawings and Specifications, the Specifications shall govern. In addition, in the event of any conflict between these General Provisions, the Special Provisions, the Technical Provisions and/or the Proposal pages, the following order of precedence shall control:

1. Proposal pages prevail if they conflict with the General, Special or Technical Provisions.
3. Technical Provisions prevail if they are in conflict with the General Provisions.

In case of discrepancy of figures between Drawings, Specifications or both, the matter shall immediately be submitted to the Engineer for determination. Failure to submit the discrepancy issue to the Engineer shall result in the Contractor's actions being at his/her own risk and expense. The Engineer shall furnish from time to time such detailed drawings and other information as he/she may consider necessary.

2.03 INSPECTION

A. Of the Work

All materials furnished and work done shall be subject to inspection.

The City’s Inspector administering the Contract shall at all times have access to the work wherever it is in progress or being performed, and the Contractor shall provide proper facilities for such access and inspection. Such inspection shall not relieve the Contractor of the responsibility of performing the work correctly, utilizing the best labor and materials in strict accordance with the Specifications of this Contract. All material or work approved and later found to be defective shall be replaced without cost to the City of Tacoma.

B. Inspector’s Authority

The inspector shall have power to reject materials or workmanship which do not fulfill the requirements of these Specifications, but in case of dispute the Contractor may appeal to the Director or Superintendent, whose decision shall be final. The word “Director” means the Director of the City of Tacoma, General Government department that is administering the contract. The word “Superintendent” means the Superintendent of the City of Tacoma, Department of Public Utilities Division that is administering the contract.

The Contract shall be carried out under the general control of the representative of the particular City Department or Division administering the Contract, who may exercise such control over the conduct of the work as may be necessary, in his or her opinion, to safeguard the interest of the City of Tacoma. The Contractor shall comply with all orders and instructions given by the representative of the particular Department or Division administering the Contract in accordance with the terms of the Contract.

Provided, that for the purposes of construction contracts, such control shall only apply (a) to the extent necessary to ensure compliance with the provisions of this contract, and (b) to the extent necessary to fulfill any nondelegable duty of the City for the benefit of third parties not engaged in promoting the activity of this contract.

Nothing herein contained, however, shall be taken to relieve the Contractor of his/her obligations or responsibilities under the Contract.

2.04 FEDERAL, STATE AND MUNICIPAL REGULATIONS

All federal, state, municipal and/or local regulations shall be satisfied in the performance of all portions of this Contract. The Contractor shall be solely responsible for all violations of the law from any cause in connection with work performed under this Contract.
2.05 INDEMNIFICATION

A. Indemnification

Contractor acknowledges that pursuant to the terms of this agreement, Contractor is solely and totally responsible for the safety of all persons and property in the performance of this Contract. To the greatest extent allowed by law, Contractor assumes the risk of all damages, loss, cost, penalties and expense and agrees to indemnify, defend and hold harmless the City of Tacoma, from and against any and all liability which may accrue to or be sustained by the City of Tacoma on account of any claim, suit or legal action made or brought against the City of Tacoma for the death of or injury to persons (including Contractor’s or subcontractor’s employees) or damage to property involving Contractor, or subcontractor(s) and their employees or agents, arising out of and in connection with or incident to the performance of the Contract including if the City is found to have a nondelegable duty to see that work is performed with requisite care, except for injuries or damages caused by the sole negligence of the City. In this regard, Contractor recognizes that Contractor is waiving immunity under industrial Insurance Law, Title 51 RCW. This indemnification extends to the officials, officers and employees of the City and also includes attorney’s fees and the cost of establishing the right to indemnification hereunder in favor of the City of Tacoma. In addition, within the context of competitive bidding laws, it is agreed that this indemnification has been mutually negotiated. Provided however, this provision is intended to be applicable to the parties to this agreement and it shall not be interpreted to allow a Contractor’s employee to have a claim or cause of action against Contractor.

B. Limitation of Liability for Primarily Supply-Type Contracts

In all contracts where the total cost of the supply of materials and/or equipment constitute at least 70 percent of the total contract price (as determined by the City), the City agrees that it will not hold the contractor, supplier or manufacturer liable for consequential damages for that part of the contract related to the manufacture and/or design of the equipment, materials or supplies.

2.06 CONTRACTOR’S INSURANCE

A. During the course and performance of a Contract, Contractor will provide proof and maintain the insurance coverage in the amounts and in the manner specified in the City of Tacoma Insurance Requirements as is applicable to the services, products, and deliverables provided under the Contract. The City of Tacoma Insurance Requirements document, if issued, is fully incorporated into the Contract by reference.

B. Failure by City to identify a deficiency in the insurance documentation provided by Contractor or failure of City to demand verification of coverage or compliance by Contractor with these insurance requirements shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

2.07 ASSIGNMENT AND SUBLETTING OF CONTRACT

C. Assignment

The Contract shall not be assigned except with the consent of the Superintendent or his/her designee.

Requests for assignment of this contract must be in writing with the written consent of the surety, and the request must show the proposed person or organization to which the contract is assigned is capable, experienced and equipped to perform such work. The proposed substitute person or organization may be required to submit to the City information as to his/her experience, financial ability and give statements covering tools, equipment, organization, plans and methods to fulfill any portion of the Contract prior to approval of assignment.

D. Subletting

The Contract shall not be sublet except with the written consent of the Superintendent or his/her designee. In the event that a prequalified electrical contractor is necessary to perform certain portions of the work, such work may be subcontracted with a City prequalified electrical contractor for the type of work involved.

Requests for subletting of this Contract must be in writing with the written consent of the Surety, and the request must show the proposed person or organization to which the Contract is sublet is capable, experienced and equipped to perform such work. The proposed substitute person or organization may be required to submit to the City information as to his experience, financial ability and give statements covering tools, equipment, organization, plans and methods to fulfill any portion of the Contract prior to approval of subletting.
The written consent approving the subletting of the Contract shall not be construed to relieve the Contractor of his/her responsibility for the fulfillment of the Contract. The Subcontractor shall be considered to be the agent of the Contractor and the Contractor agrees to be responsible for all the materials, work and indebtedness incurred by the agent.

A subcontractor shall not sublet any portion of a subcontract for work with the City without the written consent of the City.

2.08 DELAY

E. Extension of Time

With the written approval of the Superintendent or his/her designee, the Contractor may be granted additional time for completion of the work required under this Contract, if, in the Superintendent's opinion the additional time requested arises from unavoidable delay.

F. Unavoidable Delay

Unavoidable delays in the prosecution of the work shall include only delays from causes beyond the control of the Contractor and which he/she could not have avoided by the exercise of due care, prudence, foresight and diligence. Delay caused by persons other than the Contractor, Subcontractors or their employees will be considered unavoidable delays insofar as they necessarily interfere with the Contractor's completion of the work, and such delays are not part of this Contract.

Unavoidable delay will not include delays caused by weather conditions, surveys, measurements, inspections and submitting plans to the Engineer of the particular Division involved in administering this Contract.

2.09 GUARANTEE

A. Guarantee for Construction, Labor or Services Contract

Neither the final certificate of payment or any provision in the Contract Documents, nor partial or entire occupancy of the premises by the City, shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the work unless a longer period is specified. The City will give notice of observed defects with reasonable promptness.

If it has been discovered, before payment is required under the terms of the Contract, that there is a failure to comply with any of the terms and provisions of this Contract, the City has the right and may withhold payment.

In case of a failure of any part of the work, materials, labor and equipment furnished by the Contract or to fully meet all of the requirements of the Contract, the Contractor shall make such changes as may be necessary to fully meet all of the specifications and requirements of this Contract. Such changes shall be made at the Contractor's sole cost and expense without delay and with the least practicable inconvenience to the City of Tacoma. Rejected material and equipment shall be removed from the City's property by and at the expense of the Contractor.

B. Guarantee for Supply Contracts

Unless a longer period is specified, the supplier and/or manufacturer of the supplies, materials and/or equipment furnished pursuant to this Contract agrees to correct any defect or failure of the supplies, materials and/or equipment which occurs within one year from the date of: (1) test energization if electrical or mechanical equipment; (2) commencement of use if supplies or materials, provided, however, said guarantee period shall not extend beyond eighteen months after date of receipt by the City. All of the costs (including shipping, dismantling and reinstallation) of repairs and/or corrections of defective or failed equipment, supplies and/or material is the responsibility of the supplier and/or manufacturer.

When the supplier is not the manufacturer of the item of equipment, supplier agrees to be responsible for this guarantee and supplier is not relieved by a manufacturer's guarantee.
C. Guarantee Period Extension

The Contract guarantee period shall be suspended from the time a significant defect is first documented by the City until the work or equipment is repaired or replaced by Contractor and accepted by the City. In addition, in the event less than ninety (90) days remain on the guarantee period (after recalculating), the guarantee period shall be extended to allow for at least ninety (90) days from the date the work or equipment is repaired or replaced and accepted by the City.

2.10 DEDUCTIONS FOR UNCORRECTED WORK

If the City of Tacoma deems it expedient to correct work not done in accordance with the terms of this Contract, an equitable deduction from the Contract price shall be made.

2.11 CITY OF TACOMA’S RIGHT TO TERMINATE CONTRACT

A. Termination for Convenience

1. Supplies. The City may terminate a Contract for supplies at any time upon prior written notice to Contractor. Upon the effective date of termination specified in such notice, and payment by the City, all conforming supplies, materials, or equipment previously furnished hereunder shall become its property.

2. Services. The City may terminate a Contract for services at any time, with or without cause, by giving 10-business day’s written notice to Supplier. In the event of termination, all finished and unfinished work prepared by Supplier pursuant to the Contract shall be provided to the City. In the event City terminates the Contract due to the City’s own reasons and without cause due to Supplier’s actions or omissions, the City shall pay Supplier the amount due for actual work and services necessarily performed under the Contract up to the effective date of termination, not to exceed the total compensation set forth in the Contract.

B. Termination for Cause

1. The City may terminate a Contract for either services or supplies in the event of any material breach of any of the terms and conditions of the Contract if the Contractor’s breach continues in effect after written notice of breach and 30 days to cure such breach and fails to cure such breach.

2. Bankruptcy. If the Contractor should be adjudged as bankrupt, or makes a general assignment for the benefit of creditors, or a receiver should be appointed on account of his/her insolvency, or if he/she or any of his/her subcontractors should violate any of the provisions of the Contract, or if the work is not being properly and diligently performed, the City of Tacoma may serve written notice upon the Contractor and Surety, executing the Payment and Performance Bond, of its intention to terminate the Contract; such notice will contain the reasons for termination of the Contract, and unless within 10 days after the serving of such notice, such violation shall cease and an arrangement satisfactory to the City of Tacoma for correction thereof shall be made, the Contract shall, upon the expiration of said 10 days, cease and terminate and all rights of the Contractor hereunder shall be forfeited. In the event the Contract is terminated for cause, Contractor shall not be entitled to any lost profits resulting therefrom.

3. Notice. In the event of any such termination for cause, the City of Tacoma shall immediately send (by regular mail or other method) written notice thereof to the Surety and the Contractor. Upon such termination the Surety shall have the right to take over and perform the Contract, provided however, the Surety must provide written notice to the City of its intent to complete the work within 15 calendar days of its receipt of the original written notice (from the City) of the intent to terminate. Upon termination and if the Surety does not perform the work, the City of Tacoma may take over the work and prosecute the same to completion by any method it may deem advisable, for the account of and at the expense of the Contractor, and the Contractor and the Surety shall be liable to the City of Tacoma for all cost occasioned to the City of Tacoma thereby. The City of Tacoma may without liability for doing so, take possession of and utilize in completing the work, such materials, equipment, plant and other property belonging to the Contractor as may be on the site of the work and necessary therefore.
2.12 LIENS

In the event that there are any liens on file against the City of Tacoma, the City of Tacoma shall be entitled to withhold final or progress payments to the extent deemed necessary by the City of Tacoma to properly protect the outstanding lien claimants until proper releases have been filed with the City Clerk.

2.13 LEGAL DISPUTES

A. General

Washington law shall govern the interpretation of the Contract. The state or federal courts located in Pierce County Washington shall be the sole venue of any mediation, arbitration, or litigation arising out of the Contract.

Respondents providing submittals from outside the legal jurisdiction of the United States of America will be subject to Tacoma’s City Attorney’s Office (CAO) opinion as to the viability of possible litigation pursuant to a contract resulting from this Specification. If it is the opinion of the CAO that any possible litigation would be beyond reasonable cost and/or enforcement, the submittal may be excluded from evaluation.

B. Attorney Fees

For contracts up to $250,000, which become the subject of litigation or arbitration, the substantially prevailing party may be entitled to reasonable attorney fees, as provided in RCW 39.04.240. Provided, however, the attorney fee hourly rate for the City of Tacoma's assistant city attorneys is agreed to be $150 per hour or the same as the hourly rate for Contractor's legal counsel, whichever is greater.

2.14 DELIVERY

Prices must be quoted F.O.B. destination, freight prepaid and allowed with risk of loss during transit remaining with Contractor/Supplier (unless otherwise stated in these Specifications) to the designated address set forth in these Specifications.

Deliveries shall be between 9:00 a.m. and 3:30 p.m.; Monday through Friday only (except legal holidays of the City of Tacoma).

Legal holidays of the City of Tacoma are:

- New Year's Day: January 1
- Martin Luther King's Birthday: 3rd Monday in January
- Washington's Birthday: 3rd Monday in February
- Memorial Day: Last Monday in May
- Independence Day: July 4
- Labor Day: 1st Monday in September
- Veteran's Day: November 11
- Thanksgiving Day: 4th Thursday of November
- Day after Thanksgiving: 4th Friday of November
- Christmas Day: December 25

When any of these holidays occur on Saturday or Sunday, the preceding Friday or the following Monday, respectively, is a legal holiday for the City of Tacoma.

2.15 PACKING SLIPS AND INVOICES

A. Packing slips and shipping notices shall be sent to the specific City Division or Department receiving the item(s) at the address stated in City’s Solicitation or as otherwise stated in the Contract and include complete description of items, contents of items if crated or cased, quantity, shipping point, carrier, bill of lading number and City of Tacoma purchase order.

B. Each invoice shall show City of Tacoma purchase order number, release number if applicable, quantity, unit of measure, item description, unit price and extended price for each line if applicable, services and deliverables provided if applicable. Line totals shall be summed to give a grand total to which sales tax shall be added, if applicable.

1. For transactions conducted in SAP Ariba, invoices shall be submitted through Ariba.
2. For invoices paid by ACH or by check, unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to accounts payable@cityoftacoma.org.
3. For invoices paid by credit card, invoices shall also display the last name of the cardholder and last four digits (only) of the card number (e.g., Jones/6311). Unless stated otherwise, invoices shall be electronically submitted by email with corresponding PO number listed in the subject line to (do not combine different POs into one invoice or charge) to pcardadmin@cityoftacoma.org.

2.16 APPROVED EQUALS

A. Unless an item is indicated as "No substitute", special brands, when named, are intended to describe the standard of quality, performance or use desired. Equal items will be considered by the City, provided that the respondent specifies the brand and model, and provides all descriptive literature, independent test results, product samples, local servicing and parts availability to enable the City to evaluate the proposed "equal".

B. The decision of the City as to what items are equal shall be final and conclusive. If the City elects to purchase a brand represented by the respondent to be an "equal", the City's acceptance of the item is conditioned on the City's inspection and testing after receipt. If, in the sole judgment of the City, the item is determined not to be an equal, the item shall be returned at the respondent's expense.

C. When a brand name or level of quality is not stated by the respondent, it is understood the offer is exactly as specified. If more than one brand name is specified, respondents must clearly indicate the brand and model/part number being bid.

2.17 ENTIRE AGREEMENT

This written contract represents the entire Agreement between the parties and supersedes any prior oral statements, discussions or understandings between the parties.

2.18 CODE OF ETHICS

The City's Code of Ethics, Chapter 1.46, Tacoma Municipal Code, provides ethical standards for City personnel and prohibits certain unethical conduct by others including respondents and contractors. Violation of the City's Code of Ethics will be grounds for termination of this contract.

2.19 FEDERAL FINANCIAL ASSISTANCE

If federal funds, including FEMA financial assistance to the City of Tacoma, will be used to fund, pay or reimburse all or a portion of the Contract, Contractor will comply with all applicable Federal law, regulations, executive orders, FEMA policies, procedures, and directives and the following clauses will be incorporated into the Contract:

A. EQUAL EMPLOYMENT OPPORTUNITY During the performance of this Contract, Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

   1. Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

   2. The contractor will, 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, sexual orientation, gender identity, or national origin.

   3. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee’s essential job functions discloses the compensation of such other
employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

6. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

7. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, 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 in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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 shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty 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 forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (B)(1) of this section 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 clause set forth in paragraph (B)(1) of this section, in the sum of $27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.
3. Withholding for unpaid wages and liquidated damages. The City 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 other 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 clause set forth in paragraph (B)(2) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in
paragraph (B)(1) through (4) of this section and also a clause requiring the subcontractors to include
these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance
by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (B)(1)
through (4) of this section.

C. CLEAN AIR ACT

1. Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the
Clean Air Act, as amended, 42 U.S.C. § 7401 et seq.

2. Contractor agrees to report each violation to the City and understands and agrees that the City will, in
turn, report each violation as required to assure notification to the Federal Emergency Management
Agency, and the appropriate Environmental Protection Agency Regional Office.

3. Contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in
whole or in part with Federal assistance provided by FEMA.

D. FEDERAL WATER POLLUTION CONTROL ACT

1. Contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the
Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq.

2. Contractor agrees to report each violation to the City, understands, and agrees that the City will, in
turn, report each violation as required to assure notification to the Federal Emergency Management
Agency, and the appropriate Environmental Protection Agency Regional Office.

3. Contractor agrees to include these requirements in each subcontract exceeding $150,000 financed in
whole or in part with Federal assistance provided by FEMA.

E. DEBARMET AND SUSPENSION

1. This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As
such, the contractor is required to verify that none of the contractor’s principals (defined at 2 C.F.R. §
180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940)
and disqualified (defined at 2 C.F.R. § 180.935).

include a requirement to comply with these regulations in any lower tier covered transaction it enters
into.

3. This certification is a material representation of fact relied upon by the City. If it is later determined
that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C,
in addition to remedies available to (insert name of recipient/subrecipient/applicant), the Federal
Government may pursue available remedies, including but not limited to suspension and/or
debarment.

3000, subpart C while this offer is valid and throughout the period of any contract that may arise from
this offer. The bidder or proposer further agrees to include a provision requiring such compliance in
its lower tier covered transactions.
F. BYRD ANTI-LOBBYING AMENDMENT

1. Contractors who apply or bid for an award of $100,000 or more shall file the required certification with City. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the City.

2. If applicable, Contractor must sign and submit to the City the following certification:

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with 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, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds 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 this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The Contractor, ____________, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap.38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

________________________________________
Signature of Contractor’s Authorized Official

________________________________________
Name and Title of Contractor’s Authorized Official

___________Date
G. PROCUREMENT OF RECOVERED MATERIALS

1. In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired:
   a. Competitively within a timeframe providing for compliance with the contract performance schedule;
   b. Meeting contract performance requirements; or
   c. At a reasonable price.

2. Information about this requirement, along with the list of EPA-designated items, is available at EPA’s Comprehensive Procurement Guidelines web site, https://www.epa.gov/sgm/comprehensive-procurement-guideline-cpg-program.

3. Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.

[Section III is for contracts that involve construction and/or labor, and are not applicable to contracts solely for material/supply purchases.]

GENERAL PROVISIONS

SECTION III - CONSTRUCTION AND/OR LABOR CONTRACTS

SECTION III REQUIREMENTS APPLY ONLY TO CONSTRUCTION AND/OR LABOR CONTRACTS AND ARE IN ADDITION TO APPLICABLE REQUIREMENTS CONTAINED IN SECTION II CONTRACT REQUIREMENTS.

3.01 RESPONDENT’S DUTY TO EXAMINE

The Respondent agrees to be responsible for examining the site(s) and to have compared them with the Specifications and Contract Drawings, and to be satisfied as to the facilities and difficulties attending the execution of the proposed Contract (such as uncertainty of weather, floods, nature and condition of materials to be handled and all other conditions, obstacles and contingencies) before the delivery of his/her Proposal. No allowance will be subsequently made by the City on behalf of the Respondent by reason of any error or neglect on Respondent’s part, for such uncertainties as aforesaid.

3.02 PERMITS

Except when modified by the Special Provisions, the Contractor shall procure and pay for all permits and licenses necessary for the completion of this Contract including those permits required by the City of Tacoma. The City will obtain county or state road crossing permits if required. In the event a necessary permit is not obtained, the Contractor will not be permitted to work on items subject to said permit and any delays caused thereby will not be subject to extra compensation or extensions.

3.03 NOTIFICATION OF OTHER GOVERNMENTAL AGENCIES AND UTILITIES WHEN UNDERGROUND WORK IS INVOLVED

The Contractor shall notify all other affected governmental agencies and utilities whenever underground work is done under the terms of this Contract. The Contractor is required to obtain permission of the appropriate public and private utilities and governmental agencies before performing underground work pursuant to the terms of this Contract. The Contractor is required to call “one call” at 1-800-424-5555 for all work involving excavation or digging more than 12 inches beneath ground or road surface.

The City may have indicated on the plans and specifications the existence of certain underground facilities that are known to the City department responsible for this Contract. It is the Contractor’s responsibility to fully comply with the Underground Utility Locate Law, Chapter 19.122 RCW. If the site conditions are “changed or differing” as defined by RCW 19.122.040(l), the Contractor may pursue the party responsible for not properly marking or identifying the underground facility. The Contractor agrees not to file any claim or legal action against the City (department responsible for this Contract) for said “changed or differing” conditions unless said City department is solely responsible for the delay or damages that the Contractor may have incurred.
3.04 TRENCH EXCAVATION BID ITEM

In the event that "trench excavation" in excess of four feet requires a safety system pursuant to Washington State law and safety shoring, sloping, sheeting, or bracing is used, a separate bid item should be set forth in the Proposal for this work. If a separate bid item is not set forth in the Proposal pages, said installed safety system shall be paid at $3.00 per lineal foot of trench, which unit price includes both sides of the trench.

3.05 SAFETY

A. General

The Contractor shall, at all times, exercise adequate precautions for the safety of all persons, including its employees and the employees of a Subcontractor, in the performance of this Contract and shall comply with all applicable provisions of federal, state, county and municipal safety laws and regulations. It is the Contractor's responsibility to furnish safety equipment or to contractually require Subcontractors to furnish adequate safety equipment relevant to their responsibilities.

The Contractor shall obtain the necessary line clearance from the inspector before performing any work in, above, below or across energized Light Division circuits.

The Inspector and/or Engineer may advise the Contractor and the Safety Officer of any safety violations. It is the Contractor's responsibility to make the necessary corrections. Failure to correct safety violations is a breach of this Contract and, as such, shall be grounds for an order from the Safety Officer, Inspector or Engineer to cease further work and remove from the job site until the condition is corrected. Time and wages lost due to such safety shutdowns shall not relieve the Contractor of any provisions of Section 3.14 of this Specification and shall be at the sole cost of the Contractor. The purpose of this authority to stop work is to enforce the contract and not to assume control except to the extent necessary to ensure compliance with the provisions of this contract.

Any of the above actions by employees of the City of Tacoma shall in no way relieve the Contractor of his/her responsibility to provide for the safety of all persons, including his/her employees.

B. Work Hazard Analysis Report

The Contractor will be required to complete a work hazard analysis report. This report shall outline how the Contractor proposes to satisfy all safety laws and regulations involved in performing the work. This report shall be completed and submitted to the City Safety Officer before the pre-construction conference. A copy of the report shall be maintained at the work site (accessible to the supervisor).

3.06 PROTECTION OF WORKERS AND PROPERTY

The Contractor shall erect and maintain good and sufficient guards, barricades and signals at all unsafe places at or near the work and shall, in all cases, maintain safe passageways at all road crossings, and crosswalks, and shall do all other things necessary to prevent accident or loss of any kind.

The Contractor shall protect from damage all utilities, improvements, and all other property that is likely to become displaced or damaged by the execution of the work under this Contract.

The Contractor is responsible for all roads and property damaged by his/her operations as shall be determined by the Engineer administering this Contract. The Contractor shall be responsible for repairing all damage to roads caused by his/her operations to the satisfaction of the particular governmental body having jurisdiction over the road.

3.07 CONTRACTOR - SUPERVISION AND CHARACTER OF EMPLOYEES

A. Superintendent to Supervise Contractor's Employees

The Contractor shall keep on his/her work, during its progress, a competent superintendent and any necessary assistants, all of whom must be satisfactory to the City of Tacoma. The Contractor's superintendent shall not be changed except with the consent of the City of Tacoma, unless the Contractor's superintendent proves to be unsatisfactory to the Contractor and ceases to be in his/her employ. The Contractor's superintendent shall represent the Contractor in his/her absence and all directions given to him/her shall be binding as if given to the Contractor directly. The Contractor shall give efficient supervision to the work, using his/her best skill and attention.
B. Character of Contractor's Employees
The Contractor shall employ only competent, skillful, faithful and orderly persons to do the work, and whenever the Engineer administering the Contract shall notify the Contractor in writing that any person on the work is, in his or her opinion, incompetent, unfaithful, disorderly or otherwise unsatisfactory, the Contractor shall forthwith discharge such persons from the work and shall not again employ him or her on this Contract.

3.08 CONTRACTOR'S COMPLIANCE WITH THE LAW

A. Hours of Labor
The Contractor and Subcontractors shall be bound by the provisions of RCW Chapter 49.28 (as amended) relating to hours of labor. Except as set forth in the Special Provisions, eight (8) hours in any calendar day shall constitute a day's work on a job performed under this Contract.

In the event that the work is not performed in accordance with this provision and in accordance with the laws of the State of Washington, then this Contract may be terminated by the City of Tacoma for the reason that the same is not performed in accordance with the public policy of the State of Washington as defined in said statutes.

B. Prevailing Wages
If federal, state, local, or any applicable law requires Supplier to pay prevailing wages in connection with a Contract, and Supplier is so notified by the City, then Supplier shall pay applicable prevailing wages.

If applicable, a Schedule of Prevailing Wage Rates and/or the current prevailing wage determination made by the Secretary of Labor for the locality or localities where the Contract will be performed is attached and made of part of the Contract by this reference. If prevailing wages do apply to the Contract, Supplier and its subcontractors shall:

1. Be bound by and perform all transactions regarding the Contract relating to prevailing wages and the usual fringe benefits in compliance with the provisions of Chapter 39.12 RCW, as amended, the Washington State Prevailing Wage Act and/or the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) and the requirements of 29 C.F.R. pt. 5 as may be applicable, including the federal requirement to pay wages not less than once a week,

2. Ensure that no worker, laborer or mechanic employed in the performance of any part of the Contract shall be paid less than the prevailing rate of wage specified on that Schedule and/or specified in a wage determination made by the Secretary of Labor (unless specifically preempted by federal law, the higher of the Washington state prevailing wage or federal Davis-Bacon rate of wage must be paid) and, Additionally, in compliance with applicable federal law, contractors are required to pay wages not less than once a week.

3. Immediately upon award of the Contract, contact the Department of Labor and Industries, Prevailing Wages section, Olympia, Washington and/or the federal Department of Labor, to obtain full information, forms and procedures relating to these matters. Per such procedures, a Statement of Intent to Pay Prevailing Wages and/or other or additional documentation required by applicable federal law, must be submitted by Contractor and its subcontractors to the City, in the manner requested by the City, prior to any payment by the City hereunder, and an Affidavit of Wages Paid and/or other or additional documentation required by federal law must be received or verified by the City prior to final Contract payment. In the event any dispute arises as to what are the prevailing rates of wages for work of a similar nature and such dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the Director of the State of Washington, Department of Labor and industries whose decision shall be final, conclusive and binding on all parties involved in the dispute.
3.09 COPELAND ANTI-KICKBACK ACT

For contracts subject to Davis Bacon Act the following clauses will be incorporated into the Contract:

A. **Contractor.** The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.

B. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clause above and such other clauses as FEMA may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.

C. **Breach.** A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12.

3.10 CHANGES

A. **In Plans or Quantities**

The City of Tacoma, without invalidating this Contract, or any part of this Contract, may order extra work or make reasonable changes by altering, adding to or deducting from the materials, work and labor and the Contract sum will be adjusted accordingly. All such work and labor shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change. When work or bid items are deducted, reduced or eliminated, it is agreed that no payment will be made to Contractor for anticipated profit.

B. **Extra Work**

Any claim or order for extra materials, work and labor made necessary by alterations or additions to the plans or by other reasons for which no price is provided in this Contract, shall not be valid unless the Contractor and Engineer administering the Contract have agreed upon a price prior to commencing extra work, and the agreement has been signed by the Contractor and approved by the Superintendent or his/her designee, and approved by the payment and performance bond surety.

C. **Extra Work - No Agreed Price**

If it is impracticable to fix an increase in price definitely in advance, the order may fix a maximum price which shall not under any circumstances, be exceeded, and subject to such limitation, such alteration, modification, or extra shall be paid for at the actual necessary cost as determined by the City of Tacoma, which cost (including an allowance for profit) shall be determined as the sum of the following items (1) to (7) inclusive:

1. Labor, computed at regular wage scale, including premium on compensation insurance and charge for social security taxes, and other taxes, pertaining to labor; no charge for premium pay shall be allowed unless authorized by the Engineer administering the Contract;

2. The proportionate cost of premiums on comprehensive general liability and other insurance applicable to the extra work involved and required under this Contract;

3. Material, including sales taxes pertaining to materials;

4. Plant and equipment rental, to be agreed upon in writing before the work is begun; no charge for the cost of repairs to plant or equipment will be allowed;

5. Superintendence, general expense and profit computed at 20 percent of the total of paragraphs (1) to (4) inclusive;

6. The proportionate cost of premiums on bonds required by this Contract, computed by 1 1/2 percent of the total of paragraphs (1) to (5) inclusive.

7. The City of Tacoma reserves the right to furnish such materials as it may deem expedient, and no allowance will be made for profit thereon.

Whenever any extra work is in progress, for which the definite price has not been agreed on in advance, the Contractor shall each day, report to the Engineer the amount and cost of the labor and material used, and any other expense incurred in such extra work on the preceding day, and no claim for compensation for such extra work will be allowed unless such report shall have been made.
The above-described methods of determining the payment for work and materials shall not apply to the performance of any work or the furnishing of any material, which, in the judgment of the Engineer administering the Contract, may properly be classified under items for which prices are established in the Contract.

D. Claims for Extra Work

If the Contractor claims that any instructions by drawings or otherwise, involve extra cost under this Contract, he/she shall give the City of Tacoma written notice thereof within 30 days after receipt of such instruction, and in any event before proceeding to execute the work, except in an emergency endangering life or property, and the procedures governing the same shall be as provided for immediately above in this paragraph. The method in these paragraphs is the only method available to the Contractor for payment of claims for extra work performed under the terms of this Contract.

3.11 CLEANING UP

The Contractor shall at all times, at his/her own expense, keep the premises free from accumulation of waste materials or debris caused by any workers or the work, at the completion of the work the Contractor shall remove all his waste materials from and about the site and all his/her equipment, sanitary facilities and surplus materials. In the case of dispute, the City of Tacoma may remove the debris and charge the cost to the Contractor as the City of Tacoma shall determine to be just. All material that is deposited or placed elsewhere than in places designated or approved by the Engineer administering the Contract will not be paid for and the Contractor may be required to remove such material and deposit or place it where directed.

3.12 PROGRESS PAYMENT

Progress payments will be made up to the amount of ninety-five percent (95%) of the actual work completed as shall be determined by the Engineer administering the Contract.

The Contractor may request that an escrow account be established as permitted by law, in which event the Contractor will earn interest on the retained funds.

When the time for construction, services and/or installation will exceed thirty (30) days, the Contractor may request, by invoice, to be paid a progress payment based on percentage of work completed. The Engineer will review and approve the progress payment request on a monthly basis.

3.13 FINAL PAYMENT

The final payment of five percent (5%) of the Contract price shall be approved on final acceptance of the work under this Contract by the Superintendent or his/her designee. In addition, before final payment is made, the Contractor shall be required to:

A. Provide a certificate from the Washington State Department of Revenue that all taxes due from the Contractor have been paid or are collectible in accordance with the provisions of Chapter 60.28 and Title 82 of the Revised Code of Washington;

B. Provide the General Release to the City of Tacoma on the form set forth in these Contract documents;

C. Provide a release of any outstanding liens that have been otherwise filed against any monies held or retained by the City of Tacoma;

D. File with the City Director of Finance, and with the Director of the Washington State Department of Labor and Industries, on the state form to be provided, an affidavit of wages paid;

E. File with the City Director of Finance, on the state form to be provided, a statement from the State of Washington, Department of Labor and Industries, certifying that the prevailing wage requirements have been satisfied.

F. File with the City Director of Finance, on the state form to be provided, a statement of release from the Public Works Contracts Division of the State of Washington, Department of Labor and Industries, verifying that all industrial insurance and medical aid premiums have been paid.

If there is a fee assessed to the City for any certificate, release or other form required by law, the contractor agrees that the fee amount may be passed on to the Contractor and deducted from the monies paid to the Contractor.
3.14 FAILURE TO COMPLETE THE WORK ON TIME

Should the completion of the work required under the Contract be delayed beyond the expiration of the period herein set for the completion of said work, or such extension of said period as may be allowed by reason of unavoidable delays, there shall be deducted from the total Contract price of work, for each calendar day by which such completion shall be delayed beyond said period of such extension thereof the sum of $500 or a sum of money as set forth hereinafter in these Specifications, as the amount of such deduction per calendar day.

Said sum shall be considered not as a penalty, but as liquidated damages, which the City will suffer by reason of the failure of the Contractor to perform and complete the work within the period, herein fixed or such extensions of said period as may be allowed by reason of unavoidable delays.

Any money due or to become due the Contractor may be retained by the City to cover said liquidated damages, and should such money not be sufficient to cover such damages, the City shall have the right to recover the balance from the Contractor or his/her Sureties.

The filing of any bid for the work herein contemplated shall constitute acknowledgment by the Respondent that he/she understands, agrees and has ascertained that the City will actually suffer damages to the amount hereinabove fixed for each and every calendar day during which the completion of the work herein required shall be delayed beyond the expiration of the period herein fixed for such completion or such extension of said period as may be allowed by reason of unavoidable delays.

3.15 CITY RESERVES RIGHT TO USE FACILITIES PRIOR TO ACCEPTANCE

The City of Tacoma hereby reserves the right to use the facilities herein contracted prior to final acceptance under this Contract. The use of said facilities, as mentioned herein, shall not be construed as a waiver or relinquishment of any rights that the City of Tacoma has under this Contract.

3.16 LIST OF SUBCONTRACTORS

Bid proposals for construction, alteration or repair of any building or other public works that may exceed $1,000,000 including tax shall satisfy the following requirement: Respondent shall submit as part of the bid, the names of the subcontractors, with whom the respondent, if awarded the contract, will subcontract performance of the work of heating, ventilation and air conditioning, plumbing as described in chapter 18.106 RCW, and electrical as described in chapter 19.28 RCW, or to name itself for the work. The respondent shall not list more than one subcontractor for each category of work identified, unless subcontractors vary with bid alternates, in which case the respondent must indicate which subcontractor will be used for which alternate. Failure to comply with this provision or the naming of two or more subcontractors to perform the same work shall require the City (pursuant to state law RCW 39.30.060) to determine that respondent's bid is nonresponsive; therefore, the bid will be rejected.
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PART 1  GENERAL PROVISIONS

1.01 DEFINITIONS

Replace the following article in Section 1.01:

Q. “Owner” means the City or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.

Add the following articles to Section 1.01:

AC. “Abbreviations” refer to trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the specifications or other contract documents, they mean recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

AD. “Alternate Bid” (or Alternate) is an amount stated in the Bid to be added or deducted from the amount of the base Bid if the corresponding change in project scope or materials or methods of construction described in the Bidding Documents is accepted.

AE. “Base Bid” is the sum stated in the Bid for which the Bidder offers to perform the work described as the base, to which work may be added or deducted for sums stated in Alternate Bids and Unit Prices. The base bid does not include Allowances, Force Account work and Washington State Sales taxes. Owner shall pay Contractor the Contract Sum plus state sales tax for performance of the Work, in accordance with the Contract Documents.

AF. “Contracting Agency” (or Owner) is the City of Tacoma.

AG. “Contract Provisions” is the publication addressing the work required for an individual project. At the time of the call for bids, the contract provisions may include, for a specific individual project, the general conditions, supplements to the general conditions, the special provisions, a listing of the applicable standard plans, the prevailing minimum hourly wage rates, contract forms, LEAP and EIC requirements.

AH. “Furnish” is used to mean supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and other.

AI. “Indicated” refers to graphic representations, notes or schedules on the drawings, or other paragraphs or schedules in the specifications, and similar requirements in the contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limit on location is intended.

AJ. “Install” is used to describe operations at the project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
AK. “Installer” is the contractor or an entity engaged by the contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

AL. “Provide” means to furnish and install, complete and ready for intended use.

AN. “Unit Price” is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Contract Documents.

1.03 EXECUTION AND INTENT

Add the following to Section 1.03:

The intent of the contract is to be prescribing a complete work. Omissions from the contract of details of work, which are necessary to carry out the contract, shall not relieve the Contractor from performing the omitted work.

1.04 OBJECTIONS TO APPLICATION OF PRODUCTS

Add the following new Section 1.04:

Bidders for this project are required to thoroughly familiarize themselves with specified products and installation procedures and submit to the Senior Buyer any questions or objections (in writing) no later than the date specified on the “Bidder Question Form.” Submittal of Bid constitutes acceptance of products and procedures specified.

1.05 DISQUALIFICATION OF BIDDERS

Add the following new Section 1.05:

A bidder may be deemed not responsible, and the proposal rejected by the Owner for any of the following:

A. More than one bid proposal is submitted for the same project from a bidder under the same or different names;
B. Evidence of collusion exists with any other bidder. Participants in collusion will be restricted from submitting future bids;
C. A bidder is not pre-qualified for the work or to the full extent of the bid;
D. An unsatisfactory performance record exists based on past or current work;
E. There is incomplete work which may hinder or prevent the prompt completion of the work bid upon;
F. The bidder failed to settle bills for labor or materials on past or current contracts;
G. The bidder has failed to complete a written public contract or has been convicted of a crime arising from a previous public contract;
H. The bidder is unable, financially or otherwise, to perform the work;
I. A bidder is not authorized to do business in the state of Washington;
J. Failure by the contractor to properly review the project documents and/or site;
K. The bid proposal was not received by the submittal deadline;
L. The contractor fails to meet the LEAP or EIC requirements as described in these documents;
M. Receipt of addenda is not acknowledged; or
N. There are any other reasons deemed proper by the Owner.

1.06 PRE-AWARD INFORMATION

Add the following new Section 1.06:

Before awarding any contract, the Owner may require one or more of these items or actions of the apparent lowest responsible bidder:

1. A complete statement of the origin, composition, and manufacture of any or all materials to be used,
2. Samples of these materials for quality and fitness tests,
3. A progress schedule (in a form the Owner requires) showing the order of and time required for the various phases of the work,
4. A breakdown of costs assigned to any bid item,
5. Attendance at a conference with the Engineer or representatives of the Engineer,
6. Bid evaluation submittals related to the contractors ability to perform the work including experience on similar projects, project personnel and equipment, and financial resources, or
7. Any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

PART 2 INSURANCE AND BONDS

2.01 CONTRACTOR’S LIABILITY INSURANCE

Replace the entire Section 2.01 with the following:

Insurance shall be per the City’s standard “City of Tacoma Insurance Requirements” provided in the Contract Forms section of the Project Manual.

2.02 COVERAGE LIMITS

Replace the entire Section 2.02 with the following:

Insurance shall be per the City’s standard “City of Tacoma Insurance Requirements” provided in the Contract Forms section of the Project Manual.
2.03 INSURANCE COVERAGE CERTIFICATES

Replace the entire Section 2.03 with the following:

Insurance shall be per the City’s standard “City of Tacoma Insurance Requirements” provided in the Contract Forms section of the Project Manual.

2.04 PAYMENT AND PERFORMANCE BONDS

Add the following to Section 2.04:

For contracts of $150,000 or less, the Contractor may, at the Contractor’s option authorize the Contracting Agency to retain 10% of the contract amount in lieu of furnishing a performance and/or payment bond. For contracts over $150,000, a Payment Bond and Performance Bond shall be obtained by the Contractor utilizing the forms entitled “Payment Bond to the City of Tacoma” and “Performance Bond to the City of Tacoma” as found at the front of the Project Manual under “Contract Forms”.

2.06 BUILDER’S RISK

Replace the entire Section 2.06 with the following:

Insurance shall be per the City’s standard “City of Tacoma Insurance Requirements” provided in the Contract Forms section of the Project Manual.

PART 3 TIME AND SCHEDULE

3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

Delete Section 3.07 B – Actual Damages.

PART 5 PERFORMANCE

5.04 PREVAILING WAGES

Replace Section 5.04 G with the following.

G. Certified Payrolls: Consistent with WAC 296-127-320, the contractor and any subcontractor shall submit a certified copy of payroll records monthly. All certified payrolls must be filled with L&I’s online reporting system consistent with RCW 31.12.120 with a copy of such fillings being provided to the City of Tacoma per and in accordance with the project documents unless specified by owner in writing. Any contractor or subcontractor failing to comply with this requirement will be in violation of RCW 39.12.050.

5.14 AVAILABILITY AND USE OF UTILITY SERVICES

Delete Section 5.14 A – Owner to provide and charge for utilities.
5.15 TESTS AND INSPECTIONS

Replace Section 5.15 A with the following.

A. Testing and inspection of work:

Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

Owner will contract separately with an independent testing laboratory for code required special inspections, if applicable. Contractor shall give Owner timely notice of when and where special inspections are to be made.

5.20 SUBCONTRACTORS AND SUPPLIERS

Delete Section 5.20 E – Automatic assignment of subcontracts.

PART 10 MISCELLANEOUS PROVISIONS

10.11 DIVERSE BUSINESS PARTICIPATION

Replace Section 10.11 with the following:

The City of Tacoma requires participation by Diverse Businesses in its’ contracts as supported by the City’s Equity in Contracting office, Municipal code TMC 1.07.040, RCW chapters 39, 43, and WAC326. Refer to the City Programs section of the contract documents for specific project requirements.
PART 0 – GENERAL CONDITIONS

0.00 EXPLANATION TO PROSPECTIVE BIDDERS

A. In accordance with RCW 39.04.380 effective March 30, 2012, the State of Washington is enforcing a Reciprocal Preference for Resident Contractors. Any public works bid received from a nonresident contractor from a state that provides an in-state percentage bidding preference, a comparable percentage disadvantage must be applied to the bid of that nonresident contractor.

A nonresident contractor from a state that provides a percentage bid preference means a contractor that:

1. Is from a state that provides a percentage bid preference to its resident contractors bidding on public works contracts.

2. At the time of bidding on a public works project, does not have a physical office located in Washington.

The state of residence for a nonresident contractor is the state in which the contractor was incorporated or, if not a corporation, the state where the contractor's business entity was formed.

All nonresident contractors will be evaluated for out-of-state Bidder preference. If the state of the nonresident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

This section does not apply to public works procured pursuant to RCW 39.04.155, 39.04.280, or any other procurement exempt from competitive bidding.

B. Any prospective Bidder desiring an explanation or interpretation of the solicitation, drawings, specifications, etc., must submit a request in writing to the Architect/Engineer (A/E) seven (7) calendar days before the bid due date or by logging into the DES Public Procurement Portal Bonfire (https://deswa.bonfirehub.com) and submitting a vendor discussion. Oral explanations or instructions given before the award of a contract will not be binding. Any information given a prospective Bidder concerning a solicitation will be furnished promptly to all other prospective Bidders by addendum to the solicitation if that information is necessary in submitting bids or if the lack of it would be prejudicial to other prospective Bidders.

C. In accordance with the legislative findings and policies set forth in RCW 39.19 the State of Washington encourages participation in all of its contracts by MWBE firms certified by the Office of Minority and Women’s Business Enterprises (OMWBE). Participation may be either on a direct basis in response to this invitation or as a subcontractor to a Bidder. However, unless required by federal statutes, regulations, grants, or contract terms referenced in the contract documents, no preference will be included in the evaluation of bids, no minimum level of MWBE participation shall be required as a condition for receiving an award, and bids will not be rejected or considered non-responsive on that basis. Any affirmative action requirements set forth in federal regulations or statutes included or referenced in the contract documents will apply.

D. The State of Washington encourages participation in all of its contracts by Veteran-owned businesses (defined in RCW 43.60A.010) and located at

1. In order to report payment detail, the Contractor must create an account in the DES Public Works Diversity Tracking & Management System powered by B2GNow or verify if an account has already been created on behalf of the Contractor: https://des.diversitycompliance.com. The DES Public Works Diversity Tracking & Management System is designed to streamline and automate compliance reporting requirements, empowering vendors to maintain accurate contact information and submit contract payment details online.

2. For account login or account creation details, go to the DES Public Works Diversity Tracking & Management System home page by clicking on the URL listed above and clicking on Information for Vendors.

3. Every month for the duration of the contract, and while the contract is active in the DES Public Works Diversity Tracking & Management System, submit and accurately maintain the following payment information through the DES Public Works Diversity Tracking & Management System:

   (a) Payments received by the prime contractor from the Agency.
   (b) Payments paid to each first tier subcontractor.
   (c) Payments paid to each first tier supplier.

4. The Contractor must also ensure the following information is reported in the DES Public Works Diversity Tracking & Management System by first tier subcontractors and suppliers for the duration of the contract:

   (a) Confirmation of payments from the prime contractor to the subcontractor.
   (b) Payment reporting to each supplier.

E. In accordance with RCW 39.04.320, for all public works estimated to cost one million dollars or more, the State of Washington requires no less than 15% of the labor hours be performed by apprentices, unless otherwise stated in the bid advertisement or on the Submittal Questionnaire/Bidding Terms and Conditions. A contractor or subcontractor may not be required to exceed the 15% requirement. On applicable projects, the Bidder shall establish in the Bonfire Portal and the Submittal Questionnaire/Bidding Terms and Conditions a minimum required percentage of apprentice labor hours compared to the total labor hours. The project’s apprenticeship utilization rate is calculated using the approved affidavits from the L&I portal.

1. Incentives - The Contractor who meets or exceeds this utilization requirement on eligible contracts, will be awarded a monetary incentive described in the Apprentice Utilization Requirements of section 10.12 of the General Conditions.

2. Penalties - The Contractor who fails to meet the utilization requirement and fails to demonstrate a Good Faith Effort, as outlined below, is subject to penalties described in the Apprentice Utilization Requirements section in section 10.12 of the General Conditions. Contractor will receive an invoice payable to the Owner within 30 days.

3. Cost Value - The expected cost value associated with meeting the goal is included in the Base Bid as described in section 10.12 of the General Conditions.

4. Utilization Plan - The Contractor shall provide an Apprentice Utilization Plan (Plan) demonstrating how and when they intend to achieve the Apprenticeship Utilization
Requirement. The Plan shall have enough information to track the Contractor’s progress in meeting the utilization requirement. The Contractor shall submit the Plan on the Apprentice Utilization Plan template (on the DES Public Works Forms website) within 10 business days of Notice to Proceed of the contract and prior to submitting the first invoice. The Contractor shall provide an updated Plan during the course of construction when there are significant changes to the Plan which may affect their ability to meet the requirement.

(a) The Plan shall be uploaded to the Department of Labor & Industries’ (L&I) Prevailing Wage Intents and Affidavit (PWIA) system on L&I’s website.

(b) The Plan is not submitted for approval.

(c) It is expected that the Contractor will actively seek out opportunities to meet the Apprentice Utilization Requirement during construction even if the Plan indicates a shortfall in meeting the requirement.

(d) If the Plan indicates that the Contractor will not attain the Apprentice Utilization Requirement, then Contractor must submit “Good Faith Effort” (GFE) documentation with their Plan to L&I’s PWIA system.

5. **Good Faith Effort (GFE)**

(a) Good Faith Effort (GFE) documentation shall describe in detail why the Contractor is not or was not able to attain the Apprentice Utilization Requirement.

1. Contractors may submit Good Faith Effort (GFE) documentation at any time during the construction.

2. All GFE documentation must be submitted no later than 30 days before substantial completion.

(b) Good Faith Effort (GFE) documentation must be in signed letter format uploaded to the PWIA system and include:

1. The contract number, title, and the apprentice utilization requirements.

2. The amount of apprentice labor hours the contract can or did attain along with the percentage of labor hours.

3. Contractors may receive a GFE credit for graduated Apprentice hours through the end of the calendar year for all projects worked on as long as the Apprentice remains continuously employed with the same Contractor they were working for when they graduated. If an Apprentice graduates during employment on a project of significant duration, they may be counted towards a GFE credit for up to one year after their graduation or until the end of the project (whichever comes first). Determination of whether or not Contract requirements were met in good faith will be made by subtracting the hours from the journeyman total reported hours for the project and adding them to the apprentice hour total. If the new utilization percentage meets the Contract requirement, the Contractor will be reported as meeting the requirement in good faith.

4. Anticipated or actual shortfall (in apprentice labor hours and percentage) and the reason(s) for not attaining the required apprentice labor hours.

5. Information from one or more of the following areas:
6. Backup documentation to the letter consisting of the following:

Letters, emails, phone logs including names dates and outcomes, posters, photos, payrolls, timecards, schedules, copies or references to other contract specifications or documents.

Additional Resource Information

(a) For questions regarding how to complete the Apprentice Utilization Plan template or Good Faith Effort documentation, please contact the Project Manager listed in the Bid Advertisement.

(b) Step-by-step instructions on how to access and navigate the L&I’s PWIA system, including uploading required documents can be found on the L&I website.

(c) Additional information about apprentice utilization on Public Works Project can be found on the L&I website.
If any of the 3 lowest responsive bidders has indicated a cashier’s check as their form of bid security, they will be contacted by DES with instructions on how to submit the original/valid cashier’s check within 48 hours of being notified. The Owner will return bid guarantees (certified check or cashier’s check) to unsuccessful Bidders as soon as practicable, but not sooner than the execution of a contract with the successful Bidder. The successful Bidder’s bid guarantee will be returned to the successful Bidder with its official notice to proceed with the work of the contract.

C. The Bidder will allow 60 days from bid opening date for acceptance of its bid by the Owner.

The Bidder will return to the Owner a signed contract, insurance certificate and bond or bond waiver within 15 days after receipt of the contract. If the apparent successful Bidder fails to sign all contractual documents or provide the bond and insurance as required or return the documents within 15 days after receipt of the contract, the Owner may terminate the award of the contract.

D. In the event a Bidder discovers an error in its bid following the bid opening, the Bidder may request to withdraw its bid under the following conditions:

1. The Bidder must submit written notification of the withdrawal to the Owner within 24 hours following the bid opening.

2. The Bidder provides written documentation of the claimed error to the satisfaction of the Owner within 72 hours following the bid opening.

3. The Owner will approve or disapprove the request for withdrawal of the bid in writing. If the Bidder’s request for withdrawal of its bid is approved, the Bidder will be released from further obligation to the Owner without penalty. If it is disapproved, the Owner may retain the Bidder’s bid guarantee.

0.03 ADDITIVE OR DEDUCTIVE BID ITEMS

The low Bidder, for purposes of award, shall be the responsive Bidder offering the low aggregate amount for the base bid item, plus additive or deductive bid alternates selected by the Owner, and within funds available for the project.

The Bidder agrees to hold all bid alternate prices for sixty (60) days from date of bid opening.

0.04 ACKNOWLEDGEMENT OF ADDENDA

Bidders shall acknowledge receipt of all addenda to this solicitation by identifying the addenda numbers on the Bonfire Submittal Questionnaire. Failure to do so may result in the bid being declared non-responsive.

0.05 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

The Bidder acknowledges that it has taken steps 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 road; (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 the work.

The Bidder also acknowledges that it has satisfied itself as to 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 exploratory work done by the
Owner, as well as from the drawings and specifications made a part of this contract. Any failure of the Bidder to take the actions described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the work.

### 0.06 BID AMOUNTS

A. The bid prices shown for each item on the Bonfire BidTable shall include all labor, material, equipment, overhead and compensation to complete all of the work for that item.

B. The actual cost of building permit (only) and the public utility hookup fees will be a direct reimbursement to the Contractor or paid directly to the permitting agency by the Owner. Fees for these permits should not be included by the Bidder in the bid amount.

C. The Bidder agrees to hold the base bid prices for sixty (60) days from date of bid opening.

### 0.07 TAXES

The bid amounts shall not include Washington State Sales Tax (WSST). All other taxes imposed by law shall be included in the bid amount. The Owner will include WSST in progress payments. The Contractor shall pay the WSST to the Department of Revenue and shall furnish proof of payment to the Owner if requested.

[NOTE: Contractor must bond for contract amount plus the WSST.]

### 0.08 SUBMISSION OF BIDS

A. Bids must be submitted on or before the time as specified in the Advertisement for Bids.

B. The Bid shall be submitted electronically through the Bonfire Portal as specified in the Advertisement for Bids.

C. Prior to the bid opening, the Owner’s representative will designate the official bid clock in the Bonfire Portal. Any part of the bid submission, or in the rare situation of a bid modification, not received prior to the submission received date and times specified, per the designated bid clock, will not be considered and the bidder will not have the availability to submit a bid.

D. A bid may be withdrawn electronically by a Bidder’s authorized representative before the bid submittal date and time specified in the Advertisement for Bids.

E. People with disabilities who wish to request special accommodation, (e.g., sign language interpreters, braille, etc.) need to contact the Owner ten (10) working days prior to the scheduled bid opening.

F. In the event the Bonfire Portal is unavailable to all users at the bid submittal deadline, DES will contact the Bidders within 24 hours and DES will extend the bid submittal time.

G. Neither DES nor Bonfire can guarantee the availability of Internet connectivity or related telecommunication and hosting services and will not be liable or responsible if the Bidder and its representative(s) or designee(s) cannot connect to the Bonfire Portal.

H. The Bidder must comply with the Bonfire Portal’s Terms of Service (https://gobonfire.com/terms-service/) when submitting the Bid through the Bonfire Portal.
0.09 SUBCONTRACTOR LISTING

Pursuant to RCW 39.30.060, if the base bid and the sum of the additive alternates is one million dollars or more, the Bidder shall comply with the following requirements:

A. **WITHIN ONE HOUR OF BID SUBMITTAL TIME**: The Bidder shall provide names of the Subcontractors with whom the Bidder will subcontract for performance of heating, ventilation and air conditioning (HVAC), plumbing, and electrical on Subcontractor List Form A via email.

B. **WITHIN 48 HOURS OF BID SUBMITTAL TIME**: The Bidder shall also provide names of the Subcontractors with whom the Bidder will subcontract for structural steel installation and rebar installation on Subcontractor List Form B via email.

C. The Bidder can name itself for the performance of the work. Bidders who name themselves to perform the work are expected to perform the work and the Department of Enterprise Services reserves the right to reject substitution of the bidder with a subcontractor unless the bidder demonstrates a change in circumstances from the time of bid submission that is outside of the control of the bidder.

D. Substitution of a listed subcontractor (at any tier) before or after the award of the prime contract is prohibited except for the following reasons:

1. Refusal of the listed subcontractor to sign a contract with the prime contractor,
2. Bankruptcy or insolvency of the listed subcontractor,
3. Inability of the listed subcontractor to perform the requirements of the proposed contract or the project,
4. Inability of the listed subcontractor to obtain the necessary license, bonding, insurance, or other statutory requirements to perform the work detailed in the contract,
5. Refusal or inability to provide a letter of bondability from a surety company, or
6. The listed subcontractor is barred from participating in the project as a result of a court order.

E. The Bidder shall not list more than one Subcontractor for each category of work identified UNLESS Subcontractors vary with bid alternates, in which case the Bidder must indicate which Subcontractor will be used for which alternate.

F. Failure of the Bidder to submit Forms A and B within the specified times with the NAMES of such Subcontractors or to name itself to perform such work shall render the Bidder's bid nonresponsive and, therefore, will be eliminated (withdrawn) from the Bonfire Portal.

G. The Subcontractor List Form A is intended to discourage bid shopping, not to verify subcontractor qualifications. DES does not use the Subcontractor List Form A as a tool to disqualify or qualify bidders.

0.10 BID RESULTS

After the Bid Opening, Bidders may obtain bid results from the office of DES Facility Professional Services (FPS) or by logging into the DES Public Procurement Portal Bonfire (https://deswa.bonfirehub.com) and viewing public notices. Bid results may also be obtained from the A/E.

0.11 BID PROTESTS

A. Bidders may submit a bid protest to easmail@des.wa.gov within 2 business days of the Bid Opening, or within 2 business days after DES provided electronic copies of bid submissions received to those Bidders that timely requesting copies of bids received, if later. To be considered timely for purposes of this Section 0.11, a request for electronic copies of bid submissions received must be made within 2 business days after the bid opening.
1. DES will not acknowledge or accept any bid protest received more than 2 business days after the time set out in (A) above.

2. DES will not accept bid protests from non-bidders.

B. DES will review any bid protest received and shall maintain sole discretion on the merits of and resolution of any bid protest.

C. DES will provide written notice to protesting bidders of an intent to enter upon a Public Works Contract with anyone other than the protesting bidder as follows:

1. Not less than 2 business days following the Bid Opening, if no bidders requests electronic copies of bid submissions received, or

2. Not less than 2 business days following the date on which DES provided electronic copies of the bid submissions received to those bidders requesting electronic copies of bids received.

0.12 LOW RESPONSIBLE BIDDER

A. Mandatory Responsibility Criteria: Before award of a public works contract, a Bidder must meet the following mandatory responsibility criteria under RCW 39.04.350 (1) & (2) to be considered a responsible Bidder and qualified to be awarded a public works project. The individual who has signed/submitted the Bid through the Bonfire Portal shall be the authorized designee responsible for bid submissions. The Bidder must:

1. At the time of bid submittal, have a certificate of registration in compliance with RCW 18.27, a plumbing contractor license in compliance with RCW 18.106, an elevator contractor license in compliance with RCW 70.87, or an electrical contractor license in compliance with RCW 19.28 as required under the provisions of those chapters.

2. Have a current state unified business identifier number.

3. If applicable, have industrial insurance coverage for the Bidder’s employees working in Washington as required in RCW 51; an employment security department number as required in RCW 50; and a state excise tax registration number as required in RCW 82.

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010, or 39.12.065(3).

5. If bidding on a public works project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington State Apprenticeship and Training Council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under RCW 49.04 for the one-year period immediately preceding the date of the bid solicitation.

6. Public Works and Prevailing Wage Training/Exemption. Bidders shall have received training on the requirements related to public works and prevailing wage under this chapter and chapter 39.12 RCW. The bidder must designate a person or persons to be trained on these requirements. The training must be provided by the department of labor and industries or by a training provider whose curriculum is approved by the department. The department, in consultation with the prevailing wage advisory committee, must determine the length of the training. Bidders that have completed three or more public works projects and have had a valid business license in Washington for three or more years are exempt from this subsection. The department of labor and industries must keep records of entities
that have satisfied the training requirement or are exempt and make the records available on its website. Responsible parties may rely on the records made available by the department regarding satisfaction of the training requirement or exemption. https://lni.wa.gov/licensing-permits/public-works-projects/contractors-employers/contractor-training

7. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgement entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of RCW 49.46, 49.48, or 49.52. A bidder shall submit a signed Contractor Certification form with the bid or within two (2) business days of request by Owner regarding this wage theft prevention responsible bidder criteria.

B. Supplemental Responsibility Criteria: In addition to the mandatory Bidder responsibility, the Owner may adopt relevant supplemental criteria for determining Bidder responsibility applicable to a particular project which the Bidder must meet (RCW 39.04.350 (3)).

1. If applicable, the Owner shall consider an overall accounting of the attached supplemental criteria for determining Bidder responsibility “DIVISION 00 SUPPLEMENTAL RESPONSIBILITY CRITERIA”.

2. At least seven (7) days prior to the bid submittal deadline, a potential Bidder may request that the Owner modify the supplemental responsibility criteria. The Owner will evaluate the information submitted by the potential Bidder and respond before the bid submittal deadline through the Bonfire Portal. If the evaluation results in a change of the criteria, the Owner will issue an addendum to the bidding documents identifying the new criteria. The addendum will be posted as a public notice in the Bonfire Portal.

3. Upon Owner’s request, the apparent low Bidder must supply the requested responsibility information within two (2) business days of request by Owner. Withholding information or failure to submit all the information requested within the time provided may render the bid non-responsive.

4. If the Owner determines that the apparent low Bidder is not responsible, the Owner will notify the Bidder of its preliminary determination in writing.

5. After receipt of the preliminary determination, the Bidder may withdraw its bid submission before the bid submittal deadline through the Bonfire Portal or request a hearing where the Bidder may appeal the preliminary determination and present additional information to the Owner.

6. The Owner will schedule a hearing within three (3) working days of receipt of the Bidder’s request. The hearing members will include a Client Agency Representative, EAS Assistant Director or designee, Deputy Assistant Director or designee, and Project Manager.

7. The Owner will issue a Final Determination after reviewing information presented at the hearing.

8. If the Owner determines a Bidder to be not responsible, the Owner will provide, in writing, the reasons for the determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until two (2)
business days after the Bidder determined to be not responsible has received the final
determination.

9. The Owner’s Final Determination is specific to this project and will have no effect on other
or future projects.

0.13 CONTRACT AWARD

A. The Owner will evaluate bids responsiveness and responsibility in the DES Public Procurement

1. A bid will be considered responsive if it meets the following requirements:
   
   (a) It is received at the proper submittal time, date, and location online through the Bonfire
   Portal.
   
   (b) It meets the required requested information through the Bonfire Portal.
   
   (c) It is submitted by a licensed/registered contractor within the state of Washington at the
time of bid opening and is not banned from bidding by the Department of Labor and
Industries.
   
   (d) It is accompanied by a bid guarantee, if required.

2. A bid will be considered responsible if it meets the following requirements:
   
   (a) It meets the mandatory responsibility criteria established in RCW 39.04.350 and an
   overall accounting of the supplemental responsibility criteria established for the project.
   
   (b) The bidder completes, signs, and submits the “Contractor Certification Wage Theft
   Prevention – Responsible Bidder Criteria” form with their bid submission or within
two (2) business days of request by the Owner.

B. The Owner reserves the right to accept or reject any or all bids and to waive informalities.

C. The Owner may negotiate bid price adjustments with the low responsive Bidder, including
changes in the contract documents, to bring the bid within the available funding per RCW
39.04.015.

D. The apparent low Bidder, for purpose of award, shall be the responsive and responsible Bidder
offering the low aggregate amount for the base bid plus selected additive or deductive bid
alternates and meeting all other bid submittal requirements.

E. Reciprocal Preference for Resident Contractors. For a public works bid received from a
nonresident contractor from a state that provides an in-state percentage bidding preference, a
Comparable Percentage Disadvantage (CPD) will be applied to the bid of that nonresident
contractor. The CPD is the in-state contractor percent advantage provided by the contractor’s
home state.

For the purpose of determining the successful Bidder, multiply the Nonresident Contractor bid
amount by the CPD. The “bid amount” shall be the total of the base bid and all accepted
alternate bid items. The CPD shall be added to the Nonresident Contractor bid amount which
equates to the Nonresident Disadvantage Total. The Nonresident Disadvantage Total shall be
compared to the Washington contractor bid amounts. The Bidder with the lowest total shall be
the successful Bidder. See example below:
EXAMPLE:

<table>
<thead>
<tr>
<th>Alaska Nonresident Contractor Bid Amount</th>
<th>$100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplied by the Alaska CPD</td>
<td>x 0.05</td>
</tr>
<tr>
<td>Alaska CPD Total</td>
<td>$ 5,000</td>
</tr>
</tbody>
</table>

Alaska Nonresident Contractor Bid Amount $100,000
Alaska CPD Total $ 5,000
Nonresident Disadvantage Total $105,000*

* Note – If the Nonresident Disadvantage Total is lower than all other Washington contractor bid amounts, the Alaska Nonresident Contractor is the successful Bidder and will be awarded a contract for the bid amount of $100,000.

If the Nonresident Disadvantage Total is higher than a Washington contractor bid amount, the successful Washington Bidder will be awarded a contract for the bid amount.

F. The Contract will only become effective when signed by the Owner. Prior to the Owner’s signature, any and all costs incurred shall be the sole responsibility of the Bidder.

0.14 DOCUMENTS (ATTACHED)

A. Advertisement for Bids
B. Bidding Terms and Conditions
C. Subcontractor Listing Forms A & B
D. Supplemental Bidder Responsibility Criteria (if applicable)
E. Certificate of Insurance form
F. Special Conditions (if applicable)

Note: AIA Payment Bond and Performance Bond current forms (A312) are required, when applicable. These forms will not be provided by the Owner.
PART 1 - GENERAL PROVISIONS

PART 2 - INSURANCE AND BONDS

PART 3 - TIME AND SCHEDULE

PART 4 - SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

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PART 1 - GENERAL PROVISIONS

1.01 DEFINITIONS

A. “Application for Payment” means a written request submitted by Contractor to A/E for payment of Work completed in accordance with the Contract Documents and approved Schedule of Values, supported by such substantiating data as Owner or A/E may require.

B. “Architect,” “Engineer,” or “A/E” means a person or entity lawfully entitled to practice architecture or engineering, representing Owner within the limits of its delegated authority.

C. “Change Order” means a written instrument signed by Owner and Contractor stating their agreement upon all of the following: (1) a change in the Work; (2) the amount of the adjustment in the Contract Sum, if any, and (3) the extent of the adjustment in the Contract Time, if any.

D. “Claim” means Contractor’s exclusive remedy for resolving disputes with Owner regarding the terms of a Change Order or a request for equitable adjustment, as more fully set forth in Part 8.

E. “Contract Award Amount” is the sum of the Base Bid and any accepted Alternates.

F. “Contract Documents” means the Advertisement for Bids, Instructions for Bidders, completed bid submission on the DES Public Procurement Portal Bonfire (https://deswa.bonfirehub.com), General Conditions, Modifications to the General Conditions, Supplemental Conditions, Public Works Contract, other Special Forms, Drawings and Specifications, and all addenda and modifications thereof.

G. “Contract Sum” is the total amount payable by Owner to Contractor, for performance of the Work in accordance with the Contract Documents, including all taxes imposed by law and properly chargeable to the Work, except Washington State sales tax.

H. “Contract Time” is the number of calendar days allotted in the Contract Documents for achieving Substantial Completion of the Work.

I. “Contractor” means the person or entity who has agreed with Owner to perform the Work in accordance with the Contract Documents.

J. “Day(s): Unless otherwise specified, day(s) shall mean calendar day(s).”

K. “Drawings” are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, and may include plans, elevations, sections, details, schedules, and diagrams.

L. “Final Acceptance” means the written acceptance issued to Contractor by Owner after Contractor has completed the requirements of the Contract Documents, as more fully set forth in Section 6.09 B.

M. “Final Completion” means that the Work is fully and finally complete in accordance with the Contract Documents, as more fully set forth in Section 6.09 A.

N. “Force Majeure” means those acts entitling Contractor to request an equitable adjustment in the Contract Time, as more fully set forth in paragraph 3.05A.

O. “Notice” means a written notice that has been delivered to the authorized representative or officer of the addressed party by registered or certified mail, or by email as a PDF attachment. Notices should clearly identify the project number and date of notice.
P. “Notice to Proceed” means a notice from Owner to Contractor that defines the date on which the Contract Time begins to run.

Q. “Owner” means the state agency, institution, or its authorized representative with the authority to enter into, administer, and/or terminate the Work in accordance with the Contract Documents and make related determinations and findings.

R. “Person” means a corporation, partnership, business association of any kind, trust, company, or individual.

S. “Prior Occupancy” means Owner’s use of all or parts of the Project before Substantial Completion, as more fully set forth in Section 6.08 A.

T. “Progress Schedule” means a schedule of the Work, in a form satisfactory to Owner, as further set forth in Section 3.02.

U. “Project” means the total construction of which the Work performed in accordance with the Contract Documents may be the whole or a part and which may include construction by Owner or by separate contractors.

V. “Project Record” means the separate set of Drawings and Specifications as further set forth in paragraph 4.02A.

W. “Schedule of Values” means a written breakdown allocating the total Contract Sum to each principal category of Work, in such detail as requested by Owner.

X. “Specifications” are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

Y. “Subcontract” means a contract entered into by Subcontractor for the purpose of obtaining supplies, materials, equipment, or services of any kind for or in connection with the Work.

Z. “Subcontractor” means any person, other than Contractor, who agrees to furnish or furnishes any supplies, materials, equipment, or services of any kind in connection with the Work.

AA. “Substantial Completion” means that stage in the progress of the Work when the construction is sufficiently complete, as more fully set forth in Section 6.07.

AB. “Work” means the construction and services required by the Contract Documents, and includes, but is not limited to, labor, materials, supplies, equipment, services, permits, and the manufacture and fabrication of components, performed, furnished, or provided in accordance with the Contract Documents.

1.02 ORDER OF PRECEDENCE

Any conflict or inconsistency in the Contract Documents shall be resolved by giving the documents precedence in the following order:

1. Signed Public Works Contract, including any Change Orders.
2. Supplemental Conditions.
3. Modifications to the General Conditions.
4. General Conditions.
5. Specifications. Provisions in Division 1 shall take precedence over provisions of any other Division.
6. Drawings. In case of conflict within the Drawings, large-scale drawings shall take precedence over small-scale drawings.


8. Advertisement for Bids.

1.03 **EXECUTION AND INTENT**

**Contractor Representations:** Contractor makes the following representations to Owner:

1. **Contract Sum reasonable:** The Contract Sum is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work, as represented by the Contract Documents;

2. **Contractor familiar with project:** Contractor has carefully reviewed the Contract Documents, visited and examined the Project site, become familiar with the local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and subsurface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof;

3. **Contractor financially capable:** Contractor is financially solvent, able to pay its debts as they mature, and possesses sufficient working capital to complete the Work and perform Contractor’s obligations required by the Contract Documents; and

4. **Contractor can complete Work:** Contractor is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform the obligations required by the Contract Documents and has sufficient experience and competence to do so.

**PART 2 – INSURANCE AND BONDS**

**2.01 CONTRACTOR’S LIABILITY INSURANCE**

**General insurance requirements:** Prior to commencement of the Work, Contractor shall obtain all the insurance required by the Contract Documents and provide evidence satisfactory to Owner that such insurance has been procured. Review of the Contractor’s insurance by Owner shall not relieve or decrease the liability of Contractor. Companies writing the insurance to be obtained by this part shall be licensed to do business under Chapter 48 RCW or comply with the Surplus Lines Law of the State of Washington. Contractor shall include in its bid the cost of all insurance and bond costs required to complete the base bid work and accepted alternates. Insurance carriers providing insurance in accordance with the Contract Documents shall be acceptable to Owner, and its A.M. Best rating shall be indicated on the insurance certificates.

**A. Term of insurance coverage:** Contractor shall maintain the following insurance coverage during the Work and for one year after Final Acceptance. Contractor shall also maintain the following insurance coverage during the performance of any corrective Work required by Section 5.16.

1. **General Liability Insurance:** Commercial General Liability (CGL) on an Occurrence Form. Coverage shall include, but not be limited to:
   a. Completed operations/products liability;
   b. Explosion, collapse, and underground; and
   c. Employer’s liability coverage.
2. **Automobile Liability Insurance**: Automobile liability

B. **Industrial Insurance compliance**: Contractor shall comply with the Washington State Industrial Insurance Act and, if applicable, the Federal Longshoremen’s and Harbor Workers’ Act and the Jones Act.

C. **Insurance to protect for the following**: All insurance coverages shall protect against claims for damages for personal and bodily injury or death, as well as claims for property damage, which may arise from operations in connection with the Work whether such operations are by Contractor or any Subcontractor.

D. **Owner as Additional Insured**: All insurance coverages shall be endorsed to include Owner as an additional named insured for Work performed in accordance with the Contract Documents, and all insurance certificates shall evidence the Owner as an additional insured.

### 2.02 COVERAGE LIMITS

A. **Insurance Coverage Certificates and Policies**

The Contractor shall furnish acceptable proof of insurance coverage on the state of Washington Certificate of Insurance form SF500A, dated 07/02/92 or ACORD form, as well as copies of insurance policies.

B. **Required Insurance Coverages**

1. For a contract less than $100,000.00, the coverage required is:
   
   a. **Comprehensive General Liability Insurance** – The Contractor shall at all times during the term of this contract, at its cost and expense, carry and maintain general public liability insurance, including contractual liability, against claims for bodily injury, personal injury, death or property damage occurring or arising out of services provided under this contract. This insurance shall cover claims caused by any act, omission, or negligence of the Contractor or its officers, agents, representatives, assigns or servants. The limits of liability insurance, which may be increased as deemed necessary by the contracting parties, shall be:

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Occurrence</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>General Aggregate Limits</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>(other than products – commercial operations)</td>
<td></td>
</tr>
<tr>
<td>Products – Commercial Operations Limit</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>Personal and Advertising Injury Limit</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>Fire Damage Limit (any one fire)</td>
<td>$50,000.00</td>
</tr>
<tr>
<td>Medical Expense Limit (any one person)</td>
<td>$5,000.00</td>
</tr>
</tbody>
</table>

   b. If the contract is for underground utility work, then the Contractor shall provide proof of insurance for that above in the form of Explosion, Collapse and Underground (XCU) coverage.

   c. **Employers Liability on an occurrence basis in an amount not less than $1,000,000.00 per occurrence.**

2. For contracts over $100,000.00 but less than $5,000,000.00 the contractor shall obtain the coverage limits as listed for contracts below $100,000.00 and General Aggregate and Products – Commercial Operations Limit of not less than $2,000,000.00.
3. Coverage for Comprehensive General Bodily Injury Liability Insurance for a contract over $5,000,000.00 is:

   Each Occurrence $2,000,000.00
   General Aggregate Limits $4,000,000.00
   (other than products – commercial operations)
   Products – Commercial Operations limit $4,000,000.00
   Personal and Advertising Injury Limit $2,000,000.00
   Fire Damage Limit (any one fire) $50,000.00
   Medical Expense Limit (any one Person) $5,000.00

4. For all Contracts – Automobile Liability: in the event that services delivered pursuant to this contract involve the use of vehicles or the transportation of clients, automobile liability insurance shall be required. If Contractor-owned personal vehicles are used, a Business Automobile Policy covering at a minimum Code 2 “owned autos only” must be secured. If Contractor employee’s vehicles are used, the Contractor must also include under the Business Automobile Policy Code 9, coverage for non-owned autos. The minimum limits for automobile liability is: $1,000,000.00 per occurrence, using a combined single limit for bodily injury and property damage.

5. For Contracts for Hazardous Substance Removal (Asbestos Abatement, PCB Abatement, etc.)

   a. In addition to providing insurance coverage for the project as outlined above, the Contractor shall provide Pollution Liability insurance for the hazardous substance removal as follows:

      EACH OCCURRENCE AGGREGATE
      $500,000.00 $1,000,000.00

      or $1,000,000.00 each occurrence/aggregate bodily injury and property damage combined single limit.

      i. Insurance certificate must state that the insurer is covering hazardous substance removal.

      ii. Should this insurance be secured on a “claims made” basis, the coverage must be continuously maintained for one year following the project’s “final completion” through official completion of the project, plus one year following.

   For Contracts where hazardous substance removal is a subcomponent of contracted work, the general contractor shall provide to the Owner a certificate of insurance for coverage as defined in 5a. above. The State of Washington must be listed as an additional insured. This certificate of insurance must be provided to the Owner prior to commencing work.

2.03 INSURANCE COVERAGE CERTIFICATES

   A. Certificate required: Prior to commencement of the Work, Contractor shall furnish to Owner a completed certificate of insurance coverage.

   B. List Project info: All insurance certificates shall name Owner’s Project number and Project title.

   C. Cancellation provisions: All insurance certificates shall specifically require 45 Days prior notice to Owner of cancellation or any material change, except 30 Days for surplus line insurance.
2.04 PAYMENT AND PERFORMANCE BONDS

Conditions for bonds: Payment and performance bonds for 100% of the Contract Award Amount, plus state sales tax, shall be furnished for the Work, using the Payment Bond and Performance Bond form published by and available from the American Institute of Architects (AIA) – form A312. Prior to execution of a Change Order that, cumulatively with previous Change Orders, increases the Contract Award Amount by 15% or more, the Contractor shall provide either new payment and performance bonds for the revised Contract Sum, or riders to the existing payment and performance bonds increasing the amount of the bonds. The Contractor shall likewise provide additional bonds or riders when subsequent Change Orders increase the Contract Sum by 15% or more.

No payment or performance bond is required if the Contract Sum is $150,000 or less and the Contractor or General Contractor/Construction Manager agrees that Owner may, in lieu of the bond, retain 10% of the Contract Sum for the period allowed by RCW 39.08.010.

2.05 ALTERNATIVE SURETY

When alternative surety required: Contractor shall promptly furnish payment and performance bonds from an alternative surety as required to protect Owner and persons supplying labor or materials required by the Contract Documents if:

A. Owner has a reasonable objection to the surety; or

B. Any surety fails to furnish reports on its financial condition if required by Owner.

2.06 BUILDER’S RISK

A. Contractor to buy Property Insurance: Contractor shall purchase and maintain property insurance in the amount of the Contract Sum including all Change Orders for the Work on a replacement cost basis until Substantial Completion. For projects not involving New Building Construction, “Installation Floater” is an acceptable substitute for the Builder’s Risk Insurance. The insurance shall cover the interest of Owner, Contractor, and any Subcontractors, as their interests may appear.

B. Losses covered: Contractor property insurance shall be placed on an “all risk” basis and insure against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings, debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for A/E’s services and expenses required as a result of an insured loss.

C. Waiver of subrogation rights: Owner and Contractor waive all subrogation rights against each other, any Subcontractors, A/E, A/E’s subconsultants, separate contractors described in Section 5.20, if any, and any of their subcontractors, for damages caused by fire or other perils to the extent covered by property insurance obtained pursuant to this section or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by Owner as fiduciary. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.
PART 3 – TIME AND SCHEDULE

3.01 PROGRESS AND COMPLETION

Contractor to meet schedule: Contractor shall diligently prosecute the Work, with adequate forces, achieve Substantial Completion within the Contract Time, and achieve Final Completion within a reasonable period thereafter.

3.02 CONSTRUCTION SCHEDULE

A. Preliminary Progress Schedule: Unless otherwise provided in Division 1, Contractor shall, within 14 Days after issuance of the Notice to Proceed, submit a preliminary Progress Schedule. The Progress Schedule shall show the sequence in which Contractor proposes to perform the Work, and the dates on which Contractor plans to start and finish major portions of the Work, including dates for shop drawings and other submittals, and for acquiring materials and equipment.

B. Form of Progress Schedule: The Progress Schedule shall be in the form of a Critical Path Method (CPM) logic network or, with the approval of the Owner, a bar chart schedule may be submitted. The scheduling of construction is the responsibility of the Contractor and is included in the contract to assure adequate planning and execution of the work. The schedule will be used to evaluate progress of the work for payment based on the Schedule of Values. The schedule shall show the Contractor’s planned order and interdependence of activities, and sequence of work. As a minimum the schedule shall include:

1. Date of Notice to Proceed;
2. Activities (resources, durations, individual responsible for activity, early starts, late starts, early finishes, late finishes, etc.);
3. Utility Shutdowns;
4. Interrelationships and dependence of activities;
5. Planned vs. actual status for each activity;
6. Substantial completion;
7. Punch list;
8. Final inspection;
9. Final completion, and
10. Float time

The Schedule Duration shall be based on the Contract Time of Completion listed on the Bonfire Submittal Questionnaire in the Bonfire Portal. The Owner shall not be obligated to accept any Early Completion Schedule suggested by the Contractor. The Contract Time for Completion shall establish the Schedule Completion Date.

If the Contractor feels that the work can be completed in less than the Specified Contract Time, then the Surplus Time shall be considered Project Float. This Float time shall be shown on the Project Schedule. It shall be available to accommodate changes in the work and unforeseen conditions.

Neither the Contractor nor the Owner have exclusive right to this Float Time. It belongs to the project.

C. Owner comments on Progress Schedule: Owner shall return comments on the preliminary Progress Schedule to Contractor within 14 Days of receipt. Review by Owner of Contractor’s schedule does not constitute an approval or acceptance of Contractor’s construction means, methods, or sequencing, or its ability to complete the Work within the Contract Time. Contractor shall revise and resubmit its schedule, as necessary. Owner may withhold a portion of progress payments until a Progress Schedule has been submitted which meets the requirements of this section.
D. Monthly updates and compliance with Progress Schedule: Contractor shall utilize and comply with the Progress Schedule. On a monthly basis, or as otherwise directed by Owner, Contractor shall submit an updated Progress Schedule at its own expense to Owner indicating actual progress. If, in the opinion of Owner, Contractor is not in conformance with the Progress Schedule for reasons other than acts of Force Majeure as identified in Section 3.05, Contractor shall take such steps as are necessary to bring the actual completion dates of its work activities into conformance with the Progress Schedule, and if directed by Owner, Contractor shall submit a corrective action plan or revise the Progress Schedule to reconcile with the actual progress of the Work.

E. Contractor to notify Owner of delays: Contractor shall promptly notify Owner in writing of any actual or anticipated event which is delaying or could delay achievement of any milestone or performance of any critical path activity of the Work. Contractor shall indicate the expected duration of the delay, the anticipated effect of the delay on the Progress Schedule, and the action being or to be taken to correct the problem. Provision of such notice does not relieve Contractor of its obligation to complete the Work within the Contract Time.

3.03 OWNER’S RIGHT TO SUSPEND THE WORK FOR CONVENIENCE

A. Owner may suspend Work: Owner may, at its sole discretion, order Contractor, in writing, to suspend all or any part of the Work for up to 90 Days, or for such longer period as mutually agreed.

B. Compliance with suspension; Owner’s options: Upon receipt of a written notice suspending the Work, Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of cost of performance directly attributable to such suspension. Within a period up to 90 Days after the notice is delivered to Contractor, or within any extension of that period to which the parties shall have agreed, Owner shall either:

1. Cancel the written notice suspending the Work; or

2. Terminate the Work covered by the notice as provided in the termination provisions of Part 9.

C. Resumption of Work: If a written notice suspending the Work is cancelled or the period of the notice or any extension thereof expires, Contractor shall resume Work.

D. Equitable Adjustment for suspensions: Contractor shall be entitled to an equitable adjustment in the Contract Time, or Contract Sum, or both, for increases in the time or cost of performance directly attributable to such suspension, provided Contractor complies with all requirements set forth in Part 7.

3.04 OWNER’S RIGHT TO STOP THE WORK FOR CAUSE

A. Owner may stop Work for Contractor’s failure to perform: If Contractor fails or refuses to perform its obligations in accordance with the Contract Documents, Owner may order Contractor, in writing, to stop the Work, or any portion thereof, until satisfactory corrective action has been taken.

B. No Equitable Adjustment for Contractor’s failure to perform: Contractor shall not be entitled to an equitable adjustment in the Contract Time or Contract Sum for any increased cost or time of performance attributable to Contractor’s failure or refusal to perform or from any reasonable remedial action taken by Owner based upon such failure.
3.05 DELAY

A. Force Majeure actions not a default; Force Majeure defined: Any delay in or failure of performance by Owner or Contractor, other than the payment of money, shall not constitute a default hereunder if and to the extent the cause for such delay or failure of performance was unforeseeable and beyond the control of the party (“Force Majeure”). Acts of Force Majeure include, but are not limited to:

1. Acts of God or the public enemy;
2. Acts or omissions of any government entity;
3. Fire or other casualty for which Contractor is not responsible;
4. Quarantine or epidemic;
5. Strike or defensive lockout;
6. Unusually severe weather conditions which could not have been reasonably anticipated; and
7. Unusual delay in receipt of supplies or products which were ordered and expedited and for which no substitute reasonably acceptable to Owner was available.

B. Contract Time adjustment for Force Majeure: Contractor shall be entitled to an equitable adjustment in the Contract Time for changes in the time of performance directly attributable to an act of Force Majeure, provided it makes a request for equitable adjustment according to Section 7.03. Contractor shall not be entitled to an adjustment in the Contract Sum resulting from an act of Force Majeure.

C. Contract Time or Contract Sum adjustment if Owner at fault: Contractor shall be entitled to an equitable adjustment in Contract Time, and may be entitled to an equitable adjustment in Contract Sum, if the cost or time of Contractor’s performance is changed due to the fault or negligence of Owner, provided the Contractor makes a request according to Sections 7.02 and 7.03.

D. No Contract Time or Contract Sum adjustment if Contractor at fault: Contractor shall not be entitled to an adjustment in Contract Time or in the Contract Sum for any delay or failure of performance to the extent such delay or failure was caused by Contractor or anyone for whose acts Contractor is responsible.

E. Contract Time adjustment only for concurrent fault: To the extent any delay or failure of performance was concurrently caused by the Owner and Contractor, Contractor shall be entitled to an adjustment in the Contract Time for that portion of the delay or failure of performance that was concurrently caused, provided it makes a request for equitable adjustment according to Section 7.03, but shall not be entitled to an adjustment in Contract Sum.

F. Contractor to mitigate delay impacts: Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise.

3.06 NOTICE TO OWNER OF LABOR DISPUTES

A. Contractor to notify Owner of labor disputes: If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract Documents, Contractor shall immediately give notice, including all relevant information, to Owner.
B. **Pass through notification provisions to Subcontractors:** Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by delay by any actual or potential labor dispute, the Subcontractor or Sub-subcontractor shall immediately notify the next higher tier Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

### 3.07 DAMAGES FOR FAILURE TO ACHIEVE TIMELY COMPLETION

**A. Liquidated Damages**

1. **Reason for Liquidated Damages:** Timely performance and completion of the Work is essential to Owner and time limits stated in the Contract Documents are of the essence. Owner will incur serious and substantial damages if Substantial Completion of the Work does not occur within the Contract Time. However, it would be difficult if not impossible to determine the exact amount of such damages. Consequently, provisions for liquidated damages are included in the Contract Documents.

2. **Calculation of Liquidated Damages amount:** The liquidated damage amounts set forth in the Contract Documents will be assessed not as a penalty, but as liquidated damages for breach of the Contract Documents. This amount is fixed and agreed upon by and between the Contractor and Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. This amount shall be construed as the actual amount of damages sustained by the Owner, and may be retained by the Owner and deducted from periodic payments to the Contractor.

3. **Contractor responsible even if Liquidated Damages assessed:** Assessment of liquidated damages shall not release Contractor from any further obligations or liabilities pursuant to the Contract Documents.

**B. Actual Damages**

**Calculation of Actual Damages:** Actual damages will be assessed for failure to achieve Final Completion within the time provided. Actual damages will be calculated on the basis of direct architectural, administrative, and other related costs attributable to the Project from the date when Final Completion should have been achieved, based on the date Substantial Completion is actually achieved, to the date Final Completion is actually achieved. Owner may offset these costs against any payment due Contractor.

### PART 4 – SPECIFICATIONS, DRAWINGS, AND OTHER DOCUMENTS

**4.01 DISCREPANCIES AND CONTRACT DOCUMENT REVIEW**

**A. Specifications and Drawings are basis of the Work:** The intent of the Specifications and Drawings is to describe a complete Project to be constructed in accordance with the Contract Documents. Contractor shall furnish all labor, materials, equipment, tools, transportation, permits, and supplies, and perform the Work required in accordance with the Drawings, Specifications, and other provisions of the Contract Documents.

**B. Parts of the Contract Documents are complementary:** The Contract Documents are complementary. What is required by one part of the Contract Documents shall be binding as if required by all. 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.
C. Contractor to report discrepancies in Contract Documents: Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by Owner. If, during the performance of the Work, Contractor finds a conflict, error, inconsistency, or omission in the Contract Documents, it shall promptly and before proceeding with the Work affected thereby, report such conflict, error, inconsistency, or omission to A/E in writing.

D. Contractor knowledge of discrepancy in documents – responsibility: Contractor shall do no Work without applicable Drawings, Specifications, or written modifications, or Shop Drawings where required, unless instructed to do so in writing by Owner. If Contractor performs any construction activity, and it knows or reasonably should have known that any of the Contract Documents contain a conflict, error, inconsistency, or omission, Contractor shall be responsible for the performance and shall bear the cost for its correction.

E. Contractor to perform Work implied by Contract Documents: Contractor shall provide any work or materials the provision of which is clearly implied and is within the scope of the Contract Documents even if the Contract Documents do not mention them specifically.

F. Interpretation questions referred to A/E: Questions regarding interpretation of the requirements of the Contract Documents shall be referred to the A/E.

4.02 PROJECT RECORD

A. Contractor to maintain Project Record Drawings and Specifications: Contractor shall legibly mark in ink on a separate set of the Drawings and Specifications all actual construction, including depths of foundations, horizontal and vertical locations of internal and underground utilities and appurtenances referenced to permanent visible and accessible surface improvements, field changes of dimensions and details, actual suppliers, manufacturers and trade names, models of installed equipment, and Change Order Proposals (COP). This separate set of Drawings and Specifications shall be the “Project Record.”

B. Update Project Record weekly and keep on site: The Project Record shall be maintained on the project site throughout the construction and shall be clearly labeled “PROJECT RECORD.” The Project Record shall be updated at least weekly noting all changes and shall be available to Owner at all times.

C. Final Project Record to A/E before Final Acceptance: Contractor shall submit the completed and finalized Project Record to A/E prior to Final Acceptance.

4.03 SHOP DRAWINGS

A. Definition of Shop Drawings: “Shop Drawings” means documents and other information required to be submitted to A/E by Contractor pursuant to the Contract Documents, showing in detail: the proposed fabrication and assembly of structural elements; and the installation (i.e. form, fit, and attachment details) of materials and equipment. Shop Drawings include, but are not limited to, drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, samples, and similar materials furnished by Contractor to explain in detail specific portions of the Work required by the Contract Documents. For materials and equipment to be incorporated into the Work, Contractor submittal shall include the name of the manufacturer, the model number, and other information concerning the performance, capacity, nature, and rating of the item. When directed, Contractor shall submit all samples at its own expense. Owner may duplicate, use, and disclose Shop Drawings provided in accordance with the Contract Documents.

B. Approval of Shop Drawings by Contractor and A/E: Contractor shall coordinate all Shop Drawings, and review them for accuracy, completeness, and compliance with the Contract Documents and shall indicate its approval thereon as evidence of such coordination and review.
Where required by law, Shop Drawings shall be stamped by an appropriate professional licensed by the state of Washington. Shop Drawings submitted to A/E without evidence of Contractor’s approval shall be returned for resubmission. Contractor shall review, approve, and submit Shop Drawings with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of Owner or separate contractors. Contractor’s submittal schedule shall allow a reasonable time for A/E review. A/E will review, approve, or take other appropriate action on the Shop Drawings. Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings until the respective submittal has been reviewed and the A/E has approved or taken other appropriate action. Owner and A/E shall respond to Shop Drawing submittals with reasonable promptness. Any Work by Contractor shall be in accordance with reviewed Shop Drawings. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

C. Contractor not relieved of responsibility when Shop Drawings approved: Approval, or other appropriate action with regard to Shop Drawings, by Owner or A/E shall not relieve Contractor of responsibility for any errors or omissions in such Shop Drawings, nor from responsibility for compliance with the requirements of the Contract Documents. Unless specified in the Contract Documents, review by Owner or A/E shall not constitute an approval of the safety precautions employed by Contractor during construction, or constitute an approval of Contractor’s means or methods of construction. If Contractor fails to obtain approval before installation and the item or work is subsequently rejected, Contractor shall be responsible for all costs of correction.

D. Variations between Shop Drawings and Contract Documents: If Shop Drawings show variations from the requirements of the Contract Documents, Contractor shall describe such variations in writing, separate from the Shop Drawings, at the time it submits the Shop Drawings containing such variations. If A/E approves any such variation, an appropriate Change Order will be issued. If the variation is minor and does not involve an adjustment in the Contract Sum or Contract Time, a Change Order need not be issued; however, the modification shall be recorded upon the Project Record.

E. Contractor to submit 5 copies of Shop Drawings: Unless otherwise provided in Division 1, Contractor shall submit to A/E for approval 5 copies of all Shop Drawings. Unless otherwise indicated, 3 sets of all Shop Drawings shall be retained by A/E and 2 sets shall be returned to Contractor.

4.04 ORGANIZATION OF SPECIFICATIONS

Specification organization by trade: Specifications are prepared in sections which conform generally with trade practices. These sections are for Owner and Contractor convenience and shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by any trade.

4.05 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS, AND OTHER DOCUMENTS

A. A/E, not Contractor, owns Copyright of Drawings and Specifications: The Drawings, Specifications, and other documents prepared by A/E are instruments of A/E’s service through which the Work to be executed by Contractor is described. Neither Contractor nor any Subcontractor shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by A/E, and A/E shall be deemed the author of them and will, along with any rights of Owner, retain all common law, statutory, and other reserved rights, in addition to the copyright. All copies of these documents, except Contractor’s set, shall be returned or suitably accounted for to A/E, on request, upon completion of the Work.

B. Drawings and Specifications to be used only for this Project: The Drawings, Specifications, and other documents prepared by the A/E, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor
on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner and A/E. Contractor and Subcontractors are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by A/E appropriate to and for use in the execution of their Work.

C. **Shop Drawing license granted to Owner:** Contractor and all Subcontractors grant a non-exclusive license to Owner, without additional cost or royalty, to use for its own purposes (including reproduction) all Shop Drawings, together with the information and diagrams contained therein, prepared by Contractor or any Subcontractor. In providing Shop Drawings, Contractor and all Subcontractors warrant that they have authority to grant to Owner a license to use the Shop Drawings, and that such license is not in violation of any copyright or other intellectual property right. Contractor agrees to defend and indemnify Owner pursuant to the indemnity provisions in Section 5.03 and 5.22 from any violations of copyright or other intellectual property rights arising out of Owner’s use of the Shop Drawings hereunder, or to secure for Owner, at Contractor’s own cost, licenses in conformity with this section.

D. **Shop Drawings to be used only for this Project:** The Shop Drawings and other submittals prepared by Contractor, Subcontractors of any tier, or its or their equipment or material suppliers, and copies thereof furnished to Contractor, are for use solely with respect to this Project. They are not to be used by Contractor or any Subcontractor of any tier, or material or equipment supplier, on other projects or for additions to this Project outside the scope of the Work without the specific written consent of Owner. The Contractor, Subcontractors of any tier, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Shop Drawings and other submittals appropriate to and for use in the execution of their Work under the Contract Documents.

### PART 5 – PERFORMANCE

#### 5.01 CONTRACTOR CONTROL AND SUPERVISION

A. **Contractor responsible for Means and Methods of construction:** Contractor shall supervise and direct the Work, using its best skill and attention, and shall perform the Work in a skillful manner. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work, unless the Contract Documents give other specific instructions concerning these matters. Contractor shall disclose its means and methods of construction when requested by Owner.

B. **Competent Superintendent required:** Performance of the Work shall be directly supervised by a competent superintendent who has authority to act for Contractor. The superintendent must be satisfactory to the Owner and shall not be changed without the prior written consent of Owner. Owner may require Contractor to remove the superintendent from the Work or Project site, at no cost to the Owner for delay or any other claim, if Owner reasonably deems the superintendent incompetent, negligent, or otherwise objectionable, provided Owner has first notified Contractor in writing and allowed a reasonable period for transition. Noncompliance with the Owner’s request to remove and replace the superintendent for a material reason shall also be grounds for terminating the Contract for cause.

C. **Contractor responsible for acts and omissions of self and agents:** Contractor shall be responsible to Owner for acts and omissions of Contractor, Subcontractors, and their employees and agents.

D. **Contractor to employ competent and disciplined workforce:** Contractor shall enforce strict discipline and good order among all of the Contractor’s employees and other persons performing the Work. Contractor shall not permit employment of persons not skilled in tasks assigned to them. Contractor’s employees shall at all times conduct business in a manner which assures fair, equal, and nondiscriminatory treatment of all persons. Owner may, by written notice, require
Contractor to remove from the Work or Project site, at no cost to the Owner for delay or any other claim, any employee Owner reasonably deems incompetent, negligent, or otherwise objectionable. Noncompliance with the Owner’s request to remove and replace personnel at any level for a material reason shall also be grounds for terminating the Contract for cause.

E. Contractor to keep project documents on site: Contractor shall keep on the Project site a copy of the Drawings, Specifications, addenda, reviewed Shop Drawings, and permits and permit drawings.

F. Contractor to comply with ethical standards: Contractor shall ensure that its owner(s) and employees, and those of its Subcontractors, comply with the Ethics in Public Service Act RCW 42.52, which, among other things, prohibits state employees from having an economic interest in any public works contract that was made by, or supervised by, that employee. Contractor shall remove, at its sole cost and expense, any of its, or its Subcontractors’ employees, if they are in violation of this act.

5.02 PERMITS, FEES, AND NOTICES

A. Contractor to obtain and pay for permits: Unless otherwise provided in the Contract Documents, Contractor shall pay for and obtain all permits, licenses, and inspections necessary for proper execution and completion of the Work. Prior to Final Acceptance, the approved, signed permits shall be delivered to Owner.

B. Allowances for permit fees: The actual cost of the general building permit (only) and the public utility hook-up fees will be a direct reimbursement to the Contractor or paid directly to the permitting agency by the Owner. Fees for these permits should not be included by the Contractor in his bid amount.

C. Contractor to comply with all applicable laws: Contractor shall comply with and give notices required by all federal, state, and local laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

D. Contractor to submit copies: The General Contractor shall submit copies of each valid permit required on the project to the Owner’s representative. Nothing in this part shall be construed as imposing a duty upon the Owner or A/E to secure permits.

5.03 PATENTS AND ROYALTIES

Payment, indemnification, and notice: Contractor is responsible for, and shall pay, all royalties and license fees. Contractor shall defend, indemnify, and hold Owner harmless from any costs, expenses, and liabilities arising out of the infringement by Contractor of any patent, copyright, or other intellectual property right used in the Work; however, provided that Contractor gives prompt notice, Contractor shall not be responsible for such defense or indemnity when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents. If Contractor has reason to believe that use of the required design, process, or product constitutes an infringement of a patent or copyright, it shall promptly notify Owner of such potential infringement.

5.04 PREVAILING WAGES

A. Contractor to pay Prevailing Wages or applicable Federal Wages: Contractor shall pay the prevailing rate of wages to all workers, laborers, or mechanics employed in the performance of any part of the Work in accordance with RCW 39.12 and the rules and regulations of the Department of Labor and Industries (L&I). The schedule of prevailing wage rates for the locality or localities of the Work, is determined by the Industrial Statistician of the Department of Labor and Industries. It is the Contractor’s responsibility to verify the applicable prevailing wage rate. If applicable, the Contractor shall comply with all Federal Funding requirements of the Davis
Bacon Act that will be addressed in a separate “DIVISION 00 SPECIAL CONDITIONS” specification section that will be based on the specific requirements of the funding source.

B. **Statement of Intent to Pay Prevailing Wages:** Before payment is made by the Owner to the Contractor for any work performed by the Contractor and subcontractors whose work is included in the application for payment, the Contractor shall submit, or have previously submitted to the Owner for the Project, a Statement of Intent to Pay Prevailing Wages, approved by the L&I, certifying the rate of hourly wage paid and to be paid each classification of laborers, workers, or mechanics employed upon the Work by Contractor and Subcontractors. Such rates of hourly wage shall not be less than the prevailing wage rate.

C. **Affidavit of Wages Paid:** Prior to release of retainage, the Contractor shall submit to the Owner an Affidavit of Wages Paid, approved by the L&I, for the Contractor and every subcontractor, of any tier, that performed work on the Project.

D. **Disputes:** Disputes regarding prevailing wage rates shall be referred for arbitration to the Director of the L&I. The arbitration decision shall be final and conclusive and binding on all parties involved in the dispute as provided for by RCW 39.12.060.

E. **Statement with pay application; Post Statements of Intent at job site:** Each Application for Payment submitted by Contractor shall state that prevailing wages have been paid in accordance with the prefilled statement(s) of intent, as approved. Copies of the approved intent statement(s) shall be posted on the job site with the address and telephone number of the Industrial Statistician of the L&I where a complaint or inquiry concerning prevailing wages may be made.

F. **Contractor to pay for Statements of Intent and Affidavits:** In compliance with chapter 296-127 WAC, Contractor shall pay to the L&I the currently established fee(s) for each statement of intent and/or affidavit of wages paid submitted to the L&I for certification.

G. **Certified Payrolls:** Consistent with RCW 31.12.120, contractors, subcontractors, or employers shall file a copy of its certified payroll records using the L&I’s online system at least once per month. If the L&I’s online system is not used, a contractor, subcontractor, or employer shall file a copy of its certified payroll records directly with the L&I at least once per month. A contractor, subcontractor, or employer's noncompliance with this section constitutes a violation of RCW 39.12.050.

H. **Compliance with Federal Funding requirements:** If applicable, the Contractor shall comply with all Federal Funding requirements of the Davis Bacon Act that will be addressed in a separate “DIVISION 00 SPECIAL CONDITIONS” specification section that will be based on the specific requirements of the funding source.

### 5.05 HOURS OF LABOR

A. **Overtime:** Contractor shall comply with all applicable provisions of RCW 49.28 and they are incorporated herein by reference. Pursuant to that statute, no laborer, worker, or mechanic employed by Contractor, any Subcontractor, or any other person performing or contracting to do the whole or any part of the Work, shall be permitted or required to work more than eight hours in any one calendar day, provided, that in cases of extraordinary emergency, such as danger to life or property, the hours of work may be extended, but in such cases the rate of pay for time employed in excess of eight hours of each calendar day shall be not less than one and one-half times the rate allowed for this same amount of time during eight hours of service.

B. **4-10 Agreements:** Notwithstanding the preceding paragraph, RCW 49.28 permits a contractor or subcontractor in any public works contract subject to those provisions, to enter into an agreement with its employees in which the employees work up to ten hours in a calendar day. No such agreement may provide that the employees work ten-hour days for more than four calendar
days a week. Any such agreement is subject to approval by the employees. The overtime provisions of RCW 49.28 shall not apply to the hours, up to forty hours per week, worked pursuant to any such agreement.

5.06 NONDISCRIMINATION

A. Discrimination prohibited by applicable laws: The Contractor and all Subcontractors shall comply with all applicable federal and state non-discrimination laws, regulations, and policies. No person shall, on the grounds of age, race, creed, color, sex, sexual orientation, religion, national origin, marital status, honorably discharged veteran or military status, or disability (physical, mental, or sensory) be denied the benefits of, or otherwise be subjected to discrimination under any project, program, or activity, funded, in whole or in part, under this Agreement.

B. During performance of the Work:

1. Protected Classes: Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability, Vietnam era veteran status, or disabled veteran status, nor commit any other unfair practices as defined in RCW 49.60.

2. Advertisements to state nondiscrimination: Contractor shall, in all solicitations or advertisements for employees placed by or for it, state that all qualified applicants will be considered for employment, without regard to race, creed, color, national origin, sex, age, marital status, or the presence of any physical, sensory, or mental disability.

3. Contractor to notify unions and others of nondiscrimination: Contractor shall send to each labor union, employment agency, or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union, employment agency, or workers’ representative of Contractor’s obligations according to the Contract Documents and RCW 49.60.

4. Owner and State access to Contractor records: Contractor shall permit access to its books, records, and accounts, and to its premises by Owner, and by the Washington State Human Rights Commission, for the purpose of investigation to ascertain compliance with this section of the Contract Documents.

5. Pass through provisions to Subcontractors: Contractor shall include the provisions of this section in every Subcontract.

5.07 SAFETY PRECAUTIONS

A. In performing this contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoid work interruptions. For these purposes, the Contractor shall:

1. Follow Washington Industrial Safety and Health Act (WISHA) regional directives and provide a site-specific safety program that will require an accident prevention and hazard analysis plan for the contractor and each subcontractor on the work site. The Contractor shall submit a site-specific safety plan to the Owner’s representative prior to the initial scheduled construction meeting.

2. Provide adequate safety devices and measures including, but not limited to, the appropriate safety literature, notice, training, permits, placement and use of barricades, signs, signal lights, ladders, scaffolding, staging, runways, hoist, construction elevators, shoring, temporary lighting, grounded outlets, wiring, hazardous materials, vehicles, construction
3. Comply with the State Environmental Policy Act (SEPA), Clean Air Act, Shoreline Management Act, and other applicable federal, state, and local statutes and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources.

4. Post all permits, notices, and/or approvals in a conspicuous location at the construction site.

5. Provide any additional measures that the Owner determines to be reasonable and necessary for ensuring a safe environment in areas open to the public. Nothing in this part shall be construed as imposing a duty upon the Owner or A/E to prescribe safety conditions relating to employees, public, or agents of the Contractors.

B. Contractor safety responsibilities: In carrying out its responsibilities according to the Contract Documents, Contractor shall protect the lives and health of employees performing the Work and other persons who may be affected by the Work; prevent damage to materials, supplies, and equipment whether on site or stored off-site; and prevent damage to other property at the site or adjacent thereto. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss; shall erect and maintain all necessary safeguards for such safety and protection; and shall notify owners of adjacent property and utilities when prosecution of the Work may affect them.

C. Contractor to maintain safety records: Contractor shall maintain an accurate record of exposure data on all incidents relating to the Work resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. Contractor shall immediately report any such incident to Owner. Owner shall, at all times, have a right of access to all records of exposure.

D. Contractor to provide HazMat training: Contractor shall provide all persons working on the Project site with information and training on hazardous chemicals in their work at the time of their initial assignment, and whenever a new hazard is introduced into their work area.

1. Information. At a minimum, Contractor shall inform persons working on the Project site of:
   a. WAC: The requirements of chapter 296-62 WAC, General Occupational Health Standards;
   b. Presence of hazardous chemicals: Any operations in their work area where hazardous chemicals are present; and
   c. Hazard communications program: The location and availability of written hazard communication programs, including the required list(s) of hazardous chemicals and material safety data sheets required by chapter 296-62 WAC.

2. Training. At a minimum, Contractor shall provide training for persons working on the Project site which includes:
   a. Detecting hazardous chemicals: Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);
b. **Hazards of chemicals:** The physical and health hazards of the chemicals in the work area;

c. **Protection from hazards:** The measures such persons can take to protect themselves from these hazards, including specific procedures Contractor, or its Subcontractors, or others have implemented to protect those on the Project site from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and

d. **Hazard communications program:** The details of the hazard communications program developed by Contractor, or its Subcontractors, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

E. **Hazardous, toxic or harmful substances:** Contractor’s responsibility for hazardous, toxic, or harmful substances shall include the following duties:

1. **Illegal use of dangerous substances:** Contractor shall not keep, use, dispose, transport, generate, or sell on or about the Project site, any substances now or hereafter designated as, or which are subject to regulation as, hazardous, toxic, dangerous, or harmful by any federal, state or local law, regulation, statute or ordinance (hereinafter collectively referred to as “hazardous substances”), in violation of any such law, regulation, statute, or ordinance, but in no case shall any such hazardous substance be stored more than 90 Days on the Project site.

2. **Contractor notifications of spills, failures, inspections, and fines:** Contractor shall promptly notify Owner of all spills or releases of any hazardous substances which are otherwise required to be reported to any regulatory agency and pay the cost of cleanup. Contractor shall promptly notify Owner of all failures to comply with any federal, state, or local law, regulation, or ordinance; all inspections of the Project site by any regulatory entity concerning the same; all regulatory orders or fines; and all responses or interim cleanup actions taken by or proposed to be taken by any government entity or private party on the Project site.

F. **Public safety and traffic:** All Work shall be performed with due regard for the safety of the public. Contractor shall perform the Work so as to cause a minimum of interruption of vehicular traffic or inconvenience to pedestrians. All arrangements to care for such traffic shall be Contractor’s responsibilities. All expenses involved in the maintenance of traffic by way of detours shall be borne by Contractor.

G. **Contractor to act in an emergency:** In an emergency affecting the safety of life or the Work or of adjoining property, Contractor is permitted to act, at its discretion, to prevent such threatened loss or injury, and Contractor shall so act if so authorized or instructed.

H. **No duty of safety by Owner or A/E:** Nothing provided in this section shall be construed as imposing any duty upon Owner or A/E with regard to, or as constituting any express or implied assumption of control or responsibility over, Project site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

5.08 **OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS**

A. **Limited storage areas:** Contractor shall confine all operations, including storage of materials, to Owner-approved areas.

B. **Temporary buildings and utilities at Contractor expense:** Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be provided by Contractor only with the consent of Owner
and without expense to Owner. The temporary buildings and utilities shall be removed by Contractor at its expense upon completion of the Work.

C. **Roads and vehicle loads:** Contractor shall use only established roadways or temporary roadways authorized by Owner. 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 federal, state, or local law or regulation.

D. **Ownership and reporting by Contractor of demolished materials:** Ownership and control of all materials or facility components to be demolished or removed from the Project site by Contractor shall immediately vest in Contractor upon severance of the component from the facility or severance of the material from the Project site. Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal. Contractor shall provide Owner with a copy of all manifests and receipts evidencing proper disposal when required by Owner or applicable law.

E. **Contractor responsible for care of materials and equipment on-site:** Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Project site. Materials and equipment may be stored on the premises subject to approval of Owner. When Contractor uses any portion of the Project site as a shop, Contractor shall be responsible for any repairs, patching, or cleaning arising from such use.

F. **Contractor responsible for loss of materials and equipment:** Contractor shall protect and be responsible for any damage or loss to the Work, or to the materials or equipment until the date of Substantial Completion, and shall repair or replace without cost to Owner any damage or loss that may occur, except damages or loss caused by the acts or omissions of Owner. Contractor shall also protect and be responsible for any damage or loss to the Work, or to the materials or equipment, after the date of Substantial Completion, and shall repair or replace without cost to Owner any such damage or loss that might occur, to the extent such damages or loss are caused by the acts or omissions of Contractor, or any Subcontractor.

### 5.09 PRIOR NOTICE OF EXCAVATION

A. **Excavation defined; Use of locator services:** "Excavation" means an operation in which earth, rock, or other material on or below the ground is moved or otherwise displaced by any means, except the tilling of soil less than 12 inches in depth for agricultural purposes, or road ditch maintenance that does not change the original road grade or ditch flow line. Before commencing any excavation, Contractor shall provide notice of the scheduled commencement of excavation to all owners of underground facilities or utilities, through locator services.

### 5.10 UNFORESEEN PHYSICAL CONDITIONS

A. **Notice requirement for concealed or unknown conditions:** If Contractor encounters conditions at the site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then Contractor shall give written notice to Owner promptly and in no event later than 7 Days after the first observance of the conditions. Conditions shall not be disturbed prior to such notice.

B. **Adjustment in Contract Time and Contract Sum:** If such conditions differ materially and cause a change in Contractor’s cost of, or time required for, performance of any part of the Work, the Contractor may be entitled to an equitable adjustment in the Contract Time or Contract Sum, or both, provided it makes a request therefore as provided in Part 7.
5.11 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES AND IMPROVEMENTS

A. Contractor to protect and repair property: Contractor shall protect from damage all existing structures, equipment, improvements, utilities, and vegetation: at or near the Project site; and on adjacent property of a third party, the locations of which are made known to or should be known by Contractor. Contractor shall repair any damage, including that to the property of a third party, resulting from failure to comply with the requirements of the Contract Documents or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, Owner may have the necessary work performed and charge the cost to Contractor.

B. Tree and vegetation protection: Contractor shall only remove trees when specifically authorized to do so, and shall protect vegetation that will remain in place.

5.12 LAYOUT OF WORK

A. Advanced planning of the Work: Contractor shall plan and lay out the Work in advance of operations so as to coordinate all work without delay or revision.

B. Layout responsibilities: Contractor shall lay out the Work from Owner-established baselines and bench marks indicated on the Drawings, and shall be responsible for all field measurements in connection with the layout. Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the Work. Contractor shall be responsible for executing the Work to the lines and grades that may be established. Contractor shall be responsible for maintaining or restoring all stakes and other marks established.

5.13 MATERIAL AND EQUIPMENT

A. Contractor to provide new and equivalent equipment and materials: All equipment, material, and articles incorporated into the Work shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in the Contract Documents. References in the Specifications to equipment, material, articles, or patented processes by trade name, make, or catalog number, shall be regarded as establishing a standard quality and shall not be construed as limiting competition. Contractor may, at its option, use any equipment, material, article, or process that, in the judgment of A/E, is equal to that named in the specifications, unless otherwise specifically provided in the Contract Documents.

B. Use of asbestos-containing building materials: The use of asbestos-containing building materials in new construction or renovation work is strictly prohibited. For the determination of asbestos-containing building materials, the following shall apply:

1. Until January 1, 2025, asbestos deliberately added in any concentration that contains more than one percent asbestos by weight or area as determined using the United States environmental protection agency method for the determination of asbestos in bulk building materials, EPA/600/R-93/116, July 1993.

2. Following January 1, 2025, asbestos building material deliberately added in any concentration that contains more than 1/10th of one percent asbestos by weight or area for the determination of asbestos in bulk building materials, EPA/600/R-93/116, July 1993.

C. Contractor responsible for fitting parts together: Contractor shall do all cutting, fitting, or patching that may be required to make its several parts fit together properly, or receive or be received by work of others set forth in, or reasonably implied by, the Contract Documents. Contractor shall
not endanger any work by cutting, excavating, or otherwise altering the Work and shall not cut or alter the work of any other contractor unless approved in advance by Owner.

D. **Owner may reject defective Work**: Should any of the Work be found defective, or in any way not in accordance with the Contract Documents, this work, in whatever stage of completion, may be rejected by Owner.

### 5.14 AVAILABILITY AND USE OF UTILITY SERVICES

A. **Owner to provide and charge for utilities**: Owner shall make all reasonable utilities available to Contractor from existing outlets and supplies, as specified in the Contract Documents. Unless otherwise provided in the Contract Documents, the utility service consumed shall be charged to or paid for by Contractor at prevailing rates charged to Owner or, where the utility is produced by Owner, at reasonable rates determined by Owner. Contractor will carefully conserve any utilities furnished.

B. **Contractor to install temporary connections and meters**: Contractor shall, at its expense and in a skillful manner satisfactory to Owner, install and maintain all necessary temporary connections and distribution lines, together with appropriate protective devices, and all meters required to measure the amount of each utility used for the purpose of determining charges. Prior to the date of Final Acceptance, Contractor shall remove all temporary connections, distribution lines, meters, and associated equipment and materials.

### 5.15 TESTS AND INSPECTION

A. **Contractor to provide for all testing and inspection of Work**: Contractor shall maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract Documents. Contractor shall be responsible for inspection and quality surveillance of all its Work and all Work performed by any Subcontractor. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. Contractor shall give Owner timely notice of when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to Owner.

B. **Owner may conduct tests and inspections**: Owner may, at any reasonable time, conduct such inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract Documents. Owner shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract Documents. Unless the subject items are expressly accepted by Owner, such Owner inspection and tests are for the sole benefit of Owner and do not:

1. Constitute or imply acceptance;
2. Relieve Contractor of responsibility for providing adequate quality control measures;
3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;
4. Relieve Contractor of its responsibility to comply with the requirements of the Contract Documents; or
5. Impair Owner’s right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.
C. Inspections or inspectors do not modify Contract Documents: Neither observations by an inspector retained by Owner, the presence or absence of such inspector on the site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

D. Contractor responsibilities on inspections: Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by Owner. Owner may charge Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. Owner shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

5.16 CORRECTION OF NONCONFORMING WORK

A. Work covered by Contractor without inspection: If a portion of the Work is covered contrary to the requirements in the Contract Documents, it must, if required in writing by Owner, be uncovered for Owner’s observation and be replaced at the Contractor’s expense and without change in the Contract Time.

B. Payment provisions for uncovering covered Work: If, at any time prior to Final Completion, Owner desires to examine the Work, or any portion of it, which has been covered, Owner may request to see such Work and it shall be uncovered by Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an adjustment in the Contract Sum for the costs of uncovering and replacement, and, if completion of the Work is thereby delayed, an adjustment in the Contract Time, provided it makes such a request as provided in Part 7. If such Work is not in accordance with the Contract Documents, the Contractor shall pay the costs of examination and reconstruction.

C. Contractor to correct and pay for non-conforming Work: Contractor shall promptly correct Work found by Owner not to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. Contractor shall bear all costs of correcting such nonconforming Work, including additional testing and inspections.

D. Contractor’s compliance with warranty provisions: If, within one year after the date of Substantial Completion of the Work or designated portion thereof, or within one year after the date for commencement of any system warranties established under Section 6.08, or within the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written notice from Owner to do so. Owner shall give such notice promptly after discovery of the condition. This period of one year shall be extended, with respect to portions of Work first performed after Substantial Completion, by the period of time between Substantial Completion and the actual performance of the Work. Contractor’s duty to correct with respect to Work repaired or replaced shall run for one year from the date of repair or replacement. Obligations under this paragraph shall survive Final Acceptance.

E. Contractor to remove non-conforming Work: Contractor shall remove from the Project site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by Contractor nor accepted by Owner.

F. Owner may charge Contractor for non-conforming Work: If Contractor fails to correct nonconforming Work within a reasonable time after written notice to do so, Owner may replace, correct, or remove the nonconforming Work and charge the cost thereof to the Contractor.
G. **Contractor to pay for damaged Work during correction:** Contractor shall bear the cost of correcting destroyed or damaged Work, whether completed or partially completed, caused by Contractor’s correction or removal of Work which is not in accordance with the requirements of the Contract Documents.

H. **No Period of limitation on other requirements:** Nothing contained in this section shall be construed to establish a period of limitation with respect to other obligations which Contractor might have according to the Contract Documents. Establishment of the time period of one year as described in Section 5.16D relates only to the specific obligation of Contractor to correct the Work, and has no relationship to the time within which the Contractor’s obligation to comply with the Contract Documents may be sought to be enforced, including the time within which such proceedings may be commenced.

I. **Owner may accept non-conforming Work and charge Contractor:** If Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, Owner may do so instead of requiring its removal and correction, in which case the Contract Sum may be reduced as appropriate and equitable.

5.17 **CLEAN UP**

**Contractor to keep site clean and leave it clean:** Contractor shall at all times keep the Project site, including hauling routes, infrastructures, utilities, and storage areas, free from accumulations of waste materials. Before completing the Work, Contractor shall remove from the premises its rubbish, tools, scaffolding, equipment, and materials. Upon completing the Work, Contractor shall leave the Project site in a clean, neat, and orderly condition satisfactory to Owner. If Contractor fails to clean up as provided herein, and after reasonable notice from Owner, Owner may do so, and the cost thereof shall be charged to Contractor.

5.18 **ACCESS TO WORK**

**Owner and A/E access to Work site:** Contractor shall provide Owner and A/E access to the Work in progress wherever located.

5.19 **OTHER CONTRACTS**

**Owner may award other contracts; Contractor to cooperate:** Owner may undertake or award other contracts for additional work at or near the Project site. Contractor shall reasonably cooperate with the other contractors and with Owner’s employees and shall carefully adapt scheduling and perform the Work in accordance with these Contract Documents to reasonably accommodate the other work.

5.20 **SUBCONTRACTORS AND SUPPLIERS**

A. **Subcontractor Responsibility:** The Contractor shall include the language of this paragraph in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. Upon request of the Owner, the Contractor shall promptly provide documentation to the Owner demonstrating that the subcontractor meets the subcontractor responsibility criteria below. The requirements of this paragraph apply to all subcontractors regardless of tier. At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, an electrical contractor license, if required by chapter 19.28 RCW, an elevator contractor license, if required by chapter 70.87 RCW, or a plumbing contractor license if required by chapter 18.106 16 RCW;
2. Have a current Washington Unified Business Identifier (UBI) number;

3. If applicable, have:
   a. Industrial Insurance (workers’ compensation) coverage for the subcontractor’s employees working in Washington, as required in Title 51 RCW;
   b. A Washington Employment Security Department number, as required in Title 50 RCW;
   c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

4. Not be disqualified from bidding on any public works contract under RCW 39.06.010, or 39.12.065 (3).

5. On a project subject to the apprenticeship utilization requirements in RCW 39.04.320, not have been found out of compliance by the Washington state apprenticeship and training council for working apprentices out of ratio, without appropriate supervision, or outside their approved work processes as outlined in their standards of apprenticeship under chapter 49.04 RCW for the one-year period immediately preceding the date of the Owner’s first advertisement of the project.

6. Within the three-year period immediately preceding the date of the bid solicitation, not have been determined by a final and binding citation and notice of assessment issued by the L&I or through a civil judgment entered by a court of limited or general jurisdiction to have willfully violated, as defined in RCW 49.48.082, any provision of chapter 49.46, 49.48, or 49.52 RCW.

B. Provide names of Subcontractors and use qualified firms: Contractor shall utilize Subcontractors and suppliers which are experienced and qualified, and meet the requirements of the Contract Documents, if any. Contractor shall not utilize any Subcontractor or supplier to whom the Owner has a reasonable objection, and shall obtain Owner’s written consent before making any substitutions or additions. Substitutions of subcontractors listed on Forms A and B are only allowable according to RCW 39.30.060.

C. Subcontracts in writing and pass through provision: All Subcontracts must be in writing. By appropriate written agreement, Contractor shall require each Subcontractor, so far as applicable to the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents, and to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward Owner in accordance with the Contract Documents. Each Subcontract shall preserve and protect the rights of Owner in accordance with the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. However, nothing in this paragraph shall be construed to alter the contractual relations between Contractor and its Subcontractors with respect to insurance or bonds.

D. Coordination of Subcontractors; Contractor responsible for Work: Contractor shall schedule, supervise, and coordinate the operations of all Subcontractors. No Subcontracting of any of the Work shall relieve Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents or any other obligations of the Contract Documents.

E. Automatic assignment of subcontractors: Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to Owner provided that:
1. **Effective only after termination and Owner approval:** The assignment is effective only after termination by Owner for cause pursuant to Section 9.01 and only for those Subcontracts which Owner accepts by notifying the Subcontractor in writing; and

2. **Owner assumes Contractor’s responsibilities:** After the assignment is effective, Owner will assume all future duties and obligations toward the Subcontractor which Contractor assumed in the Subcontract.

3. **Impact of bond:** The assignment is subject to the prior rights of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.
5.21 WARRANTY OF CONSTRUCTION

A. Contractor warranty of Work: In addition to any special warranties provided elsewhere in the Contract Documents, Contractor warrants that all Work conforms to the requirements of the Contract Documents and is free of any defect in equipment, material, or design furnished, or workmanship performed by Contractor.

B. Contractor responsibilities: With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract Documents, Contractor shall:

1. Obtain warranties: Obtain all warranties that would be given in normal commercial practice;

2. Warranties for benefit of Owner: Require all warranties to be executed, in writing, for the benefit of Owner;

3. Enforcement of warranties: Enforce all warranties for the benefit of Owner, if directed by Owner; and

4. Contractor responsibility for subcontractor warranties: Be responsible to enforce any subcontractor’s, manufacturer’s, or supplier’s warranties should they extend beyond the period specified in the Contract Documents.

C. Warranties beyond Final Acceptance: The obligations under this section shall survive Final Acceptance.

5.22 INDEMNIFICATION

A. Contractor to indemnify Owner: Contractor shall defend, indemnify, and hold Owner and A/E harmless from and against all claims, demands, losses, damages, or costs, including but not limited to damages arising out of bodily injury or death to persons and damage to property, caused by or resulting from:

1. Sole negligence of Contractor: The sole negligence of Contractor or any of its Subcontractors;

2. Concurrent negligence: The concurrent negligence of Contractor, or any Subcontractor, but only to the extent of the negligence of Contractor or such Subcontractor; and

3. Patent infringement: The use of any design, process, or equipment which constitutes an infringement of any United States patent presently issued, or violates any other proprietary interest, including copyright, trademark, and trade secret.

B. Employee action and RCW Title 51: In any action against Owner and any other entity indemnified in accordance with this section, by any employee of Contractor, its Subcontractors, Sub-subcontractors, agents, or anyone directly or indirectly employed by any of them, the indemnification obligation of this section shall not be limited by a limit on the amount or type of damages, compensation, or benefits payable by or for Contractor or any Subcontractor under RCW Title 51, the Industrial Insurance Act, or any other employee benefit acts. In addition, Contractor waives immunity as to Owner and A/E only, in accordance with RCW Title 51.
PART 6 – PAYMENTS AND COMPLETION

6.01 CONTRACT SUM

Owner shall pay Contract Sum: Owner shall pay Contractor the Contract Sum plus state sales tax for performance of the Work, in accordance with the Contract Documents.

6.02 SCHEDULE OF VALUES

Contractor to submit Schedule of Values: Before submitting its first Application for Payment, Contractor shall submit to Owner for approval a breakdown allocating the total Contract Sum to each principal category of work, in such detail as requested by Owner (“Schedule of Values”). The approved Schedule of Values shall include appropriate amounts for demobilization, record drawings, O&M manuals, and any other requirements for Project closeout, and shall be used by Owner as the basis for progress payments. Payment for Work shall be made only for and in accordance with those items included in the Schedule of Values.

6.03 APPLICATION FOR PAYMENT

A. Monthly Application for Payment with substantiation: At monthly intervals, unless determined otherwise by Owner, Contractor shall submit to Owner an itemized Application for Payment for Work completed in accordance with the Contract Documents and the approved Schedule of Values. Each application shall be supported by such substantiating data as Owner may require.

B. Contractor certifies Subcontractors paid: By submitting an Application for Payment, Contractor is certifying that all Subcontractors have been paid, less earned retainage in accordance with RCW 60.28.011, as their interests appeared in the last preceding certificate of payment. By submitting an Application for Payment, Contractor is recertifying that the representations set forth in Section 1.03, are true and correct, to the best of Contractor’s knowledge, as of the date of the Application for Payment.

C. Reconciliation of Work with Progress Schedule: At the time it submits an Application for Payment, Contractor shall analyze and reconcile, to the satisfaction of Owner, the actual progress of the Work with the Progress Schedule.

D. Payment for material delivered to site or stored off-site: If authorized by Owner, the Application for Payment may include request for payment for material delivered to the Project site and suitably stored, or for completed preparatory work. Payment may similarly be requested for material stored off the Project site, provided Contractor complies with or furnishes satisfactory evidence of the following:

1. Suitable facility or location: The material will be placed in a facility or location that is structurally sound, dry, lighted and suitable for the materials to be stored;

2. Facility or location within 10 miles of Project: The facility or location is located within a 10-mile radius of the Project. Other locations may be utilized, if approved in writing, by Owner;

3. Facility or location exclusive to Project’s materials: Only materials for the Project are stored within the facility or location (or a secure portion of a facility or location set aside for the Project);

4. Insurance provided on materials in facility or location: Contractor furnishes Owner a certificate of insurance extending Contractor’s insurance coverage for damage, fire, and theft to cover the full value of all materials stored, or in transit;
5. **Facility or location locked and secure:** The facility or location (or secure portion thereof) is continuously under lock and key, and only Contractor’s authorized personnel shall have access;

6. **Owner right of access to facility or location:** Owner shall at all times have the right of access in company of Contractor;

7. **Contractor assumes total responsibility for stored materials:** Contractor and its surety assume total responsibility for the stored materials; and

8. **Contractor provides documentation and Notice when materials moved to site:** Contractor furnishes to Owner certified lists of materials stored, bills of lading, invoices, and other information as may be required, and shall also furnish Notice to Owner when materials are moved from storage to the Project site.

### 6.04 PROGRESS PAYMENTS

A. **Owner to pay within 30 Days:** Owner shall make progress payments, in such amounts as Owner determines are properly due, within 30 Days after receipt of a properly executed Application for Payment. Owner shall notify Contractor in accordance with chapter 39.76 RCW if the Application for Payment does not comply with the requirements of the Contract Documents.

B. **Withholding retainage; Options for retainage:** Owner shall retain 5% of the amount of each progress payment until 45 Days after Final Acceptance and receipt of all documents required by law or the Contract Documents, including, at Owner’s request, consent of surety to release of the retainage. In accordance with chapter 60.28 RCW, Contractor may request that monies reserved be retained in a fund by Owner, deposited by Owner in a bank or savings and loan, or placed in escrow with a bank or trust company to be converted into bonds and securities to be held in escrow with interest to be paid to Contractor. Owner may permit Contractor to provide an appropriate bond in lieu of the retained funds.

C. **Title passes to Owner upon payment:** Title to all Work and materials covered by a progress payment shall pass to Owner at the time of such payment free and clear of all liens, claims, security interests, and encumbrances. Passage of title shall not, however, relieve Contractor from any of its duties and responsibilities for the Work or materials, or waive any rights of Owner to insist on full compliance by Contractor with the Contract Documents.

D. **Interest on unpaid balances:** Payments due and unpaid in accordance with the Contract Documents shall bear interest as specified in chapter 39.76 RCW.

### 6.05 PAYMENTS WITHHELD

A. **Owner’s right to withhold payment:** Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any payment to such extent as may be necessary to protect Owner from loss or damage for reasons including but not limited to:

1. **Non-compliant Work:** Work not in accordance with the Contract Documents;

2. **Remaining Work to cost more than unpaid balance:** Reasonable evidence that the Work required by the Contract Documents cannot be completed for the unpaid balance of the Contract Sum;

3. **Owner correction or completion Work:** Work by Owner to correct defective Work or complete the Work in accordance with Section 5.16;
4. **Contractor’s failure to perform**: Contractor’s failure to perform in accordance with the Contract Documents; or

5. **Contractor’s negligent acts or omissions**: Cost or liability that may occur to Owner as the result of Contractor’s fault or negligent acts or omissions.

**B. Owner to notify Contractor of withholding for unsatisfactory performance**

In any case where part or all of a payment is going to be withheld for unsatisfactory performance, Owner shall notify Contractor in accordance with chapter 39.76 RCW.

**6.06 RETAINAGE AND BOND CLAIM RIGHTS**

Chapters 39.08 RCW and 60.28 RCW incorporated by reference: Chapters 39.08 RCW and 60.28 RCW, concerning the rights and responsibilities of Contractor and Owner with regard to the performance and payment bonds and retainage, are made a part of the Contract Documents by reference as though fully set forth herein.

**6.07 SUBSTANTIAL COMPLETION**

**Substantial Completion defined**: Substantial Completion is the stage in the progress of the Work (or portion thereof designated and approved by Owner) when the construction is sufficiently complete, in accordance with the Contract Documents, so Owner has full and unrestricted use and benefit of the facilities (or portion thereof designated and approved by Owner) for the use for which it is intended. All Work other than incidental corrective or punch list work shall be completed. Substantial Completion shall not have been achieved if all systems and parts are not functional, if utilities are not connected and operating normally, if all required occupancy permits have not been issued, or if the Work is not accessible by normal vehicular and pedestrian traffic routes. The date Substantial Completion is achieved shall be established in writing by Owner. Contractor may request an early date of Substantial Completion which must be approved by Change Order. Owner’s occupancy of the Work or designated portion thereof does not necessarily indicate that Substantial Completion has been achieved.

**6.08 PRIOR OCCUPANCY**

A. **Prior Occupancy defined; Restrictions**: Owner may, upon written notice thereof to Contractor, take possession of or use any completed or partially completed portion of the Work (“Prior Occupancy”) at any time prior to Substantial Completion. Unless otherwise agreed in writing, Prior Occupancy shall not: be deemed an acceptance of any portion of the Work; accelerate the time for any payment to Contractor; prejudice any rights of Owner provided by any insurance, bond, guaranty, or the Contract Documents; relieve Contractor of the risk of loss or any of the obligations established by the Contract Documents; establish a date for termination or partial termination of the assessment of liquidated damages; or constitute a waiver of claims.

B. **Damage; Duty to repair and warranties**: Notwithstanding anything in the preceding paragraph, Owner shall be responsible for loss of or damage to the Work resulting from Prior Occupancy. Contractor’s one year duty to repair any system warranties shall begin on building systems activated and used by Owner as agreed in writing by Owner and Contractor.

**6.09 FINAL COMPLETION, ACCEPTANCE, AND PAYMENT**

A. **Final Completion defined**: Final Completion shall be achieved when the Work is fully and finally complete in accordance with the Contract Documents. The date Final Completion is achieved shall be established by Owner in writing, but in no case shall constitute Final Acceptance which is a subsequent, separate, and distinct action.
B. **Final Acceptance defined:** Final Acceptance shall be achieved when the Contractor has completed the requirements of the Contract Documents. The date Final Acceptance is achieved shall be established by Owner in writing. Prior to Final Acceptance, Contractor shall, in addition to all other requirements in the Contract Documents, submit to Owner a written notice of any outstanding disputes or claims between Contractor and any of its Subcontractors, including the amounts and other details thereof. Neither Final Acceptance, nor final payment, shall release Contractor or its sureties from any obligations of these Contract Documents or the payment and performance bonds, or constitute a waiver of any claims by Owner arising from Contractor’s failure to perform the Work in accordance with the Contract Documents.

C. **Final payment waives Claim rights:** Acceptance of final payment by Contractor, or any Subcontractor, shall constitute a waiver and release to Owner of all claims by Contractor, or any such Subcontractor, for an increase in the Contract Sum or the Contract Time, and for every act or omission of Owner relating to or arising out of the Work, except for those Claims made in accordance with the procedures, including the time limits, set forth in Part 8.

**PART 7 – CHANGES**

**7.01 CHANGE IN THE WORK**

A. **Changes in Work, Contract Sum, and Contract Time by Change Order:** Owner may, at any time and without notice to Contractor’s surety, order additions, deletions, revisions, or other changes in the Work. These changes in the Work shall be incorporated into the Contract Documents through the execution of Change Orders. If any change in the Work ordered by Owner causes an increase or decrease in the Contract Sum or the Contract Time, an equitable adjustment shall be made as provided in Section 7.02 or 7.03, respectively, and such adjustment(s) shall be incorporated into a Change Order.

B. **Owner may request COP from Contractor:** If Owner desires to order a change in the Work, it may request a written Change Order Proposal (COP) from Contractor. Contractor shall submit a Change Order Proposal within 14 Days of the request from Owner, or within such other period as mutually agreed. Contractor’s Change Order Proposal shall be full compensation for implementing the proposed change in the Work, including any adjustment in the Contract Sum or Contract Time, and including compensation for all delays in connection with such change in the Work and for any expense or inconvenience, disruption of schedule, or loss of efficiency or productivity occasioned by the change in the Work.

C. **COP negotiations:** Upon receipt of the Change Order Proposal, or a request for equitable adjustment in the Contract Sum or Contract Time, or both, as provided in Sections 7.02 and 7.03, Owner may accept or reject the proposal, request further documentation, or negotiate acceptable terms with Contractor. Pending agreement on the terms of the Change Order, Owner may direct Contractor to proceed immediately with the Change Order Work. Contractor shall not proceed with any change in the Work until it has obtained Owner’s approval. All Work done pursuant to any Owner-directed change in the Work shall be executed in accordance with the Contract Documents.

D. **Change Order as full payment and final settlement:** If Owner and Contractor reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, such agreement shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of all claims for time and for direct, indirect, and consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the request for equitable adjustment.

E. **Failure to agree upon terms of Change Order; Final offer and Claims:** If Owner and Contractor are unable to reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, Contractor may at any time in writing, request a final offer from
Owner. Owner shall provide Contractor with its written response within 30 Days of Contractor’s request. Owner may also provide Contractor with a final offer at any time. If Contractor rejects Owner’s final offer, or the parties are otherwise unable to reach agreement, Contractor’s only remedy shall be to file a Claim as provided in Part 8.

F. Field Authorizations: The Owner may direct the Contractor to proceed with a change in the work through a written Field Authorization (also referred to as a Field Order) when the time required to price and execute a Change Order would impact the Project.

The Field Authorization shall describe and include the following:

1. The scope of work.
2. An agreed upon maximum not-to-exceed amount.
3. Any estimated change to the Contract Time.
4. The method of final cost determination in accordance with the requirements of Part 7 of the General Conditions.
5. The supporting cost data to be submitted in accordance with the requirements of Part 7 of the General Conditions.

Upon satisfactory submittal by the Contractor and approval by the Owner of supporting cost data, a Change Order will be executed. The Owner will not make payment to the Contractor for Field Authorization work until that work has been incorporated into an executed Change Order.

7.02 CHANGE IN THE CONTRACT SUM

A. General Application

1. Contract Sum changes only by Change Order: The Contract Sum shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Sum in its Change Order Proposal.

2. Owner fault or negligence as basis for change in Contract Sum: If the cost of Contractor’s performance is changed due to the fault or negligence of Owner, or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Sum in accordance with the following procedure. No change in the Contract Sum shall be allowed to the extent: Contractor’s changed cost of performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible; the change is concurrently caused by Contractor and Owner; or the change is caused by an act of Force Majeure as defined in Section 3.05.

   (a) Notice and record keeping for equitable adjustment: A request for an equitable adjustment in the Contract Sum shall be based on written notice delivered to Owner within 7 Days of the occurrence of the event giving rise to the request. For purposes of this part, “occurrence” means when Contractor knew, or in its diligent prosecution of the Work should have known, of the event giving rise to the request. If Contractor believes it is entitled to an adjustment in the Contract Sum, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such records and, if requested shall promptly furnish copies of such records to Owner.

   (b) Content of notice for equitable adjustment; Failure to comply: Contractor shall not be entitled to any adjustment in the Contract Sum for any occurrence of events or costs that
occurred more than 7 Days before Contractor’s written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Sum; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Sum requested. Failure to properly give such written notice shall, to the extent Owner’s interests are prejudiced, constitute a waiver of Contractor’s right to an equitable adjustment.

(c) Contractor to provide supplemental information: Within 30 Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with subparagraph a. above with additional supporting data. Such additional data shall include, at a minimum: the amount of compensation requested, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the damages claimed, but that the damages claimed were actually a result of the act, event, or condition complained of and that the Contract Documents provide entitlement to an equitable adjustment to Contractor for such act, event, or condition; and documentation sufficiently detailed to permit an informed analysis of the request by Owner. When the request for compensation relates to a delay, or other change in Contract Time, Contractor shall demonstrate the impact on the critical path, in accordance with Section 7.03C. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner’s interests are prejudiced, constitute a waiver of Contractor’s right to an equitable adjustment.

(d) Contractor to proceed with Work as directed: Pending final resolution of any request made in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.

(e) Contractor to combine requests for same event together: Any requests by Contractor for an equitable adjustment in the Contract Sum and in the Contract Time that arise out of the same event(s) shall be submitted together.

3. Methods for calculating Change Order amount: The value of any Work covered by a Change Order, or of any request for an equitable adjustment in the Contract Sum, shall be determined by one of the following methods:

(a) Fixed Price: On the basis of a fixed price as determined in paragraph 7.02B.

(b) Unit Prices: By application of unit prices to the quantities of the items involved as determined in paragraph 7.02C.

(c) Time and Materials: On the basis of time and material as determined in paragraph 7.02D.

4. Fixed price method is default; Owner may direct otherwise: When Owner has requested Contractor to submit a Change Order Proposal, Owner may direct Contractor as to which method in subparagraph 3 above to use when submitting its proposal. Otherwise, Contractor shall determine the value of the Work, or of a request for an equitable adjustment, on the basis of the fixed price method.

B. Change Order Pricing – Fixed Price

Procedures: When the fixed price method is used to determine the value of any Work covered by a Change Order, or of a request for an equitable adjustment in the Contract Sum, the following procedures shall apply:
1. **Breakdown and itemization of details on COP:** Contractor’s Change Order Proposal, or request for adjustment in the Contract Sum, shall be accompanied by a complete itemization of the costs, including labor, material, subcontractor costs, and overhead and profit. The costs shall be itemized in the manner set forth below, and shall be submitted on breakdown sheets in a form approved by Owner.

2. **Use of industry standards in calculating costs:** All costs shall be calculated based upon appropriate industry standard methods of calculating labor, material quantities, and equipment costs.

3. **Costs contingent on Owner’s actions:** If any of Contractor’s pricing assumptions are contingent upon anticipated actions of Owner, Contractor shall clearly state them in the proposal or request for an equitable adjustment.

4. **Markups on additive and deductive Work:** The cost of any additive or deductive changes in the Work shall be calculated as set forth below, except that overhead and profit shall not be included on deductive changes in the Work. Where a change in the Work involves additive and deductive work by the same Contractor or Subcontractor, small tools, overhead, profit, bond and insurance markups will apply to the net difference.

5. **Breakdown not required if change less than $1,000:** If the total cost of the change in the Work or request for equitable adjustment does not exceed $1,000, Contractor shall not be required to submit a breakdown if the description of the change in the Work or request for equitable adjustment is sufficiently definitive for Owner to determine fair value.

6. **Breakdown required if change between $1,000 and $2,500:** If the total cost of the change in the Work or request for equitable adjustment is between $1,000 and $2,500, Contractor may submit a breakdown in the following level of detail if the description of the change in the Work or if the request for equitable adjustment is sufficiently definitive to permit the Owner to determine fair value:
   a. lump sum labor;
   b. lump sum material;
   c. lump sum equipment usage;
   d. overhead and profit as set forth below; and
   e. insurance and bond costs as set forth below.

7. **Components of increased cost:** Any request for adjustment of Contract Sum based upon the fixed price method shall include only the following items:
   a. **Craft labor costs:** These are the labor costs determined by multiplying the estimated or actual additional number of craft hours needed to perform the change in the Work by the hourly labor costs. Craft hours should cover direct labor, as well as indirect labor due to trade inefficiencies. The hourly costs shall be based on the following:
      1. **Basic wages and benefits:** Hourly rates and benefits as stated on the L&I approved “statement of intent to pay prevailing wages” or a higher amount if approved by the Owner. Direct supervision shall be a reasonable percentage not to exceed 15% of the cost of direct labor. No supervision markup shall be allowed for a working supervisor’s hours.
      2. **Worker’s insurance:** Direct contributions to the state of Washington for industrial insurance; medical aid; and supplemental pension, by the class and rates established by the L&I.
(3) **Federal insurance:** Direct contributions required by the Federal Insurance Compensation Act; Federal Unemployment Tax Act; and the State Unemployment Compensation Act.

(4) **Travel allowance:** Travel allowance and/or subsistence, if applicable, not exceeding those allowances established by regional labor union agreements, which are itemized and identified separately.

(5) **Safety:** Cost incurred due to the Washington Industrial Safety and Health Act, which shall be a reasonable percentage not to exceed 2% of the sum of the amounts calculated in (1), (2), and (3) above.

b. **Material costs:** This is an itemization of the quantity and cost of materials needed to perform the change in the Work. Material costs shall be developed first from actual known costs, second from supplier quotations or if these are not available, from standard industry pricing guides. Material costs shall consider all available discounts. Freight costs, express charges, or special delivery charges, shall be itemized.

c. **Equipment costs:** This is an itemization of the type of equipment and the estimated or actual length of time the construction equipment appropriate for the Work is or will be used on the change in the Work. Costs will be allowed for construction equipment only if used solely for the changed Work, or for additional rental costs actually incurred by the Contractor. Equipment charges shall be computed on the basis of actual invoice costs or if owned, from the current edition of one of the following sources:

   (1) The National Electrical Contractors Association for equipment used on electrical work.

   (2) The Mechanical Contractors Association of America for equipment used on mechanical work.

   (3) The EquipmentWatch Fleet Manager Estimator Package (digital). The maximum rate for standby equipment shall not exceed that shown in the Associated General Contractors Washington State Department of Transportation (AGC WSDOT) Equipment Rental Agreement, current edition on the Contract execution date.

   The EquipmentWatch Rental Rate Blue Book shall be used as a basis for establishing rental rates of equipment not listed in the above sources. The maximum rate for standby equipment shall not exceed that shown in the AGC WSDOT Equipment Rental Agreement, current edition on the Contract execution date.

d. **Allowance for small tools, expendables & consumable supplies:** Small tools consist of tools which cost $250 or less and are normally furnished by the performing contractor. The maximum rate for small tools shall not exceed the following:

   (1) **3% for Contractor:** For Contractor, 3% of direct labor costs.

   (2) **5% for Subcontractors:** For Subcontractors, 5% of direct labor costs.

   Expendables and consumables supplies directly associated with the change in Work must be itemized.

e. **Subcontractor costs:** This is defined as payments Contractor makes to Subcontractors for changed Work performed by Subcontractors of any tier. The Subcontractors’ cost of Work shall be calculated and itemized in the same manner as prescribed herein for Contractor.
f. **Allowance for overhead:** This is defined as costs of any kind attributable to direct and indirect delay, acceleration, or impact, added to the total cost to Owner of any change in the Contract Sum. If the Contractor is compensated under Section 7.03D, the amount of such compensation shall be reduced by the amount Contractor is otherwise entitled to under this subsection (f). This allowance shall compensate Contractor for all noncraft labor, temporary construction facilities, field engineering, schedule updating, as-built drawings, home office cost, B&O taxes, office engineering, estimating costs, additional overhead because of extended time, and any other cost incidental to the change in the Work. It shall be strictly limited in all cases to a reasonable amount, mutually acceptable, or if none can be agreed upon to an amount not to exceed the rates below:

1. **Projects less than $3 million:** For projects where the Contract Award Amount is under $3 million, the following shall apply:
   
   a. **Contractor markup on Contractor Work:** For Contractor, for any Work actually performed by Contractor’s own forces, 16% of the first $50,000 of the cost, and 4% of the remaining cost, if any.
   
   b. **Subcontractor markup for Subcontractor Work:** For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 16% of the first $50,000 of the cost, and 4% of the remaining cost, if any.
   
   c. **Contractor markup for Subcontractor Work:** For Contractor, for any work performed by its Subcontractor(s) 6% of the first $50,000 of the amount due each Subcontractor, and 4% of the remaining amount if any.
   
   d. **Subcontractor markup for lower tier Subcontractor Work:** For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first $50,000 of the amount due the sub-Subcontractor, and 2% of the remaining amount if any.
   
   e. **Basis of cost applicable for markup:** The cost to which overhead is to be applied shall be developed in accordance with Section 7.02B 7a. – e.

2. **Projects more than $3 million:** For projects where the Contract Award Amount is equal to or exceeds $3 million, the following shall apply:
   
   a. **Contractor markup on Contractor Work:** For Contractor, for any Work actually performed by Contractor’s own forces, 12% of the first $50,000 of the cost, and 4% of the remaining cost, if any.
   
   b. **Subcontractor markup for Subcontractor Work:** For each Subcontractor (including lower tier subcontractors), for any Work actually performed by its own forces, 12% of the first $50,000 of the cost, and 4% of the remaining cost, if any.
   
   c. **Contractor markup for Subcontractor Work:** For Contractor, for any Work performed by its Subcontractor(s), 4% of the first $50,000 of the amount due each Subcontractor, and 2% of the remaining amount if any.
   
   d. **Subcontractor markup for lower tier Subcontractor Work:** For each Subcontractor, for any Work performed by its Subcontractor(s) of any lower tier, 4% of the first $50,000 of the amount due the sub-Subcontractor, and 2% of the remaining amount if any.
(e) **Basis of cost applicable for markup:** The cost to which overhead is to be applied shall be developed in accordance with Section 7.02B 7a. – e.

g. **Allowance for profit:** Allowance for profit is an amount to be added to the cost of any change in contract sum, but not to the cost of change in Contract Time for which contractor has been compensated pursuant to the conditions set forth in Section 7.03. It shall be limited to a reasonable amount, mutually acceptable, or if none can be agreed upon, to an amount not to exceed the rates below:

1. **Contractor / Subcontractor markup for self-performed Work:** For Contractor or Subcontractor of any tier for work performed by their forces, 6% of the cost developed in accordance with Section 7.02B 7a. – e.

2. **Contractor / Subcontractor markup for Work performed at lower tier:** For Contractor or Subcontractor of any tier for work performed by a subcontractor of a lower tier, 4% of the subcontract cost developed in accordance with Section 7.02B 7a. – h.

h. **Insurance and bond premiums:** Cost of change in insurance or bond premium: This is defined as:

1. **Contractor’s liability insurance:** The cost of any changes in Contractor’s liability insurance arising directly from execution of the Change Order; and

2. **Payment and Performance Bond:** The cost of the additional premium for Contractor’s bond arising directly from the changed Work.

The cost of any change in insurance or bond premium shall be added after overhead and allowance for profit are calculated in accordance with subparagraph f. and g above.

**C. Change Order Pricing – Unit Prices**

1. **Content of Owner authorization:** Whenever Owner authorizes Contractor to perform Work on a unit-price basis, Owner’s authorization shall clearly state:

   a. **Scope:** Scope of work to be performed;

   b. **Reimbursement basis:** Type of reimbursement including pre-agreed rates for material quantities; and

   c. **Reimbursement limit:** Cost limit of reimbursement.

2. **Contractor responsibilities:** Contractor shall:

   a. Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, Contractor shall identify workers assigned to the Change Order Work and areas in which they are working;

   b. Leave access as appropriate for quantity measurement; and

   c. Not exceed any cost limit(s) without Owner’s prior written approval.

3. **Cost breakdown consistent with Fixed Price requirements:** Contractor shall submit costs in accordance with paragraph 7.02B and satisfy the following requirements:
a. Unit prices must include overhead, profit, bond and insurance premiums: Unit prices shall include reimbursement for all direct and indirect costs of the Work, including overhead, profit, bond, and insurance costs; and

b. Owner verification of quantities: Quantities must be supported by field measurement statements signed by Owner.

D. **Change Order Pricing – Time-and-Material Prices**

1. Content of Owner authorization: Whenever Owner authorizes Contractor to perform Work on a time-and-material basis, Owner’s authorization shall clearly state:

   a. **Scope**: Scope of Work to be performed;

   b. **Reimbursement basis**: Type of reimbursement including pre-agreed rates, if any, for material quantities or labor; and

   c. **Reimbursement limit**: Cost limit of reimbursement.

2. **Contractor responsibilities**: Contractor shall:

   a. Identify workers assigned: Cooperate with Owner and assist in monitoring the Work being performed. As requested by Owner, identify workers assigned to the Change Order Work and areas in which they are working;

   b. Provide daily timesheets: Identify on daily time sheets all labor performed in accordance with this authorization. Submit copies of daily time sheets within 2 working days for Owner’s review.

   c. Allow Owner to measure quantities: Leave access as appropriate for quantity measurement;

   d. Perform Work efficiently: Perform all Work in accordance with this section as efficiently as possible; and

   e. Not exceed Owner’s cost limit: Not exceed any cost limit(s) without Owner’s prior written approval.

3. **Cost breakdown consistent with Fixed Price requirements**: Contractor shall submit costs in accordance with paragraph 7.02B and additional verification supported by:

   a. Timesheets: Labor detailed on daily time sheets; and

   b. Invoices: Invoices for material.

7.03 **CHANGE IN THE CONTRACT TIME**

A. **COP requests for Contract Time**: The Contract Time shall only be changed by a Change Order. Contractor shall include any request for a change in the Contract Time in its Change Order Proposal.

B. **Time extension permitted if not Contractor’s fault**: If the time of Contractor’s performance is changed due to an act of Force Majeure, or due to the fault or negligence of Owner or anyone for whose acts Owner is responsible, Contractor shall be entitled to make a request for an equitable adjustment in the Contract Time in accordance with the following procedure. No adjustment in the Contract Time shall be allowed to the extent Contractor’s changed time of
performance is due to the fault or negligence of Contractor, or anyone for whose acts Contractor is responsible.

1. **Notice and record keeping for Contract Time request:** A request for an equitable adjustment in the Contract Time shall be based on written notice delivered within 7 Days of the occurrence of the event giving rise to the request. If Contractor believes it is entitled to adjustment of Contract Time, Contractor shall immediately notify Owner and begin to keep and maintain complete, accurate, and specific daily records. Contractor shall give Owner access to any such record and if requested, shall promptly furnish copies of such record to Owner.

2. **Timing and content of Contractor's Notice:** Contractor shall not be entitled to an adjustment in the Contract Time for any events that occurred more than 7 Days before Contractor's written notice to Owner. The written notice shall set forth, at a minimum, a description of: the event giving rise to the request for an equitable adjustment in the Contract Time; the nature of the impacts to Contractor and its Subcontractors of any tier, if any; and to the extent possible the amount of the adjustment in Contract Time requested. Failure to properly give such written notice shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

3. **Contractor to provide supplemental information:** Within 30 Days of the occurrence of the event giving rise to the request, unless Owner agrees in writing to allow an additional period of time to ascertain more accurate data, Contractor shall supplement the written notice provided in accordance with subparagraph 7.03B.2 with additional supporting data. Such additional data shall include, at a minimum: the amount of delay claimed, itemized in accordance with the procedure set forth herein; specific facts, circumstances, and analysis that confirms not only that Contractor suffered the delay claimed, but that the delay claimed was actually a result of the act, event, or condition complained of, and that the Contract Documents provide entitlement to an equitable adjustment in Contract Time for such act, event, or condition; and supporting documentation sufficiently detailed to permit an informed analysis of the request by Owner. Failure to provide such additional information and documentation within the time allowed or within the format required shall, to the extent Owner's interests are prejudiced, constitute a waiver of Contractor's right to an equitable adjustment.

4. **Contractor to proceed with Work as directed:** Pending final resolution of any request in accordance with this paragraph, unless otherwise agreed in writing, Contractor shall proceed diligently with performance of the Work.

C. **Contractor to demonstrate impact on critical path of schedule:** Any change in the Contract Time covered by a Change Order, or based on a request for an equitable adjustment in the Contract Time, shall be limited to the change in the critical path of Contractor's schedule attributable to the change of Work or event(s) giving rise to the request for equitable adjustment. Any Change Order Proposal or request for an adjustment in the Contract Time shall demonstrate the impact on the critical path of the schedule. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event: had a specific impact on the critical path, and except in case of concurrent delay, was the sole cause of such impact; and could not have been avoided by resequencing of the Work or other reasonable alternatives.

D. **Cost of change in Contract Time:** Contractor may request compensation for the cost of a change in Contract Time in accordance with this paragraph, 7.03D, subject to the following conditions:

1. **Must be solely fault of Owner or A/E:** The change in Contract Time shall solely be caused by the fault or negligence of Owner or A/E;

2. **Procedures:** Contractor shall follow the procedure set forth in paragraph 7.03B;
3. **Demonstrate impact on critical path:** Contractor shall establish the extent of the change in Contract Time in accordance with paragraph 7.03C; and

4. **Limitations on daily costs:** The daily cost of any change in Contract Time shall be limited to the items below, less the amount of any change in the Contract Sum the Contractor may otherwise be entitled to pursuant to Section 7.02B 7f for any change in the Work that contributed to this change in Contract Time:
   
a. **Non-productive supervision or labor:** cost of nonproductive field supervision or labor extended because of delay;
   
b. **Weekly meetings and indirect activities:** cost of weekly meetings or similar indirect activities extended because of the delay;
   
c. **Temporary facilities or equipment rental:** cost of temporary facilities or equipment rental extended because of the delay;
   
d. **Insurance premiums:** cost of insurance extended because of the delay;
   
e. **Overhead:** general and administrative overhead in an amount to be agreed upon, but not to exceed 3% of the Contract Award Amount divided by the originally specified Contract Time for each Day of the delay.

**PART 8 – CLAIMS AND DISPUTE RESOLUTION**

**8.01 CLAIMS PROCEDURE**

A. **Claim is Contractor’s remedy:** If the parties fail to reach agreement on the terms of any Change Order for Owner-directed Work as provided in Section 7.01, or on the resolution of any request for an equitable adjustment in the Contract Sum as provided in Section 7.02 or the Contract Time as provided in Section 7.03, Contractor’s only remedy shall be to file a Claim with Owner as provided in this section.

B. **Claim filing deadline for Contractor:** Contractor shall file its Claim within 120 Days from Owner’s final offer made in accordance with paragraph 7.01E, or by the date of Final Acceptance, whichever occurs first.

C. **Claim must cover all costs and be documented:** The Claim shall be deemed to cover all changes in cost and time (including direct, indirect, impact, and consequential) to which Contractor may be entitled. It shall be fully substantiated and documented. At a minimum, the Claim shall contain the following information:

1. **Factual statement of Claim:** A detailed factual statement of the Claim for additional compensation and time, if any, providing all necessary dates, locations, and items of Work affected by the Claim;

2. **Dates:** The date on which facts arose which gave rise to the Claim;

3. **Owner and A/E employee’s knowledgeable about Claim:** The name of each employee of Owner or A/E knowledgeable about the Claim;

4. **Support from Contract Documents:** The specific provisions of the Contract Documents which support the Claim;
5. Identification of other supporting information: The identification of any documents and the substance of any oral communications that support the Claim;

6. Copies of supporting documentation: Copies of any identified documents, other than the Contract Documents, that support the Claim;

7. Details on Claim for Contract Time: If an adjustment in the Contract Time is sought: the specific days and dates for which it is sought; the specific reasons Contractor believes an extension in the Contract Time should be granted; and Contractor’s analysis of its Progress Schedule to demonstrate the reason for the extension in Contract Time;

8. Details on Claim for adjustment of Contract Sum: If an adjustment in the Contract Sum is sought, the exact amount sought and a breakdown of that amount into the categories set forth in, and in the detail as required by Section 7.02; and

9. Statement certifying Claim: A statement certifying, under penalty of perjury, that the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor’s knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes Owner is liable.

D. Owner’s response to Claim filed: After Contractor has submitted a fully documented Claim that complies with all applicable provisions of Parts 7 and 8, Owner shall respond, in writing, to Contractor as follows:

1. Response time for Claim less than $50,000: If the Claim amount is less than $50,000, with a decision within 60 Days from the date the Claim is received; or

2. Response time for Claim of $50,000 or more: If the Claim amount is $50,000 or more, with a decision within 60 Days from the date the Claim is received, or with notice to Contractor of the date by which it will render its decision. Owner will then respond with a written decision in such additional time.

E. Owner’s review of Claim and finality of decision: To assist in the review of Contractor’s Claim, Owner may visit the Project site, or request additional information, in order to fully evaluate the issues raised by the Claim. Contractor shall proceed with performance of the Work pending final resolution of any Claim. Owner’s written decision as set forth above shall be final and conclusive as to all matters set forth in the Claim, unless Contractor follows the procedure set forth in Section 8.02.

F. Waiver of Contractor rights for failure to comply with this Section: Any Claim of the Contractor against the Owner for damages, additional compensation, or additional time, shall be conclusively deemed to have been waived by the Contractor unless made in accordance with the requirements of this Section.

8.02 ARBITRATION

A. Timing of Contractor’s demand for arbitration: If Contractor disagrees with Owner’s decision rendered in accordance with paragraph 8.01D, Contractor shall provide Owner with a written demand for arbitration. No demand for arbitration of any such Claim shall be made later than 30 Days after the date of Owner’s decision on such Claim; failure to demand arbitration within said 30 Day period shall result in Owner’s decision being final and binding upon Contractor and its Subcontractors.

B. Filing of Notice for arbitration: Notice of the demand for arbitration shall be filed with the American Arbitration Association (AAA), with a copy provided to Owner. The parties shall negotiate or
mediate under the Voluntary Construction Mediation Rules of the AAA, or mutually acceptable service, before seeking arbitration in accordance with the Construction Industry Arbitration Rules of AAA as follows:

1. **Claims less than $30,000:** Disputes involving $30,000 or less shall be conducted in accordance with the Northwest Region Expedited Commercial Arbitration Rules; or

2. **Claims greater than $30,000:** Disputes over $30,000 shall be conducted in accordance with the Construction Industry Arbitration Rules of the AAA, unless the parties agree to use the expedited rules.

C. **Arbitration is forum for resolving Claims:** All Claims arising out of the Work shall be resolved by arbitration. The judgment upon the arbitration award may be entered, or review of the award may occur, in the superior court having jurisdiction thereof. No independent legal action relating to or arising from the Work shall be maintained.

D. **Owner may combine Claims into same arbitration:** Claims between Owner and Contractor, Contractor and its Subcontractors, Contractor and A/E, and Owner and A/E shall, upon demand by Owner, be submitted in the same arbitration or mediation.

E. **Settlement outside of arbitration to be documented in Change Order:** If the parties resolve the Claim prior to arbitration judgment, the terms of the resolution shall be incorporated in a Change Order. The Change Order shall constitute full payment and final settlement of the Claim, including all claims for time and for direct, indirect, or consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity.

### 8.03 CLAIMS AUDITS

A. **Owner may audit Claims:** All Claims filed against Owner shall be subject to audit at any time following the filing of the Claim. Failure of Contractor, or Subcontractors of any tier, to maintain and retain sufficient records to allow Owner to verify all or a portion of the Claim or to permit Owner access to the books and records of Contractor, or Subcontractors of any tier, shall constitute a waiver of the Claim and shall bar any recovery.

B. **Contractor to make documents available:** In support of Owner audit of any Claim, Contractor shall, upon request, promptly make available to Owner the following documents:

1. Daily time sheets and supervisor’s daily reports;
2. Collective bargaining agreements;
3. Insurance, welfare, and benefits records;
4. Payroll registers;
5. Earnings records;
6. Payroll tax forms;
7. Material invoices, requisitions, and delivery confirmations;
8. Material cost distribution worksheet;
9. Equipment records (list of company equipment, rates, etc.);
11. Contracts between Contractor and each of its Subcontractors, and all lower-tier Subcontractor contracts and supplier contracts;

12. Subcontractors’ and agents’ payment certificates;

13. Cancelled checks (payroll and vendors);

14. Job cost report, including monthly totals;

15. Job payroll ledger;

16. Planned resource loading schedules and summaries;

17. General ledger;

18. Cash disbursements journal;

19. Financial statements for all years reflecting the operations on the Work. In addition, the Owner may require, if it deems it appropriate, additional financial statements for 3 years preceding execution of the Work;

20. Depreciation records on all company equipment whether these records are maintained by the company involved, its accountant, or others;

21. If a source other than depreciation records is used to develop costs for Contractor’s internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;

22. All nonprivileged documents which relate to each and every Claim together with all documents which support the amount of any adjustment in Contract Sum or Contract Time sought by each Claim;

23. Work sheets or software used to prepare the Claim establishing the cost components for items of the Claim including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, all documents which establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals; and

24. Work sheets, software, and all other documents used by Contractor to prepare its bid.

C. Contractor to provide facilities for audit and shall cooperate: The audit may be performed by employees of Owner or a representative of Owner. Contractor, and its Subcontractors, shall provide adequate facilities acceptable to Owner, for the audit during normal business hours. Contractor, and all Subcontractors, shall make a good faith effort to cooperate with Owner’s auditors.

PART 9 – TERMINATION OF THE WORK

9.01 TERMINATION BY OWNER FOR CAUSE

A. 7 Day Notice to Terminate for Cause: Owner may, upon 7 Days written notice to Contractor and to its surety, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:
1. **Contractor fails to prosecute Work:** Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;

2. **Contractor bankrupt:** Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;

3. **Contractor fails to correct Work:** Contractor fails in a material way to replace or correct Work not in conformance with the Contract Documents;

4. **Contractor fails to supply workers or materials:** Contractor repeatedly fails to supply skilled workers or proper materials or equipment;

5. **Contractor failure to pay Subcontractors or labor:** Contractor repeatedly fails to make prompt payment due to Subcontractors or for labor;

6. **Contractor violates laws:** Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or

7. **Contractor in material breach of Contract:** Contractor is otherwise in material breach of any provision of the Contract Documents.

B. **Owner's actions upon termination:** Upon termination, Owner may at its option:

1. **Take possession of Project site:** Take possession of the Project site and take possession of or use all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor to maintain the orderly progress of, and to finish, the Work;

2. **Accept assignment of Subcontracts:** Accept assignment of subcontracts pursuant to Section 5.20; and

3. **Finish the Work:** Finish the Work by whatever other reasonable method it deems expedient.

C. **Surety's role:** Owner’s rights and duties upon termination are subject to the prior rights and duties of the surety, if any, obligated under any bond provided in accordance with the Contract Documents.

D. **Contractor's required actions:** When Owner terminates the Work in accordance with this section, Contractor shall take the actions set forth in paragraph 9.02B, and shall not be entitled to receive further payment until the Work is accepted.

E. **Contractor to pay for unfinished Work:** If the unpaid balance of the Contract Sum exceeds the cost of finishing the Work, including compensation for A/E’s services and expenses made necessary thereby and any other extra costs or damages incurred by Owner in completing the Work, or as a result of Contractor’s actions, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner. These obligations for payment shall survive termination.

F. **Contractor and Surety still responsible for Work performed:** Termination of the Work in accordance with this section shall not relieve Contractor or its surety of any responsibilities for Work performed.

G. **Conversion of “Termination for Cause” to “Termination for Convenience”:** If Owner terminates Contractor for cause and it is later determined that none of the circumstances set forth in paragraph 9.01A exist, then such termination shall be deemed a termination for convenience pursuant to Section 9.02.
9.02 TERMINATION BY OWNER FOR CONVENIENCE

A. Owner Notice of Termination for Convenience: Owner may, upon written notice, terminate (without prejudice to any right or remedy of Owner) the Work, or any part of it, for the convenience of Owner.

B. Contractor response to termination Notice: Unless Owner directs otherwise, after receipt of a written notice of termination for either cause or convenience, Contractor shall promptly:

1. Cease Work: Stop performing Work on the date and as specified in the notice of termination;

2. No further orders or Subcontracts: Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;

3. Cancel orders and Subcontracts: Cancel all orders and subcontracts, upon terms acceptable to Owner, to the extent that they relate to the performance of Work terminated;

4. Assign orders and Subcontracts to Owner: Assign to Owner all of the right, title, and interest of Contractor in all orders and subcontracts;

5. Take action to protect the Work: Take such action as may be necessary or as directed by Owner to preserve and protect the Work, Project site, and any other property related to this Project in the possession of Contractor in which Owner has an interest; and

6. Continue performance not terminated: Continue performance only to the extent not terminated

C. Terms of adjustment in Contract Sum if Contract terminated: If Owner terminates the Work or any portion thereof for convenience, Contractor shall be entitled to make a request for an equitable adjustment for its reasonable direct costs incurred prior to the effective date of the termination, plus reasonable allowance for overhead and profit on Work performed prior to termination, plus the reasonable administrative costs of the termination, but shall not be entitled to any other costs or damages, whatsoever, provided however, the total sum payable upon termination shall not exceed the Contract Sum reduced by prior payments. Contractor shall be required to make its request in accordance with the provisions of Part 7.

D. Owner to determine whether to adjust Contract Time: If Owner terminates the Work or any portion thereof for convenience, the Contract Time shall be adjusted as determined by Owner.

PART 10 – MISCELLANEOUS PROVISIONS

10.01 GOVERNING LAW

Applicable law and venue: The Contract Documents and the rights of the parties herein shall be governed by the laws of the state of Washington. Venue shall be in the county in which Owner’s principal place of business is located, unless otherwise specified.

10.02 SUCCESSORS AND ASSIGNS

Bound to successors; Assignment of Contract: Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party shall assign the Work without written consent of the other, except that Contractor may assign the Work for security
purposes, to a bank or lending institution authorized to do business in the state of Washington. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations set forth in the Contract Documents.

10.03 MEANING OF WORDS

Meaning of words used in Specifications: Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the code of any governmental authority, whether such reference be specific or by implication, shall be to the latest standard specification, manual, or code in effect on the date for submission of bids, except as may be otherwise specifically stated. Wherever in these Drawings and Specifications an article, device, or piece of equipment is referred to in the singular manner, such reference shall apply to as many such articles as are shown on the drawings, or required to complete the installation.

10.04 RIGHTS AND REMEDIES

No waiver of rights: No action or failure to act by Owner or A/E shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall action or failure to act constitute approval or an acquiescence in a breach therein, except as may be specifically agreed in writing.

10.05 CONTRACTOR REGISTRATION

Contractor must be registered or licensed: Pursuant to RCW 39.06, Contractor shall be registered or licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27.

10.06 TIME COMPUTATIONS

Computing time: When computing any period of time, the day of the event from which the period of time begins shall not be counted. The last day is counted unless it falls on a weekend or legal holiday, in which event the period runs until the end of the next day that is not a weekend or holiday. When the period of time allowed is less than 7 days, intermediate Saturdays, Sundays, and legal holidays are excluded from the computation.

10.07 RECORDS RETENTION

Six-year records retention period: The wage, payroll, and cost records of Contractor, and its Subcontractors, and all records subject to audit in accordance with Section 8.03, shall be retained for a period of not less than 6 years after the date of Final Acceptance.

10.08 THIRD-PARTY AGREEMENTS

No third-party relationships created: The Contract Documents shall not be construed to create a contractual relationship of any kind between: A/E and Contractor; Owner and any Subcontractor; or any persons other than Owner and Contractor.

10.09 ANTITRUST ASSIGNMENT

Contractor assigns overcharge amounts to Owner: Owner and Contractor recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by the purchaser. Therefore, Contractor hereby assigns to Owner any and all claims for such overcharges as to goods, materials, and equipment purchased in connection with the Work performed in accordance with the Contract Documents, except as to overcharges which result from antitrust violations commencing after the Contract Sum is established and which are not passed on to Owner.
under a Change Order. Contractor shall put a similar clause in its Subcontracts, and require a similar clause in its sub-Subcontracts, such that all claims for such overcharges on the Work are passed to Owner by Contractor.

10.10 HEADINGS AND CAPTIONS

Headings for convenience only: All headings and captions used in these General Conditions are only for convenience of reference, and shall not be used in any way in connection with the meaning, effect, interpretation, construction, or enforcement of the General Conditions, and do not define the limit or describe the scope or intent of any provision of these General Conditions.

10.11 DIVERSE BUSINESS PARTICIPATION

The state of Washington encourages participation in all of its contracts by Diverse Businesses as found in RCW Chapters 39, 43, and WAC 326. The voluntary Diverse Business goal of 26%, which is an aggregate of: 10% Minority Business Enterprises (MBE), 6% Women Business Enterprises (WBE), 5% Veteran-owned Business, and 5% Washington Small Businesses self-identified in the Washington Electronic Business Solution (WEBS). Contractors are encouraged to meet or exceed the project goals in the advertisement by any level of participation, regardless of category.

DES reserves the right to adjust the voluntary participation goals.

Businesses are encouraged to register in WEBS, as well as registering as a state certified M/WBE/Veteran Business.

For reporting, Contractor is required to register and create an account in the DES Public Works Diversity Tracking & Management System powered by B2GNow.

Every month for the duration of your contract, and while your contract is active in the DES Public Works Diversity Tracking & Management System, submit and accurately maintain the following information:

1. Payments received by the prime contractor from the Agency.
2. Payments paid to each first tier subcontractor.
3. Payments paid to each first tier supplier.

You must also ensure the following information is reported in the DES Public Works Diversity Tracking & Management System by your first tier subcontractors and suppliers for the duration of your contract:

1. Confirmation of payments from the prime contractor to the first-tier subcontractor.
2. Confirmation of payments from the prime contractor to first tier suppliers

10.12 MINIMUM LEVELS OF APPRENTICESHIP PARTICIPATION

In accordance with RCW 39.04.320, the State of Washington requires 15% apprenticeship participation for projects estimated to cost one million dollars or more unless otherwise stated on the Bid Advertisement and the Submittal Questionnaire/Bidding Terms and Conditions. Contractors who meet or exceed minimum participation requirement are eligible for monetary incentive of $1,000 and will be paid to the contractor meeting the apprentice utilization requirement. A monetary penalty will be applied to the contractor failing to meet the utilization requirement and failing to demonstrate a Good Faith Effort. The penalty will be applied to every hour of shortfall of the minimum number of required apprentice hours using the applicable published wage of a Step 1 apprentice laborer.
The penalty will not exceed five percent (5%) of the total Contract Sum. The cost value associated with meeting the apprentice utilization requirement is included in the Base Bid.

A. Apprentice participation, under this contract, may be counted towards the required percentage (%) only if the apprentices are from an apprenticeship program registered and approved by the Washington State Apprenticeship and Training Council (RCW 49.04 and WAC 296-05).

B. Bidders may contact the L&I to obtain more information about apprenticeship programs.

C. No changes to the required percentage (%) of apprentice participation shall be allowed without written approval of the Owner. In any request for the change, the Contractor shall clearly demonstrate a good faith effort to comply with the requirements for apprentice participation.

D. Any substantive violation of the mandatory requirements of this part of the contract may be a material breach of the contract by the Contractor. The Owner may withhold payment pursuant to Part 6.05, stop the work for cause pursuant to Part 3.04, and terminate the contract for cause pursuant to Part 9.01.

10.13 SPECIAL CONDITIONS

The Owner may have Federal Funding or other special requirements for this project. If applicable, the Contractor will be required to comply with the “DIVISION 00 SPECIAL CONDITIONS” section in the specifications that will be based on the specific requirements of the funding source.
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- DIVISION 11 – EQUIPMENT
  - 11 30 12 – Appliances

- DIVISION 12 – FURNISHINGS
  - 12 36 00 – Countertops

- DIVISION 22 – PLUMBING
  - 22 00 10 – General Plumbing Provisions
  - 22 05 23 – General-Duty Valves for Plumbing Piping
  - 22 05 29 – Hangers and Supports for Plumbing Piping and Equipment
  - 22 05 49 – Seismic Controls for Plumbing
  - 22 05 53 – Identification for Plumbing Piping and Equipment
  - 22 07 19 – Plumbing Piping Insulation
  - 22 08 00 – Commissioning of Plumbing
  - 22 11 16 – Domestic Water Piping
  - 22 13 16 – Sanitary Waste and Vent Piping
  - 22 40 00 – Plumbing Fixtures

- DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING
  - 23 00 10 – General HVAC Provisions
  - 23 05 17 – Sleeves and Sleeve Seals for HVAC Piping
  - 23 05 18 – Escutcheons for HVAC Piping
  - 23 05 23 – General-Duty Valves for HVAC Piping
  - 23 05 29 – Hangers and Supports for HVAC Piping and Equipment
  - 23 05 48 – Vibration and Seismic Controls for HVAC
  - 23 05 53 – Identification for HVAC Piping and Equipment
  - 23 05 93 – Testing, Adjusting, and Balancing for HVAC
  - 23 07 00 – HVAC Insulation
  - 23 08 00 – Commissioning of HVAC
  - 23 23 00 – Refrigerant Piping
  - 23 31 13 – Metal Ducts
  - 23 33 00 – Air Duct Accessories
  - 23 37 13 – Diffusers, Registers, and Grilles
  - 23 72 00 – Energy Recovery Ventilators
  - 23 81 29 – Variable Refrigerant Flow Systems

- DIVISION 26 - ELECTRICAL
  - 26 00 10 – Electrical Provisions
  - 26 00 50 – Basic Electrical Materials and Methods
  - 26 05 19 – Wire and Cable (600v and Less)
  - 26 05 26 – Grounding and Bonding for Electrical Systems
  - 26 05 33 – Raceway and Boxes for Electrical Systems
  - 26 08 00 – Commissioning of Electrical
  - 26 09 23 – Lighting Control Devices
o 26 24 16 – Panelboards
o 26 27 26 – Wiring Devices
o 26 28 13 – Fuses
o 26 28 16 – Enclosed Switches and Circuit Breakers
o 26 51 19 – LED Interior Lighting

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OPERATIONS CENTER RENOVATIONS, GREEN RIVER TREATMENT PLANT TACOMA WATER
36525 SE GREEN RIVER HEADWORKS ROAD, RAVENSDALE, WA 98051

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF DIFFERENT TRADES.
2. EXACT SEQUENCE OF CONSTRUCTION WORK IS DELEGATED TO THE GENERAL CONTRACTOR. GENERAL CONTRACTOR SHALL NOTIFY subcontractors and/or material suppliers of the sequence of work and required coordination. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING THE GENERAL CONTRACTOR'S SCHEDULE AND FOR COORDINATING SUBTRADE ACTIVITIES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PRODUCING ALL PROJECT DRAWINGS AND ACCORDANCE WITH THE INFORMATION PROVIDED IN THIS CONTRACT.
4. GENERAL CONTRACTOR SHALL OVERSEE THE PRODUCTION OF THE CONTRACTOR'S SCHEDULE AND THE REQUIREMENT FOR THE CONTRACTOR'S WORK.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND SCHEDULING THE WORK OF VARIOUS TRADES AND CONTRACTORS, INCLUDING SUBTRADES.
6. ALL TRADES SHALL BE RESPONSIBLE FOR COORDINATING AND SCHEDULING THE WORK OF THEIR TRADES AND CONTRACTORS.

DEFINITIONS AND DIMENSIONS

DEFINITION / DIMENSION

ARCH / INTERIOR ABBREVIATIONS

PROJECT TEAM

LEGAL DESCRIPTION / PARCEL NO.

STREET MAP

COVER SHEET / PROJECT INFORMATION

DRAWING INDEX

DEFERRED SUBMITTALS / SEPARATE PERMIT

PLUMBING SCHEDULES

ELECTRICAL SCHEDULES

ELEVATIONS AND SECTIONS

CONSTRUCTION DOCUMENTS FOR CONTENT, FINISH SELECTIONS, SCOPE OF WORK, AND ALL OTHER ITEMS REQUIRING BACKING.

DEFINITIONS AND DIMENSIONS

1. "TYPICAL" OR "TYP" INDICATES IDENTICAL COMPLETE SYSTEM FOR THE CONDITION NOTED.
2. "SIMILAR" OR "SIM" INDICATES COMPLETE SYSTEM AND COMPONENTS COMPARABLE TO THE CHARACTERISTICS FOR THE CONDITION NOTED.
3. "FINISH SYMBOL" OR "FIN" INDICATES THE EXTERNAL FINISH OR MATERIALS USED IN THE SPECIFIED AREA.
4. "GLAZING SYMBOL" OR "GLAZ" INDICATES THE GLAZING TYPES AND LOCATION FOR THE SPECIFIED AREA.
5. "SCALE" OR "SCL" INDICATES THE SCALE OF THE DRAWING OR SHEET.
6. "KEY PLAN / FLOOR PLATE" OR "KFP" INDICATES THE KEY PLAN OR FLOOR PLATE FOR THE SPECIFIED AREA.
7. "AREA OF WORK" OR "AW" INDICATES THE AREA OF WORK FOR THE SPECIFIED AREA.

COVERAGE SHEET / PROJECT INFORMATION

CITY:

STATE:

ZIP:

ATTN:

ENLARGED 2ND FLOOR ELECTRICAL PLANS

X 21.0222.00

LIGHTING DEMO FLOOR PLAN

2. "SIMILAR" OR "SIM" INDICATES COMPLETE SYSTEM AND COMPONENTS COMPARABLE TO THE CHARACTERISTICS FOR THE CONDITION NOTED.
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7. "AREA OF WORK" OR "AW" INDICATES THE AREA OF WORK FOR THE SPECIFIED AREA.
1. REFER TO CONSTRUCTION PLAN AND CEILING PLAN FOR EXTENT OF DEMOLITION.
2. SAVE AND STORE ALL LIGHT FIXTURES, EXIT SIGNS, DOORS & HARDWARE FOR RE-USE, UON.
3. SAVE ALL EXISTING PLUMBING FIXTURES FOR RE-USE, UON.
4. REMOVE ALL TELEPHONE, ELECTRICAL, AND DATA OUTLETS, FIXTURES, PANELS, ETC, FROM ALL DEMOLISHED PARTITIONS. REMOVE ALL CORRESPONDING CABLES, CONDUIT, WIRING, ETC, ALL THE WAY BACK TO THE ORIGINATING SOURCE, UON.
5. REMOVE FLOOR FINISHES WHERE INDICATED IN THE KEYNOTES EXCEPT FOR EXISTING ROOMS NOTED AS NOT IN CONTRACT OR OTHERWISE INDICATED IN THE KEYNOTES. SCRAPE ALL ADHESIVE TO CLEAN FINISH. PATCH AND REPAIR FLOOR SLAB AS REQUIRED TO MAINTAIN A SMOOTH AND EVEN SURFACE. LEAVE FLOOR SLAB IN BROOM Swept CLEAN condition TO PREPARE FOR NEW FLOOR FINISH.
6. REMOVE ALL WALL FINISHES, WALL BASE AND SKIM WALLS WHERE INDICATED IN THE KEYNOTES. FINISHES TO REMAIN IN AREAS NOTED AS NOT IN CONTRACT.

GENERAL FLOOR DEMOLITION NOTES

DEMOLITION FLOOR SYMBOLS

EXISTING CONSTRUCTION TO BE REMOVED
EXISTING CONSTRUCTION TO REMAIN
EXISTING SIDELIGHT TO BE REMOVED
EXISTING SIDELIGHT TO REMAIN
EXISTING GLASS TO REMAIN
NOT IN CONTRACT, (NIC)
EXISTING DOOR TO REMAIN
EXISTING DOUBLE DOOR TO REMAIN
EXISTING DOOR TO BE REMOVED
EXISTING POWER TO BE REMOVED
EXISTING WALLCOVERING EXTENTS TO BE REMOVED

KEYED FLOOR DEMOLITION SHEET NOTES

REMOVE DOOR, FRAME, AND HARDWARE - TO BE STORED OR RELOCATED AND REINSTALLED WHERE APPLICABLE.
REMOVE PORTION OF EXISTING PARTITION AS SHOWN.
REMOVE UPPER AND LOWER CASEWORK.
REMOVE EXISTING PLUMBING FIXTURES, HARDWARE AND ASSOCIATED EQUIPMENT. REMOVE WATER AND DRAIN LINES, NOT TO BE REUSED, AND CAP PLUMBING AS REQUIRED. PATCH AND REPAIR ALL SURFACES AS REQUIRED FOR NEW CONSTRUCTION AND FINISHES.
REMOVE EXISTING WALLCOVERING TO PREP WALLS FOR PAINT.
REMOVE EXISTING CARPET.
EXISTING FIRE CONTROL PANEL TO BE RELOCATED. RE: AI101 FOR NEW LOCATION.
REMOVE EXISTING SHOWER WALL TILE.
REMOVE EXISTING TILE COVE BASE AND TILE FLOOR.
MAINTAIN EXISTING SHOWER DRAIN AT INDICATED LOCATION.
REMOVE EXISTING WALL COAT HOOKS AND REINSTALL. RE: AI101 FOR LOCATION.
REMOVE EXISTING SHOWER SEAT AND REINSTALL. RE: AI402 FOR LOCATION.
RESTROOM ACCESSORIES TO BE STORED AND REINSTALLED WHERE APPLICABLE.
EXISTING SERVER TO BE RELOCATED IN 116 SERVER.
EXISTING FIRE EXTINGUISHER CABINET TO BE RELOCATED. RE: AI101 FOR NEW LOCATION.
EXISTING TOILET TO BE SALVAGED AND REINSTALLED. INSPECT DEMO TOILETS AND REINSTALL THE (2) FIXTURES IN THE BEST CONDITION. RE: AI101 FOR NEW LOCATION.
REMOVE EXISTING LOCKERS AND MAINTAIN EXISTING 4" PLINTH AND RUBBER BASE.

GFCI
1. REFER TO CONSTRUCTION PLAN AND REFLECTED CEILING PLAN FOR EXTENT OF DEMOLITION.
2. SAVE AND STORE ALL LIGHT FIXTURES FOR RE-USE.
3. USE SALVAGED CEILING TILES IN GOOD CONDITION AS INFILL WHENEVER POSSIBLE.

GENERAL CEILING DEMOLITION NOTES
- REMOVE EXISTING FLUORESCENT LIGHTING.
- REMOVE EXISTING TRANSLUCENT ACRYLIC PANELS.
- REMOVE EXISTING FLUORESCENT FIXTURE TO BE RELOCATED.

KEYED CEILING DEMOLITION SHEET NOTES
- FIELD OF EXISTING FLUORESCENT LIGHTING
- FIELD OF EXISTING TRANSLUCENT ACRYLIC PANELS
- REMAIN EXISTING FLUORESCENT FIXTURE TO BE RELOCATED
1. PROVIDE ACCESSIBLE HEIGHT COAT HOOK @ 48" AFF ON BACK OF 116 ADA SHOWER ROOM DOOR.

2. PROVIDE COAT HOOKS AT 60" AFF ON BACKS OF RESTROOMS, SHOWER, TOILET, AND WELLNESS ROOM DOORS.

3. REFER TO DETAIL B/AI500 FOR STANDARD BLOCKING.

4. REFER TO PROJECT NOTES FOR CONSTRUCTION REQUIREMENTS.

5. RELOCATE EXISTING SHOWER SEAT AT INDICATED LOCATION.

6. RELOCATED FIRE EXTINGUISHER CABINET.

7. REINSTALL EXISTING TOILETS IN BEST CONDITION AT INDICATED LOCATION.

8. REFILL ANY ABANDONED CORE DRILL HOLE OR SIMILAR WITH FIRE PROOFING THAT MATCHES THE FLOOR RATING, UNLESS NOT IN CONTRACT (NIC).

9. PROVIDE ACCESSIBLE HEIGHT COAT HOOK @ 48" AFF ON BACK OF 116 ADA SHOWER ROOM DOOR.

10. REFER TO DETAIL B/AI500 FOR STANDARD BLOCKING.

11. ATTACHED TO PARTITIONS.

12. PROVIDE COAT HOOKS AT 60" AFF ON BACKS OF RESTROOMS, SHOWER, TOILET, AND WELLNESS ROOM DOORS.

OTHER ACCESSORIES, ALIGN FACE OF PARTITIONS, TAPE & SAND SMOOTH FOR NEW FINISH.

WHERE PARTITION LAYOUT INTERSECTS EXISTING SHELL/CORE GYPSUM BOARD, REMOVE EXISTING CORNER BEADS AND OR WEATHER STRIPPED AS REQUIRED TO MEET PARTITION RATINGS.

ALL INTERIOR PARTITION, PENETRATIONS, AND OTHER OPENINGS IN THE BUILDING SHELL SHALL BE SEALED, GASKETED, REFER TO DETAIL B/AI500 FOR STANDARD BLOCKING.

FRAMELESS SIDELITE
FULL HEIGHT SIDELITE
NEW INSULATED FURRING CONSTRUCTION, IN ROOM 104, PER DETAIL G/AI300
NEW OR EXISTING BUILDING STANDARD FIRE EXTINGUISHER CABINET
FRAMING DEPARTMENT STANDARDS SHEET METAL DOORS AND CASED OPENINGS WITHOUT DIMENSIONS OR DETAILS ARE TO BE LOCATED 4" FROM ADJACENT WALL OR MORE INFORMATION.
1. REFER TO PROJECT NOTES FOR CONSTRUCTION REQUIREMENTS.
2. ARCHITECTURAL REFLECTED CEILING PLANS INDICATE TYPE AND LOCATION OF LIGHT FIXTURES. REFER TO ELECTRICAL DRAWINGS AND GENERAL CONTRACTOR LIFE SAFETY FOR COMPLETE REFLECTED CEILING PLAN DESIGN.
3. LIGHT SWITCHES ARE SHOWN FOR LOCATION AND DESIGN INTENT ONLY. REFER TO ELECTRICAL CONTRACTOR FOR SPECIFIC LOCATION AND SWITCHING DIAGRAMS.
4. UNLESS OTHERWISE NOTED, MULTIPLE SWITCHES IN A SINGLE LOCATION SHALL BE GANGED IN A SINGLE BOX AND COVERED WITH A SINGLE COVERPLATE.
5. CLEAN, REPAIR OR REPLACE AS REQUIRED ALL EXISTING SUSPENDED CEILING GRID AND TILES EXISTING TO REMAIN.
6. HVAC CONTRACTOR TO CLEAN ALL EXISTING SUPPLY/RETURN GRILLS PRIOR TO COMPLETION OF PROJECT.
7. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE COUNTS OF EXISTING FIXTURES TO BE RELOCATED.
8. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR PROVIDING CUT SHEETS TO DESIGNER FOR ALL FIXTURES DESIGNATED AS NEW.
9. DRAWING SHOWS ONE METHOD OF PROVIDING EGRESS ILLUMINATION FOR IBC 1008. PROVIDE EGRESS ILLUMINATION PER IBC 1008. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF THIS SYSTEM UNDER THE CONTRACT. VERIFY WITH EXISTING SYSTEM AND PROVIDE FULL COMPLIANCE TO NEW TENANT SPACE.
10. THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT CANDLE (11 LUX) AT THE WALKING SURFACE.

GENERAL RCP NOTES:

11. REFER TO PROJECT NOTES FOR CONSTRUCTION REQUIREMENTS.
12. ARCHITECTURAL REFLECTED CEILING PLANS INDICATE TYPE AND LOCATION OF LIGHT FIXTURES. REFER TO ELECTRICAL DRAWINGS AND GENERAL CONTRACTOR LIFE SAFETY FOR COMPLETE REFLECTED CEILING PLAN DESIGN.
13. LIGHT SWITCHES ARE SHOWN FOR LOCATION AND DESIGN INTENT ONLY. REFER TO ELECTRICAL CONTRACTOR FOR SPECIFIC LOCATION AND SWITCHING DIAGRAMS.
14. UNLESS OTHERWISE NOTED, MULTIPLE SWITCHES IN A SINGLE LOCATION SHALL BE GANGED IN A SINGLE BOX AND COVERED WITH A SINGLE COVERPLATE.
15. CLEAN, REPAIR OR REPLACE AS REQUIRED ALL EXISTING SUSPENDED CEILING GRID AND TILES EXISTING TO REMAIN.
16. HVAC CONTRACTOR TO CLEAN ALL EXISTING SUPPLY/RETURN GRILLS PRIOR TO COMPLETION OF PROJECT.
17. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE COUNTS OF EXISTING FIXTURES TO BE RELOCATED.
18. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR PROVIDING CUT SHEETS TO DESIGNER FOR ALL FIXTURES DESIGNATED AS NEW.
19. DRAWING SHOWS ONE METHOD OF PROVIDING EGRESS ILLUMINATION FOR IBC 1008. PROVIDE EGRESS ILLUMINATION PER IBC 1008. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF THIS SYSTEM UNDER THE CONTRACT. VERIFY WITH EXISTING SYSTEM AND PROVIDE FULL COMPLIANCE TO NEW TENANT SPACE.
20. THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT CANDLE (11 LUX) AT THE WALKING SURFACE.

KEYED RCP SHEET NOTES:

1. REFER TO PROJECT NOTES FOR CONSTRUCTION REQUIREMENTS.
2. ARCHITECTURAL REFLECTED CEILING PLANS INDICATE TYPE AND LOCATION OF LIGHT FIXTURES. REFER TO ELECTRICAL DRAWINGS AND GENERAL CONTRACTOR LIFE SAFETY FOR COMPLETE REFLECTED CEILING PLAN DESIGN.
3. LIGHT SWITCHES ARE SHOWN FOR LOCATION AND DESIGN INTENT ONLY. REFER TO ELECTRICAL CONTRACTOR FOR SPECIFIC LOCATION AND SWITCHING DIAGRAMS.
4. UNLESS OTHERWISE NOTED, MULTIPLE SWITCHES IN A SINGLE LOCATION SHALL BE GANGED IN A SINGLE BOX AND COVERED WITH A SINGLE COVERPLATE.
5. CLEAN, REPAIR OR REPLACE AS REQUIRED ALL EXISTING SUSPENDED CEILING GRID AND TILES EXISTING TO REMAIN.
6. HVAC CONTRACTOR TO CLEAN ALL EXISTING SUPPLY/RETURN GRILLS PRIOR TO COMPLETION OF PROJECT.
7. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE COUNTS OF EXISTING FIXTURES TO BE RELOCATED.
8. ELECTRICAL SUB-CONTRACTOR IS RESPONSIBLE FOR PROVIDING CUT SHEETS TO DESIGNER FOR ALL FIXTURES DESIGNATED AS NEW.
9. DRAWING SHOWS ONE METHOD OF PROVIDING EGRESS ILLUMINATION FOR IBC 1008. PROVIDE EGRESS ILLUMINATION PER IBC 1008. CONTRACTOR IS RESPONSIBLE FOR DESIGN OF THIS SYSTEM UNDER THE CONTRACT. VERIFY WITH EXISTING SYSTEM AND PROVIDE FULL COMPLIANCE TO NEW TENANT SPACE.
10. THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL NOT BE LESS THAN 1 FOOT CANDLE (11 LUX) AT THE WALKING SURFACE.
Section E: Non-rated Floor to Deck Furring

Section F: Non-rated Floor to Deck Partition

Section G: Non-rated Floor to Ceiling Partition

General FRAMING NOTES

1. All Metal Studs Shall Be ASTM A653, Grade 33 (Min) Cold-Formed Steel (Min). Steel Stud Braces, At Locations as Required By The Drawings, Shall Be 3 5/8" 20 Ga Metal Stud Framing At 16" Oc Max, Unless Otherwise Noted. All Non-Load Bearing Metal Wall Framing Shall Be 20 Gauge, Unless Otherwise Noted.


3. General Partition Notes

4. Use metal studs for all stud wall framing as indicated by the drawings. The depth stated by the drawings shall be used. If a different depth is desired, contact Burgess Design.

5. Partition faces are independent of applied finishes. Refer to finish schedule and specification notes for information on finishes.

6. Cripple stud infill and sill track below window openings.

7.elmet frame wall framing shall be 20 gauge, at 16" Oc max, unless otherwise noted. Partition to be sealed at top head condition.

8. Where partition is to be glazed, provide 2" min embedment of applied finish or face of stud. Provide 1/2" min embedment for applied finishes.

9. Where it stops, partition face, new and existing.

10. Partition type indications are independent of applied finishes. Refer to finish schedule and/or specifications.
SUSPENDED CEILING AS SCHEDULED

CEILING HT PER RCP 6" 3-5/8", 20 GA CEILING TRACK ATTACHED TO EA KICKER W/ (3) #10 SELF-TAPPING SMS ATTACH EA STUD TO CEILING TRACK W/ 3/4" #10 SMS, EA SIDE
COPE FLANGES AND BEND WEB OF KICKER AND ATTACH TO (E) STRUCTURE W/ (2) 1/4" TITEN HD SCREWS OR (2) 1/4" DIA EXPANSION BOLTS, TYP. PROVIDE 2" MIN EMBEDMENT

FOR KICKER LENGTH LESS THAN 8'-0", PROVIDE (1) 250S137-43 STEEL STUD BRACE AT ENDS AND AT 8'-0" OC, MAX TO STRUCTURE. FOR KICKER LENGTH BETWEEN 8'-0" AND 12'-0", PROVIDE (1) 362S137-43 STEEL STUD BRACE AT LOCATIONS INDICATED ABOVE. FOR KICKER LENGTH BETWEEN 12'-0" AND 16'-0", PROVIDE BACK TO BACK 362S137-43 STEEL STUD BRACES, AT LOCATIONS INDICATED ABOVE. FOR KICKER LENGTH GREATER THAN 16'-0", CONTACT ARCHITECT FOR ADDITIONAL INFORMATION. MAX PARTITION WEIGHT 8 LBS/PSF

COPE Flanges AND BEND Web OF EA KICKER AND ATTACH TO CEILING Track W/ (3) #10 SMS 3/8" MIN, 1/2" MAX, EA SIDE

Provide Insulation Per Plans. Where PTN Type Is Insulated Provide Batt Insulation In Cavity Existing Subfloor (1) Layer 5/8" TYPE 'X' GWB ON 7/8" SINGLE LEG RESILIENT CHANNELS ATTACHED TO EXISTING PARTITION FRAMING BOTTOM OF (E) STRUCTURE

Notes:
1. COLD FORMED STUD MATERIAL TO BE ASTM A653, GRADE 33 (MIN).
2. SCREW SPACING AND EDGE DISTANCE SHALL NOT BE LESS THAN 3 TIMES THE DIAMETER OF THE SCREW. PENETRATION OF SCREWS SHALL NOT BE LESS THAN 3 EXPOSED THREADS. SCREWS SHALL BE INSTALLED PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. MAXIMUM WEIGHT OF BRACED WALL ASSEMBLY EQUALS 8 PSF.
4. PROVIDE ACOUSTIC SEALANT AT ALL JOINTS AND PUNCTURES OR PARTITION FACE, NEW AND EXISTING.
5. WRAP ALL NEW AND EXISTING WALL DEVICES WITH ACOUSTICAL PAD.
### TYPICAL ADA COMPLIANT RESTROOM MOUNTING HEIGHTS

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<th>Description</th>
<th>Dimensions</th>
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<td>Recessed Toilet</td>
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<tr>
<td>B</td>
<td>Countertop Sanitizer</td>
<td>12&quot;</td>
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<tr>
<td>C</td>
<td>Framed Mirror</td>
<td>2'-3&quot;</td>
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<tr>
<td>D</td>
<td>Counter Soap</td>
<td>5&quot;</td>
</tr>
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<td>E</td>
<td>Under Cabinet Dispenser</td>
<td>3'-0&quot;</td>
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<tr>
<td>F</td>
<td>Soap Dispenser Below Grab Bar</td>
<td>2'-9&quot;</td>
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<tr>
<td>G</td>
<td>Soft Soap</td>
<td>6&quot;</td>
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<tr>
<td>H</td>
<td>Paper Towel</td>
<td>1 1/2&quot;</td>
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<td>I</td>
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<td>J</td>
<td>Fire Paper</td>
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<td>K</td>
<td>Water Paper</td>
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<td>L</td>
<td>One Touch Sanitizer</td>
<td>1 1/2&quot;</td>
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<td>N</td>
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<td>O</td>
<td>Towel</td>
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<td>P</td>
<td>Hand Sanitizer</td>
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<tr>
<td>Q</td>
<td>Flat Bar</td>
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<tr>
<td>R</td>
<td>Long Grab Barb</td>
<td>2'-9&quot;</td>
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<tr>
<td>S</td>
<td>ADA Accessible Grab Bar</td>
<td>2'-3&quot;</td>
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<td>ADA Accessible Sanitizer</td>
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<tr>
<td>X</td>
<td>ADA Accessible Paper Towel</td>
<td>2'-3&quot;</td>
</tr>
<tr>
<td>Y</td>
<td>ADA Accessible Fire Paper</td>
<td>2'-3&quot;</td>
</tr>
<tr>
<td>Z</td>
<td>ADA Accessible Water Paper</td>
<td>2'-3&quot;</td>
</tr>
</tbody>
</table>

*Original drawing is 24" x 36". Scale entities accordingly if reduced.*

---

**Project No:** Permit / Bid Set01

**Project Manager:** [Name]

**Date:** [Date]

---

**EQUIPMENT SCHEDULE**

<table>
<thead>
<tr>
<th>Equipment Description</th>
<th>Dimensions</th>
<th>Make/Brand</th>
<th>Model/Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>[List of equipment with dimensions and brands]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AI500 ADAPTER THROUGH THE CEILING TILE TO ALLOW FREE MOVEMENT OF AT LEAST 1" IN ALL HORIZONTAL DIRECTIONS.

FOR CEILINGS WITHOUT RIGID BRACING, SPRINKLER HEAD PENETRATIONS SHALL HAVE A 2" OVERSIZE RING, SLEEVE OR SPECIAL INSPECTIONS SHALL BE SUBJECT TO SPECIAL INSPECTION REQUIREMENTS.


TERMINAL ENDS OF MAIN RUNNERS AND CROSS MEMBERS SHALL BE TIED TOGETHER OR HAVE SOME OTHER APPROVED CONNECTION DEVICE, AT THE SUPPORTING CONSTRUCTION, SHALL BE CAPABLE OF CARRYING NOT LESS THAN 100 LBS. OF LATERAL FORCE.

CEILING AREAS OF 1000 SQ FT OR LESS SHALL BE EXEMPT FROM LATERAL FORCE REQUIREMENTS, PER ASTM E580.

VERTICAL STRUTS MUST BE POSITIVELY ATTACHED TO SUSPENSION SYSTEMS AND THE STRUCTURE ABOVE, PER ASTM E580.

VERTICAL STRUTS MAY BE EMT CONDUIT, METAL STUDS OR PROPRIETARY COMPRESSION POSTS.

LATERAL FORCE BRACING IS THE USE OF VERTICAL STRUTS (COMPRESSION POSTS) AND SPLAY WIRES.

POWDER ACTUATED FASTENERS (PAF’S) WHEN USED FOR SEISMIC APPLICATIONS AS PART OF THE PRESCRIPTIVE PATH IN THE CODE, MUST USE APPROVED MOUNTING HARDWARE LATCH AND MFR MOUNTING HARDWARE.

GENERAL DEVICE ALIGNMENT

COORDINATE ANCHOR BRACKET LOCATION TO RESIST THE DEAD LOAD AND LATERAL FORCES APPROPRIATE FOR THE SEISMIC CATEGORY, PER ASTM E580.

SEISMIC COMPRESSION STRUT

NOT TO SCALE

REFERENCED SOURCES PER HIERARCHY: IBC (INTERNATIONAL BUILDING CODE), AMERICAN SOCIETY OF TESTING MATERIALS, AND CISCA (CITY OF SEATTLE PROFESSIONAL ENGINEERS COUNCIL) ZONES 3-4.

NOT TO SCALE

NOT TO SCALE

NOT TO SCALE

NOT SCALE

NOT TO SCALE

NOT TO SCALE

NOT TO SCALE

NOTE:

L

AI500

ADAPTER THROUGH THE CEILING TILE TO ALLOW FREE MOVEMENT OF AT LEAST 1" IN ALL HORIZONTAL DIRECTIONS.

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SCHLUTER: RENO-U
TRANSITION PROFILE-
STAINLESS STEEL FINISH
PORCELAIN TILE AS SPECIFIED
1/2" MAX
1/2"
7/8"
TILE OVER THIN SET
GROUT
MORTAR BED
STAINLESS STEEL
SCHLUTER JOLLY TRIM OR EQUAL
EXISTING GWB
TILE AS SPECIFIED
HEIGHT AS SHOWN IN ELEVATIONS
EPOXY
GROUT
TILE WITH SCHLUTER
QUADEC  17/64" X 1/4" S
STL TRIM AT OUTER EDGES
EXISTING GWB WALL TILE AS SPECIFIED
CEMENT BOARD SUBSTRATE
EPOXY GROUT
TILE WITH SCHLUTER
QUADEC  17/64" X 1/4" STL TRIM AT OUTER EDGES, TYP
LATEX-PORTLAND CEMENT MORTAR
WALL TYPE PER PLANS
FEATHERING COMPOUND AS REQUIRED
SCHEDULED DIRECT GLUED CARPET TILE
CLEAR SEALED CONCRETE FLOOR
CONTINUOUS CARPET TO SEALED CONCRETE TRANSITION STRIP
BID SET
GWB TO TILE TRANSITION DETAIL
TILE BASE DETAIL
TILE PATTERN DETAIL, TYPICAL
CARPET TO CONCRETE TRANSITION
CONCRETE TO TILE TRANSITION
OUTSIDE CORNER DETAIL
FLOOR DETAIL @ SHOWER

NOTES:
- VERTICAL TILE GROUT LINES NOT TO ALIGN RUNNING BOND, TYPICAL.
- CONTINUOUS CARPET TO SEALED CONCRETE TRANSITION STRIP
- BID SET
- PERMIT / BID SET
- TENANT: Operations Center Renovations
- City: Green River
- WATER: Green River Treatment Plant
- PROJECT: Tacoma Water
- ADDRESS: 3605 SE Green River Wastewater Road, Ravensdale, WA 98051
- DRAWN BY: Burgess Design
- ORIGINAL DRAWING IS 24" X 36". SCALE ENTITIES ACCORDINGLY IF REDUCED
- ALL REPRODUCTION & INTELLECTUAL PROPERTY RIGHTS RESERVED © 2023
- PROJECT NO:
- DRAWN BY: Burgess Design
- PROJECT MANAGER:
**HEADER FRAMING. REFER TO DOOR/SIDELIGHT TYPE ELEVATIONS FOR ADDITIONAL INFORMATION.**

**OPENING HEADER FRAMING**

- **Opening Width**
  - 3'-0" to 8'-0" (Openings 3'-0" to 8'-0"
  - 4'-4"
  - WIDTH

- **Header Type**
  - Metal Stud, Where (Where Occurs)
  - 1/2" TYP

- **Header Material**
  - Metal Stud, Where (Where Occurs)

**OPENING JAMB**

- **Opening Width**
  - 3'-0" to 8'-0" (Openings 3'-0" to 8'-0"
  - 4'-4"
  - WIDTH

- **Jamb Type**
  - Metal Stud, Where (Where Occurs)

**Special Note for Access Control**

- **Walls**
  - 1/2" TYP

- **Door/Window**
  - Metal Stud, Where (Where Occurs)

**Door & Hardware General Notes**

- **Door Types**
  - Door with a height no smaller than floor to floor. Refer to Projection for Dimensions.

- **Double Door**
  - Refer to Door General Notes

- **Hardware**
  - Refer to Door General Notes

- **Door Hardware**
  - Refer to Door General Notes

- **Schedules**
  - Refer to Door General Notes

**Hardware Group**

- **Schedules**
  - Refer to Door General Notes

- **Typical Notes**
  - Refer to Door General Notes

**Door Schedule**

- **Door Name**
  - Schedule

- **Door Size**
  - Width

- **Door Type**
  - Height

- **Operating Hardware**
  - Electromagnetically Locked Egress Doors.

**Hardware Specifications**

- **Door & Hardware General Notes**
  - Refer to Door General Notes

- **Special Note for Access Control**
  - Refer to Door General Notes

- **Door Schedules**
  - Refer to Door General Notes

**Reference**

- Permit / Bid Set 01
## LIGHTING COMPLIANCE SUMMARY

**2018 WSEC Compliance Forms for Commercial Buildings including Group R2, R3 & R4 over 3 stories and all R1**

### Project & Applicant Information
- **Project Title:** Tacoma Water Headworks - 2018 WSEC
- **Permit / Bid Set:** 01
- **Applicant Name:** John Doe
- **Applicant Email:** john.doe@example.com

For questions about the report, contact WSEC Compliance Technical Support at 1-800-555-1234 or via email at compliance@nwpsa.org

### General Occupancy
- **Commercial**
- **General Building Use Type:** Offices, Other

### Lighting Compliance Details and Method
- **Project Title:** Tacoma Water Headworks - 2018 WSEC

### Lighting Power Calculation
- **Project:** Alteration - Interior LIGHTING (Less than 50% replaced)
- **Compliance Verification:** COMPLIES

<table>
<thead>
<tr>
<th>Space Type</th>
<th>Existing Lighting Watts Prior to Alteration</th>
<th>Total Watts Allowed</th>
<th>Total Proposed Watts (LPD + Displays LPD)</th>
<th>Compliance Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior Lighting</td>
<td>410</td>
<td>410</td>
<td>0</td>
<td>COMPLIES</td>
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</tbody>
</table>

### Proposed Lighting Power Density - Spaces with Less than 50% fixtures replaced

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Fixture ID</th>
<th>Quantity of Fixtures (A)</th>
<th>Watts of Lighting (Wt) (Wt)</th>
<th>Total Linear Foot (LP)</th>
<th>Watts per Linear Foot (Wp/L)</th>
<th>Total Watts per Linear Foot (LP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Fixtures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uplight</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Downlight</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Wallwash</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Wallwash</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

### Project Title: Tacoma Water Headworks - 2018 WSEC

### Proposed Fixtures Details
- **Project:** Alteration - Interior LIGHTING (Less than 50% replaced)

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Fixture ID</th>
<th>Location in Documents</th>
<th>Luminaire Type</th>
<th>New or Existing in Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Fixtures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uplight</td>
<td>5</td>
<td>1</td>
<td>LED</td>
<td>New</td>
</tr>
<tr>
<td>Downlight</td>
<td>5</td>
<td>1</td>
<td>LED</td>
<td>New</td>
</tr>
<tr>
<td>Wallwash</td>
<td>5</td>
<td>1</td>
<td>LED</td>
<td>New</td>
</tr>
<tr>
<td>Wallwash</td>
<td>5</td>
<td>1</td>
<td>LED</td>
<td>New</td>
</tr>
</tbody>
</table>

### Date: Mar 04, 2024
### VRF Fan Coil Unit Schedule

<table>
<thead>
<tr>
<th>Model</th>
<th>Quantity</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCU-7B</td>
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<td>UNIT</td>
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</tr>
<tr>
<td>FCU-14</td>
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<td>UNIT</td>
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</tr>
<tr>
<td>FCU-10</td>
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<td>UNIT</td>
<td></td>
</tr>
<tr>
<td>FCU-9</td>
<td>1</td>
<td>UNIT</td>
<td></td>
</tr>
<tr>
<td>FCU-8</td>
<td>1</td>
<td>UNIT</td>
<td></td>
</tr>
<tr>
<td>FCU-5</td>
<td>1</td>
<td>UNIT</td>
<td></td>
</tr>
<tr>
<td>FCU-3</td>
<td>1</td>
<td>UNIT</td>
<td></td>
</tr>
<tr>
<td>FCU-2</td>
<td>1</td>
<td>UNIT</td>
<td></td>
</tr>
</tbody>
</table>

### Heat Recovery Box Schedule (VRF)

#### Heat Recovery Box Specifications
- FACE SIZE: 24x24 OR 12x12
- PROVIDE 24x24 FOR LAY IN CEILINGS

<table>
<thead>
<tr>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2</td>
<td></td>
</tr>
<tr>
<td>HB-2</td>
<td></td>
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</tbody>
</table>

### VRF Heat Pump Unit Schedule

<table>
<thead>
<tr>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>RXMQ48TBVJU</td>
<td></td>
</tr>
<tr>
<td>FXMQ15TBVJU</td>
<td></td>
</tr>
<tr>
<td>FXMQ48TBVJU</td>
<td></td>
</tr>
<tr>
<td>FXMQ15TBVJU</td>
<td></td>
</tr>
</tbody>
</table>

### Energy Recovery Ventilation Schedule

#### Energy Recovery Ventilation Specifications
- FAN: 1100 CFM

<table>
<thead>
<tr>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1100 CFM</td>
<td></td>
</tr>
</tbody>
</table>

### Diffuser, Register, and Grille Schedule

<table>
<thead>
<tr>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes
1. PROVIDE WITH VENTUM H10 DX COIL.
2. PROVIDE WITH MERV 13 FILTER BOX.
3. ASSOCIATED 3)
4. GREEN RIVER TREATMENT PLANT
5. LABORATORY
6. TO
7. HVAC SCHEDULES
DEMOLITION GROUND FLOOR PLAN - SECTION A

GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
2. CONTRACTOR SHALL COORDINATE WITH BUILDING OWNER AND FUTURE TENANTS PRIOR TO SHUTDOWN OF ANY UTILITIES.

DEMOLISH EXISTING TERMINAL UNIT AND INITIAL LOW PRESSURE RUN OUT. DEMOLISH (E) 10Ø DUCT BACK TO CAP.
DEMOLISH EXISTING TERMINAL UNIT AND INITIAL LOW PRESSURE RUN OUT. DEMOLISH (E) 8Ø DUCT BACK TO (E) 14Ø DUCT.

DEMOLISH (E) 8Ø DIFFUSER AND ASSOCIATED DUCTWORK BACK TO (E) 10Ø DUCT CAP.

DEMOLISH (E) 6Ø DUCT BACK TO (E) 8x12.

DEMOLISH (E) 8x8 DIFFUSER AND ASSOCIATED DUCTWORK BACK TO (E) 10x8.

DEMOLISH (E) 6Ø DIFFUSER AND ASSOCIATED DUCTWORK BACK TO (E) 8x12.

DEMOLISH (E) 8x8 DIFFUSER AND ASSOCIATED DUCTWORK BACK TO (E) 10x8.

CAP (E) 8Ø DUCT

DEMOLISH EXISTING TERMINAL UNIT. DEMOLISH (E) 6Ø DUCT BACK TO (E) 16Ø BRANCH. DEMOLISH ALL ASSOCIATED LOW PRESSURE DUCTWORK. ALL EXISTING ASSOCIATED DIFFUSERS ARE TO REMAIN UNLESS NOTED OTHERWISE.

DEMOLISH (E) 8Ø LINEAR DIFFUSER

DEMOLISH EXISTING TERMINAL UNIT AND ASSOCIATED LOW PRESSURE DUCTWORK AND DIFFUSERS. DEMOLISH (E) 8Ø DUCT BACK TO (E) 16Ø BRANCH.

GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
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GENERAL NOTES:
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2. CONTRACTOR SHALL COORDINATE WITH BUILDING OWNER AND FUTURE TENANTS PRIOR TO SHUTDOWN OF ANY UTILITIES.

FLAG NOTES:
- Disconnect exhaust fan and store for relocation.

DISCONNECT (E) 6Ø FROM EXISTING TERMINAL UNIT. DEMOLISH EXISTING TERMINAL UNIT AND ASSOCIATED LOW PRESSURE DUCTWORK.

EXISTING TERMINAL UNIT AND ASSOCIATED DUCTWORK.

DEMOLISH (E) 6" DUCT BACK TO (E) 22Ø BRANCH.

DEMOLISH EXISTING TERMINAL UNIT AND INITIAL LOW PRESSURE RUN OUT. DEMOLISH 10Ø DUCT BACK TO CAP.

DISCONNECT (E) 6Ø DUCT FROM EXISTING TERMINAL UNIT. DEMOLISH EXISTING TERMINAL UNIT AND ASSOCIATED LOW PRESSURE DUCTWORK UNLESS NOTED OTHERWISE.

10x6 LINEAR DIFFUSER AND 8Ø DUCT EXISTING TO REMAIN.

DEMOLISH EXISTING EXPANSION TANK.

DISCONNECT EXISTING RANGE HOOD AND SAVE FOR LATER USE.

DEMOLISH 12x8 DUCT BACK TO CAP.

DEMOLISH (E) 36x26 DUCT BACK TO CAP.

DEMOLISH (E) 26x26 DUCT.

DEMOLISH (E) 12Ø DUCT AND ASSOCIATED DIFFUSERS BACK TO (E) 22Ø BRANCH.

DEMOLISH EXISTING AIR HANDLING UNIT.

DEMOLISH (E) 12x36 DUCT BACK TO CAP.

DEMOLISH (E) 12Ø DUCT AND ASSOCIATED DIFFUSERS.

CAP (E) 10Ø DUCT.

CAP (E) 26x26 DUCT.

CAP (E) 12x8 DUCT.

CAP (E) 12x36 DUCT.

CAP (E) 12Ø DUCT.

CAP 10Ø DUCT.

CAP (E) 12x8 DUCT.

CAP (E) 26x26 DUCT.

CAP (E) 12x8 DUCT.

CAP (E) 26x26 DUCT.

FLAG NOTES:
- Disconnect exhaust fan and store for relocation.

GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
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2. CONTRACTOR SHALL COORDINATE WITH BUILDING OWNER AND FUTURE TENANTS PRIOR TO SHUTDOWN OF ANY UTILITIES.

FLAG NOTES:
- Disconnect exhaust fan and store for relocation.
DEMOLISH EXISTING TERMINAL UNIT AND INITIAL LOW PRESSURE RUN OUT. DEMOLISH 8Ø DUCT BACK TO (E) 16Ø.

DEMOLISH TWO (2) EXISTING LABORATORY EXHAUST FAN (E)10Ø THRU ROOF

EXISTING BOILER TO BE ABANDONED IN PLACE.
GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
2. CONTRACTOR SHALL COORDINATE WITH BLDG. OWNER AND ALL TENANTS PRIOR TO WORK
   START.
3. INSTALL ALL APPARATUS PER THE MANUFACTURER'S RECOMMENDATIONS.

FLAG NOTES:
CONNECT 3/4" CONDENSATE TO SINK WASTE WITH WYE FITTING.

GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
2. CONTRACTOR SHALL COORDINATE WITH BLDG. OWNER AND ALL TENANTS PRIOR TO WORK
   START.
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FLAG NOTES:
CONNECT 3/4" CONDENSATE TO SINK WASTE WITH WYE FITTING.
GENERAL NOTES:
1. Contractor shall verify all existing conditions prior to start of work.
2. Contractor shall coordinate with building owner and field to confirm locations of all MEP.
3. Install and size refrigeration piping per the manufacturer recommendations.

FLAG NOTES:

H3. Condensate to be directed with tee fitting.

DRAIN 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN MECHANICAL ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.

ROUTE REFRIGERATION PIPING UNDERGROUND.

GENERAL NOTES:
1. Contractor shall verify all existing conditions prior to start of work.
2. Contractor shall coordinate with building owner and future tenants prior to shutdown of any utilities.
3. Install and size refrigeration piping per the manufacturer recommendations.

FLAG NOTES:

H3. Condensate to be directed with tee fitting.

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1. Contractor shall verify all existing conditions prior to start of work.
2. Contractor shall coordinate with building owner and future tenants prior to shutdown of any utilities.
3. Install and size refrigeration piping per the manufacturer recommendations.

FLAG NOTES:

H3. Condensate to be directed with tee fitting.

DRAIN 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN MECHANICAL ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.

ROUTE REFRIGERATION PIPING UNDERGROUND.

GENERAL NOTES:
1. Contractor shall verify all existing conditions prior to start of work.
2. Contractor shall coordinate with building owner and future tenants prior to shutdown of any utilities.
3. Install and size refrigeration piping per the manufacturer recommendations.

FLAG NOTES:

H3. Condensate to be directed with tee fitting.

DRAIN 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN MECHANICAL ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.

ROUTE REFRIGERATION PIPING UNDERGROUND.

GENERAL NOTES:
1. Contractor shall verify all existing conditions prior to start of work.
2. Contractor shall coordinate with building owner and future tenants prior to shutdown of any utilities.
3. Install and size refrigeration piping per the manufacturer recommendations.

FLAG NOTES:

H3. Condensate to be directed with tee fitting.

DRAIN 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN MECHANICAL ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.

ROUTE REFRIGERATION PIPING UNDERGROUND.
GENERAL NOTES:
1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
2. CONTRACTOR SHALL COORDINATE WITH BUILDING OWNER AND FUTURE TENANTS PRIOR TO SHUTDOWN OF ANY UTILITIES.
3. INSTALL AND SIZE REFRIGERATION PIPING PER THE MANUFACTURER'S RECOMMENDATIONS.

FLAG NOTES:
CIRCULATE 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN BOILER ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
2. CONTRACTOR SHALL COORDINATE WITH BUILDING OWNER AND FUTURE TENANTS PRIOR TO SHUTDOWN OF ANY UTILITIES.
3. INSTALL AND SIZE REFRIGERATION PIPING PER THE MANUFACTURER'S RECOMMENDATIONS.

CIRCULATE 3/4" CONDENSATE TO FLOOR SINK OR HUB DRAIN IN BOILER ROOM WITH AIR GAP. FIELD VERIFY EXACT LOCATION OF DRAIN.
### MOTOR EQUIPMENT AND WIRING SCHEDULE

**ID** | DESCRIPTION | PHASE | CURRENT | CHARGE | VOLTAGE | VOLTS | PANEL | HUB | FUSE | REMARKS
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
001 | FAN | 3/4"C, 2#12, 1#12 EGC | 35 A | 20 A | 208 V | 208V | 34,36 | 34,36 | 20 A | BID SET
002 | FAN | 3/4"C, 2#12, 1#12 EGC | 30 A | 20 A | 208 V | 208V | 29,31 | 29,31 | 20 A | BID SET
003 | FAN | 3/4"C, 2#12, 1#12 EGC | 25 A | 20 A | 208 V | 208V | 23,25 | 23,25 | 20 A | BID SET
004 | FAN | 3/4"C, 2#12, 1#12 EGC | 20 A | 20 A | 208 V | 208V | 19,21 | 19,21 | 20 A | BID SET
005 | FAN | 3/4"C, 2#12, 1#12 EGC | 15 A | 20 A | 208 V | 208V | 19,21 | 19,21 | 20 A | BID SET
006 | FAN | 3/4"C, 2#12, 1#12 EGC | 10 A | 20 A | 208 V | 208V | 19,21 | 19,21 | 20 A | BID SET
007 | FAN | 3/4"C, 2#12, 1#12 EGC | 5 A | 20 A | 208 V | 208V | 19,21 | 19,21 | 20 A | BID SET
008 | FAN | 3/4"C, 2#12, 1#12 EGC | 0 A | 20 A | 208 V | 208V | 19,21 | 19,21 | 20 A | BID SET

---

### PANEL: 40-DPL-01

**SUPPLIES:** 30 A | **MANUFACTURER:** GENERAL ELECTRIC | **CIRCUIT NO.:** 1 | **NUMBER OF PHASES:** 3 | **PHASES:** 3 | **MOUNTING TYPE:** HOUSE SERVICE | **WIRING METHOD:** 3-CONDUCTOR | **MOTOR EQUIPMENT AND WIRING SCHEDULE**

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<th>No.</th>
<th>CIRCUIT DESCRIPTION</th>
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### PANEL: 40-DPL-C

**SUPPLIES:** 30 A | **MANUFACTURER:** GENERAL ELECTRIC | **CIRCUIT NO.:** 1 | **NUMBER OF PHASES:** 3 | **PHASES:** 3 | **MOUNTING TYPE:** HOUSE SERVICE | **WIRING METHOD:** 3-CONDUCTOR | **MOTOR EQUIPMENT AND WIRING SCHEDULE**

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<th>No.</th>
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</table>
GENERAL NOTES:
1. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
2. BRANCH CIRCUITING INDICATED ON PLANS AND SCHEDULES IS BASED UPON EXISTING PLANS AND SITE OBSERVATION CONTRACTOR TO FIELD VERIFY.
3. PROVIDE NECESSARY DEMOLITION TO FACILITATE NEW CONSTRUCTION WORK ASSOCIATED WITH THIS PROJECT. COORDINATE OUTAGES WITH OWNER MINIMUM 72 HOURS IN ADVANCE. PROVIDE DISPOSAL OF REMOVED MATERIAL. MAINTAIN CIRCUIT CONTINUITY AS REQUIRED.
4. REMOVE ABANDONED EQUIPMENT, WIRING AND RACEWAY.

FLAG NOTES:
- DEMOLISH EXISTING LUMINAIRE. REMOVE CONDUIT AND CONDUCTORS BACK TO NEAREST HOMERUN JUNCTION BOX.
- DEMOLISH EXISTING SWITCH, CONDUIT, AND CONDUCTORS.
- DISCONNECT AND PROTECT EXISTING LUMINAIRE. REPLACE LUMINAIRE AS SHOWN ON PLAN. EXTEND CONDUIT AND CONDUCTORS TO NEW LOCATION.
- DEMOLISH EXISTING SWITCH, CONDUIT, AND CONDUCTORS. PROTECT AND MAINTAIN EXISTING CIRCUIT. LUMINAIRES TO REMAIN.

Tenant: Operations Center Renovations
Green River Treatment Plant
Tacoma Water
36225 SE Green River Headworks Road,
Ravensdale, WA 98051

Permit / Bid Set
01
02.28.24
03.01.24
03.05.24

LIGHTING DEMO FLOOR PLAN
ED-201
**GENERAL NOTES:**

1. All equipment shown is existing unless noted otherwise.
2. Branch circuits indicated on plans and schedules are based upon existing plans and site observation; contractor to field verify.
3. Provide necessary coordination to facilitate new construction work associated with this project. Cooperate closely with owner's management to avoid any interference. Provide disposal of removed material, maintain circuit continuity as required.
4. Remove abandoned equipment, wiring and raceway.

**FLAG NOTES:**

- Disconnect and demolish existing disconnect, conduit and conductors.
- Disconnect existing drinking fountain, existing conduit and conductors back to panel.
- Protect and maintain existing conduit and circuit during construction.
- Disconnect existing floor boxes, existing conduit and conductors.
- Disconnect and demolish existing disconnect, conduit and conductors back to panel.
- Protect and maintain existing conduit and circuit during construction.
- Disconnect existing floor boxes, existing conduit and conductors.

**ELECTRICAL DEMO FLOOR PLAN**

**Tentative Operations Center Renovations**

Green River Treatment Plant

 Tacoma Water

3625 SE Green River Road, Ravensdale, WA 98051

**Issue Description**

**No.**

**Date**

**Professional seal**

**Client Approval**

**Tenant:**

Operations Center Renovations

Green River Treatment Plant

Tacoma Water

3625 SE Green River Road, Ravensdale, WA 98051

**Scale:** 1/8" = 1'0"
GENERAL NOTES:
1. BRANCH CIRCUITING INDICATED ON PLANS AND SCHEDULES IS BASED UPON EXISTING PLANS AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.
2. EQUIPMENT SHOWN IS DIAGRAMMATIC. COORDINATE EQUIPMENT LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.
3. REFER TO SHEETS E0.02 AND E0.03 FOR SCHEDULES.
4. REFER TO ARCHITECTURAL DRAWINGS FOR LUMINAIRE SCHEDULE.
5. REFER TO ARCHITECTURAL DRAWINGS FOR SCHEDULE.

FLAG NOTES:
- INDICATES LUMINAIRES EXTENDED EXISTING LOCAL CIRCUIT TO THIS LOCATION.
- COORDINATE FINAL LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.
- CIRCUIT EXISTING LUMINAIRE THROUGH EXISTING LOCAL CIRCUIT AND CONTROLS.
- CIRCUIT NEW LUMINARI TO EXISTING LOCAL CIRCUIT AND CONTROLS.
GENERAL NOTES:

1. BRANCH CIRCUITS INDICATED ON PLANS AND SCHEDULES HAVE BEEN UPON EXISTING PLANS AND SITE OBSERVATION. CONTRACTOR TO FIELD VERIFY.

2. COORDINATE EXPOSED CONDUIT ROUTING WITH ARCHITECTURAL PRIOR TO INSTALLATION. AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

3. COORDINATE WORKSPACE CIRCUIT ROUTING WITH ARCHITECTURAL PRIOR TO INSTALLATION IN ALL SPACES EXCEPT FOR MECHANICAL, ELECTRICAL, MDF/IDF, AND STORAGE ROOMS. AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

4. PROVIDE CONNECTION FOR NEW DRINKING FOUNTAIN. AND ARCHITECTURAL PRIOR TO INSTALLATION.

5. PROVIDE ABOVE COUNTER SWITCH FOR GARBAGE DISPOSAL. COORDINATE SWITCH LOCATION AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

6. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

7. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

8. PROVIDE RECEPTACLE FOR MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

9. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

FLAG NOTES:

1. PROVIDE ABOVE COUNTER SWITCH FOR GARBAGE DISPOSAL. COORDINATE SWITCH LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

2. PROVIDE CONNECTION FOR NEW DRINKING FOUNTAIN.

3. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

4. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

5. PROVIDE RECEPTACLE FOR MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

EQUIPMENT SHOWN IS DIAGRAMMATIC. COORDINATE EQUIPMENT LOCATION WITH OWNER 5. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

 PROVE ABOVE COUNTER SWITCH FOR GARBAGE DISPOSAL. COORDINATE SWITCH LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

2. PROVIDE CONNECTION FOR NEW DRINKING FOUNTAIN.

3. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

4. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

5. PROVIDE RECEPTACLE FOR MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

GENERAL NOTES:

1. BRANCH CIRCUITS INDICATED ON PLANS AND SCHEDULES HAVE BEEN UPON EXISTING PLANS AND SITE OBSERVATION. CONTRACTOR TO FIELD VERIFY.

2. COORDINATE EXPOSED CONDUIT ROUTING WITH ARCHITECTURAL PRIOR TO INSTALLATION. AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

3. COORDINATE WORKSPACE CIRCUIT ROUTING WITH ARCHITECTURAL PRIOR TO INSTALLATION IN ALL SPACES EXCEPT FOR MECHANICAL, ELECTRICAL, MDF/IDF, AND STORAGE ROOMS. AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

4. PROVIDE CONNECTION FOR NEW DRINKING FOUNTAIN. AND ARCHITECTURAL PRIOR TO INSTALLATION.

5. PROVIDE ABOVE COUNTER SWITCH FOR GARBAGE DISPOSAL. COORDINATE SWITCH LOCATION AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

6. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

7. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

8. PROVIDE RECEPTACLE FOR MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

9. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

FLAG NOTES:

1. PROVIDE ABOVE COUNTER SWITCH FOR GARBAGE DISPOSAL. COORDINATE SWITCH LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

2. PROVIDE CONNECTION FOR NEW DRINKING FOUNTAIN.

3. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

4. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

5. PROVIDE RECEPTACLE FOR MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.

6. PROVIDE GFCI PROTECTION FOR ALL RECEPTACLES LOCATED WITHIN 6' OF EDGE OF SINK AND SITE OBSERVATION, CONTRACTOR TO FIELD VERIFY.

7. PROVIDE CONNECTION FOR NEW MICROWAVE. COORDINATE LOCATION WITH ARCHITECTURAL PRIOR TO INSTALLATION.
GENERAL NOTES:
1. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
2. BRANCH CIRCUITING SHOWN IS BETWEEN 1'0" AND 6'0" UNLESS NOTED OTHERWISE.
3. PROVIDE NECESSARY INFORMATION TO FACILITATE EXPANSION WORK ASSOCIATED WITH NEW PROJECT. COORDINATE DESIGN WITH CONTRACTOR TO PROVIDE INCORPORATION OF REQUIRED MATERIAL(s) AND CIRCUIT CONTINUITY WHERE REQUIRED.
4. PREVENT ABANDONED EQUIPMENT, WIRING AND CONDUIT.
5. EQUIPMENT SHOWN IS DIAGRAMMATIC. COORDINATE EQUIPMENT LOCATION WITH OWNER AND ARCHITECTURAL PRIOR TO INSTALLATION.
6. LOCATE EXISTING CONDUIT AND CONDUCTORS. EXISTING EQUIPMENT TO REMAIN.
7. REFER TO SHEETS E5.02 AND E5.03 FOR SCHEDULES.

FLAG NOTES:
- DISCONNECT EXISTING UNIT. DEMOLISH EXISTING DISCONNECT. EXISTING CONDUIT AND CONDUCTORS TO REMAIN.
- EXTEND EXISTING CONDUIT AND CONDUCTORS TO NEW LOCATION AS REQUIRED.
- DISCONNECT EXISTING BOILER AND REMOVE CONDUCTORS. EXISTING CONDUIT TO REMAIN.

ELECTRICAL SECOND FLOOR DEMO PLAN

ELECTRICAL SECOND FLOOR PLAN

Trecent
Operations Center Renovations
Green River Treatment Plant
Tacoma Water
3625 SE Green River Road
Ravensdale, WA 98051

PERMIT/BID SET
03.01.24
02.28.24
03.01.24
03.05.24
BID SET

ENLARGED 2ND FLOOR ELECTRICAL PLANS

E-501
ELECTRICAL ONE-LINE DIAGRAM

GENERAL NOTES:
1. ALL EQUIPMENT IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
2. PROVIDE NECESSARY DEMOLITION TO FACILITATE NEW CONSTRUCTION WORK ASSOCIATED WITH THIS PROJECT. COORDINATE OUTAGES WITH OWNER MINIMUM 72 HOURS IN ADVANCE.
3. PROVIDE DISPOSAL OF REMOVED MATERIAL. MAINTAIN CIRCUIT CONTINUITY AS REQUIRED.
4. REMOVE ABANDONED EQUIPMENT, WIRING AND RACEWAY UNLESS NOTED OTHERWISE.
5. REFER TO SCHEDULES ON SHEETS E0.2 AND E0.3 FOR ADDITIONAL INFORMATION.

FLAG NOTES:
- PROVIDE CIRCUITING, BREAKER, CONDUIT AND CONDUCTORS TO EQUIPMENT. SIZE CONDUIT AND CONDUCTORS PER SCHEDULE SHOWN ON E0.02.

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E-801
GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE THE SHUTDOWN OF ANY SYSTEMS WITH THE BUILDING OWNER PRIOR TO THE START OF ANY DEMOLITION WORK.

DEMOLISH EXISTING FOUR (4) FLOOR DRAINS, TWO (2) LAVS, TWO (2) WATER CLOSETS, ONE (1) URINAL, AND ONE (1) SHOWER AND ASSOCIATED PIPING.

DEMOLISH EXISTING SINK AND ASSOCIATED PIPING.

DEMOLISH EXISTING DRINKING FOUNTAIN. CAP CW, WASTE, AND VENT INLETS FOR FUTURE CONNECTION.

E) 2" VTR TO REMAIN

E) 1/2" HWC TO REST OF BUILDING.

E) 4" VTR TO REMAIN

E) 1-1/2" CW TO REST OF BUILDING.

E) 1" HW TO REST OF BUILDING.

E) 1/2" HWC TO REST OF BUILDING.

E) 2" DN TO REMAIN

DEMOLISH EXISTING LAVATORIES. CAP CW, HW, WASTE, AND VENT PIPING FOR FUTURE CONNECTION.

REMOVE EXISTING WATER CLOSETS & FLUSH VALVES AND STORE FOR RE-USE. CAP CW AND WASTE PIPING FOR FUTURE CONNECTION.
FLAG NOTES:
1. CONNECT P-2 TO EXISTING SANITARY WASTE, VENT, CW, AND HW STUBS.
2. CONNECT P-4 TO EXISTING SANITARY WASTE, VENT, AND CW STUBS.
3. CONNECT P-1 TO EXISTING SANITARY WASTE, VENT, AND CW STUBS.
4. EXTEND 1/2" CW, HW, AND HWC TO P-5 FROM THE NEAREST ACTIVE BRANCHES LOCATED IN THE WALL. EXTEND AND STUB 1/2" CW FOR COFFEE MAKER.
5. ROUTE WASTE THROUGH WALL AND CONNECT TO (E) 2" W DN.
6. ROUTE HW DOWN WALL WITHIN 24" OF LAVATORY.
7. ROUTE 2" W THRU WALL TO SPECIFIED LOCATION.

CONNECT P-2 TO EXISTING SANITARY WASTE, VENT, CW, AND HW STUBS.
CONNECT P-4 TO EXISTING SANITARY WASTE, VENT, AND CW STUBS.
CONNECT P-1 TO EXISTING SANITARY WASTE, VENT, AND CW STUBS.
EXTEND 1/2" CW, HW, AND HWC TO P-5 FROM THE NEAREST ACTIVE BRANCHES LOCATED IN THE WALL. EXTEND AND STUB 1/2" CW FOR COFFEE MAKER.
ROUTE WASTE THROUGH WALL AND CONNECT TO (E) 2" W DN.
ROUTE HW DOWN WALL WITHIN 24" OF LAVATORY.
ROUTE 2" W THRU WALL TO SPECIFIED LOCATION.
DIVISION 01
GENERAL REQUIREMENTS
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions, Modifications to the General Conditions and Divisions 00 and 01 Specification Sections, apply to work of this section.

1.02 SECTION INCLUDES

A. Summary of Work, including:

1. Project Description
2. Contract Method
3. Permit Conditions
4. Objection to Application of Products
5. Existing Information
6. Completion Time
7. Contractor’s Use of Building and Site
8. Construction Documents

1.03 PROJECT DESCRIPTION

A. The work of the project is defined by the Contract Documents and generally consists of the following:

Headworks Operations Remodel and HVAC Replacement — The project consists of the remodel of restrooms, locker room, kitchen, lobby, mechanical room, server room and various other areas in the Headworks Operations Building. The project also includes the demolition of the existing Variable Air Volume (VAV) HVAC system and installation of a new VRF HVAC system.

i. Demolition of existing locker room restrooms, kitchen area, and select walls per the plans and specifications.
ii. Construction of new locker room restrooms, wellness room, updated kitchen, conference room, hotel station room, and flex space per the plans and specifications.
iii. Installation of new cabinetry, appliances and new lockers.
iv. Relocation of the fire panel to allow for changes in lobby area.
v. Update finishes per the plans and specifications.
vi. Install power, data and communications per plans and specifications.
vii. Demolition and removal of existing HVAC equipment not to be reused per...
the plans and specifications.
   viii. Provision and installation of new HVAC equipment per the plans and specifications.
   ix. Integration, provision, installation of new HVAC controls.
   x. Start-up and Commissioning of new HVAC system.
   xi. Removal, recycling, and disposal of all removed materials to approved recycling or dump locations.
   xii. Various other changes per the plans and specifications.

B. The Headworks Operations Building is an essential facility for Tacoma Water that operates twenty-four (24) hours a day, seven (7) days a week. Contractor to plan, sequence, and perform the work to allow Tacoma Water personnel to use the areas inside the building that are outside of the active construction zone during the Contract Work.

C. Provide materials, labor, equipment, temporary facilities and construction expertise as required to complete the Project as shown in the Contract Documents.

D. Contractor represents that he has carefully examined prior to bidding, Contract Documents and site conditions, and understands the character, quality and quantity of work called for and conditions affecting the Contract Work.

1.04 CONTRACT METHOD

A. Construct the Work under a guaranteed single fixed-price Contract.

B. The General Contractor is responsible for coordinating, understanding and directing the work of trades involved in the project.

C. General Contractor is responsible for coordinating and scheduling work of each subcontractor to expedite progress of the Project. Cooperate and coordinate with any other separate Contractors under Contract with the Owner. The Contractor shall involve the City’s assigned Project Manager in all communication with the tenant department where work is occurring and shall to the extent possible conduct all such communication through the City’s Project Manager throughout the project.

D. The General Contractor shall not make changes, or modifications to the scope of work, or any alteration to the scope set forth in the attached plans and remaining specifications without the consent of the City’s assigned Project Manager. Such consent shall be communicated by the City’s assigned Project Manager in writing. The Contractor shall not accept on-site direction from tenant department staff as approval, acceptance, or agreement to any modification or scope of work changes to any portion of the work herein described, as authorization for any such modification or alteration. Upon such requests the General Contractor shall direct tenant department staff to contact the City’s assigned Project Manager directly, and that no changes can be made without the Project Manager’s approval per the specifications stated herein.

1.05 PERMIT CONDITIONS

A. Conform to permit conditions and requirements imposed by authority(s) having jurisdiction.
B. The Owner will obtain the Building permits for the proposed work. The General Contractor is responsible for obtaining all other permits, including but not limited to commercial mechanical, plumbing, electrical, roadway or sidewalk closure, and barricade permits for site dumpsters. The Contractor will call for all inspections to comply with permits.

C. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction. Contractor is responsible for coordinating and paying for the cost of any special permit requirements for staging and delivery of materials within the right-of-way.

1.06 OBJECTIONS TO APPLICATION OF PRODUCTS

A. Subcontractors and suppliers submitting a bid for this Project shall thoroughly familiarize themselves with specified products and installation procedures and submit any questions or substitutions (in writing). Submittal of Bid constitutes acceptance of products and procedures specified.

1.07 EXISTING INFORMATION

A. Subcontractors and suppliers are encouraged to familiarize themselves with existing site conditions and site location prior to bidding. Submit any questions or substitutions (in writing). Submittal of Bid constitutes acceptance of products and procedures specified.

1.08 COMPLETION TIME

A. Time is of the essence, the Owner needs this project completed within the times listed. Provide the necessary management, equipment and manpower, including any overtime, double-shifting or special work schedules, required to achieve completion of the Project within the times listed in the following Completion Schedule.

B. Substantial Completion for this project will be considered to have been achieved when all of the Work shown on the drawings has been satisfactorily completed in accordance the Contract Documents and an Occupancy Permit (or Temporary Occupancy Permit or final permit sign off) has been issued by the Jurisdiction Having Authority (JHA). Minor punch list items may be completed after Substantial Completion date within the time frame listed in the Completion Schedule. The Contractor shall provide written notice, three (3) days prior to anticipated substantial completion date.

C. Anticipated Construction Completion Schedule:

1. Substantially complete all the work within 112 Calendar Days (estimated 4 months) after the Notice to Proceed.

2. Anticipated Notice to Proceed: August 2024

3. Anticipated Substantial Completion Date: December 2024

D. Early completion of the Work is allowed provided that the Owner shall not be obligated for any costs associated with delays to the Contractor’s accelerated schedule which are within the stipulated contract completion schedule above.
1.09 CONTRACTOR'S USE OF BUILDING AND SITE

A. The Contractor has direct responsibility for and control of the Contractor occupied construction areas for the duration of the Project, subject to this Section.

B. Contractor's Use of Site: Limit use of the site for work, storage and access only as required to achieve work of this contract. Contractor shall maintain a clean and secure site.
   1. Owner will not reserve parking stalls for the Contractor's use to park equipment and store materials.
   2. Owner will not reserve parking stalls for the Contractor's or subcontractor's vehicles.
   3. Owner will recommend a location for Contractor's use and for Contractor's or subcontractor's vehicles.

C. Contractor's Materials / Equipment: Limit storage of materials and equipment to within Contractor occupied construction areas or other storage area as agreed upon with Owner.

D. Construction Facilities and Temporary Controls: Refer to Section 01 50 00.

E. Emergency Vehicle Access: Maintain access roadway and fire lanes on site for use by emergency vehicles. Coordinate requirements with local authority having jurisdiction.

F. Access Routes to Construction Areas: Contractor shall maintain site access routes in a clean and safe manner free of construction materials, debris and dirt. Maintain access to existing walkways, sidewalks, parking spots, entrances, and other adjacent occupied or used facilities. Do not close or obstruct walkways, sidewalks, parking spots, entrances, or other occupied or used facilities without written approval of authorities having jurisdiction.

G. Public Safety: Contractor is responsible for performing a safety analysis for the construction work on the project site and shall:
   1. Implement and enforce conclusions from safety analysis for duration of project.
   2. Maintain site and building in a manner that prevents any unsafe or potentially unsafe condition.

H. Construction Areas: Monitor to prevent unauthorized persons from entering during construction work. After work hours remove ladders and tools.
   1. Contractor shall assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.
I. Owner Occupancy During Construction: Owner will occupy site and existing building during entire construction period, EXCEPT the Owner will provide access to areas of the building as needed for Contractor to complete work to the extent possible for continued operation of the building. Contractor shall coordinate in advance with owner for access to areas of work to be performed. It is understood that some level of Tacoma Water operations will continue throughout the construction process.

1. Contractor to provide temporary barriers to separate areas of work for security and safety.

2. Coordinate with City’s assigned Project Manager or Owner Representative during construction operations to minimize conflicts and facilitate Owner usage.

3. Perform the Work so as not to interfere with Owner’s day-to-day operations.

4. Maintain existing exits at all times.

J. Noise: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruptions with the Owner. Contractor work hours and noise levels shall comply with King County requirements.

K. Contractor shall provide a site-specific safety plan to be submitted to Owner before Project Work commences.

1.10 CONSTRUCTION DOCUMENTS

A. Contractor is responsible for posting any addendums in the Contract Drawings and Project Manual.

B. The General Contractor is responsible for costs to reproduce the Construction Documents.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION
SECTION 01 12 00

PERMITS AND FEES

PART 1 - GENERAL

1.01 PERMITS PAID FOR BY OWNER
   A. The Owner will pay for the primary Building Permit as issued by King County which includes the commercial mechanical permit. Do not include the cost of this permit in the bid. The Owner has previously submitted the construction documents to King County.

1.02 PERMITS PAID FOR BY CONTRACTOR
   A. Contractor is responsible to acquire and pay for all other permits and fees required by all other agencies having jurisdiction. These may include: electrical, plumbing permits and dumpster or right of way permits.

1.03 PERMIT RECORDS
   A. Maintain notebook on site with copies of all permits and inspection reports. Include same in Maintenance and Operation Manuals furnished at conclusion of project.

1.04 PERMIT INSPECTIONS
   A. Contractor will request and schedule all inspections related to permit compliance, including and not limited to permits paid for by Owner.

1.05 UTILITY SERVICE CONNECTION FEES PAID FOR BY OWNER (Permanent)
   A. The Owner will pay directly for fees required for all permanent service connections to utilities (natural gas, electricity, water, sewer, telecommunications). Make all final connection application(s) required, advise Owner when connection fee is ready for payment, and notify Owner of all pertinent permit payment details so that payment can be made.

1.06 UTILITY SERVICE CONNECTION FEES PAID FOR BY CONTRACTOR (Temporary)
   A. Pay for all utility service connection fees required by utility vendors that are required for temporary use during the course of construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)
SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Division 00 - Bid Period Forms – Substitution Request Form
B. Section 01 30 00 - Administrative Requirements: Submittal procedures, coordination.

1.2 SECTION INCLUDES

A. Procedural requirements for proposed substitutions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Furnish and install products in accordance with options and conditions for substitutions stated in this Section.

1. Where specified only by performance or reference standards, select a product meeting standards by any Manufacturer.

2. Where specified by naming several products or Manufacturers, select any product and Manufacturer named.

3. Where specified by naming one or more products, but indicating "or approved" or similar wording after specified listing, select specified product or submit Request for Product Substitution on attached form.

4. Where specified by naming only one product and Manufacturer, there is no option, and no substitution will be allowed.

B. SUBSTITUTIONS (PRIOR TO BID DATE)

1. Prior to Bid Date, substitution requests shall be submitted utilizing the form provided under “Bid Period Forms” to the Senior Buyer. Substitution requests must be received no later than the date specified on the “Substitution Request Form” to be included in an addendum:
   a. Submit electronic copy of request for substitution for consideration. Limit each request to one proposed substitution.
   b. Requests received after the due date will not be reviewed or considered regardless of cause. No request for approval will be considered unless submitted in accordance with this Section.
   c. Bidders will be notified by written Addendum of materials and products approved for use in addition to those specified. No other form of approval,
including verbal or implied, is acceptable as indicator of accepted Substitution Requests.

C. SUBSTITUTIONS (AFTER AWARD OF CONTRACT)

1. After award of the Contract, the Owner may, at their option, consider certain other substitutions submitted in accordance with requirements of this Section. Indicate one or more of the following reasons for request:
   a. Substitution is required for compliance with final code interpretation requirements, or insurance regulation.
   b. Specified product is unavailable through no fault of Contractor.
   c. Subsequent information discloses specified product unable to perform properly or fit designated space.
   d. Manufacturer or fabricator refuses to certify or guarantee performance of specified product, as required.
   e. Substitution saves substantial cost, time. (Submit accurate cost and/or time data for proposed substitution in lieu of product specified.)

D. In making request for Substitution, Manufacturer/Contractor represents:

1. It has personally investigated proposed product and, in his opinion, it is equal or superior in all respects to that specified.
   a. Substantiate whenever requested by Architect or Engineer.

2. It will coordinate installation of accepted substitution into the Work and guarantees to complete it in all respects.

3. It has identified any and all changes, if any, required to other portions of the Work as a result of the proposed product.

4. It will provide the same or an improved guarantee for the proposed substitution as for the specified product.

5. It waives all claims for additional costs related to the proposed substitution that consequently become apparent.

6. It agrees to pay all of the Owner's additional costs related to the proposed substitution that consequently become apparent, such as redesign expenses, utility and service relocations, etc.

7. Cost data is complete and includes all related costs under its Contract, but excludes:
   a. Cost under separate Contractors.
   b. Design Consultants' redesign, unless designated.

8. Substitutions will not be considered if:
   a. They are indicated or implied on Shop Drawings or other submittals without proper submittal on attached Form.
   b. Acceptance will require substantial revisions of Contract Documents.
9. Contractor shall pay Architect or Engineer and his Consultants for time required to review substitutions, if requested.

10. Architect or Engineer is sole judge of suitability of substitution and decision is final.

3.2 ACCEPTANCE

A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION
PART 1 - GENERAL

1.1 GENERAL

A. Changes to and/or clarifications of the Work may be initiated by a Request for Information, Architect’s or Engineer’s Supplemental Instruction, Construction Change Directive, or a Change Order.

B. A monetary change to the Contract Sum is only implemented by a Change Order.

1.2 DOCUMENTATION OF COSTS

A. Unit prices noted on the Bid Form shall include all overhead, profit and related costs. Adjustments shall be made in accordance with General Conditions. The Contractor shall document quantities used.

B. All actual or proposed costs, whether initiated by a Change Order Proposal or Construction Change Directive, shall be summarized on forms acceptable to the Owner, with all necessary substantiating documentation attached thereto. Contractor and Subcontractors of all tiers shall submit Change in the Work Summary Calculation Sheets, Forms A and B, respectively.

C. Estimates of Not-to-Exceed costs may only be used for the purpose of expediting the Work.

D. The Owner reserves the right to request notarized time sheets, invoices and other documentation as necessary to protect the public interest.

E. The Contractor’s quotations shall be valid for 60 days.

1.3 CHANGES TO CONTRACT TIME

A. The Contractor shall make every effort to comply with the Contract Dates of Substantial and Final Completion.

B. The Contractor may not make claim for costs or losses associated with the use of float time, if any, between anticipated completion dates and the Contract Dates of Substantial and Final Completion.

C. Only impacts on critical path activities which can be documented as delaying the Contract Date of Substantial Completion shall be considered for changes in the Contract Time. Contractor shall be responsible for showing clearly on the Progress Schedule that the change or event: had a specific impact on the critical path, and except in case of concurrent delay, was the sole cause of such impact;
and could not have been avoided by resequencing of the Work or other reasonable alternatives.

1.4 REQUEST FOR INFORMATION (RFI)

A. Prepared by Contractor and distributed to Owner and Architect.

B. Form provided by Architect, or on a form approved by the Owner and the Architect.

C. Response provided by Architect.

D. Distributed by the Owner following acceptance of Architect response.

E. Contractor must either:
   1. Proceed upon receipt of response if no cost impact, or,
   2. Submit a statement of cost impact within 7 days of receipt of response.
      a. If cost impact is justified, Owner shall issue a CCD and/or COP.
      b. If cost impact is not justified, Owner will issue a Notice to Proceed, directing the Contractor to proceed with the Work in question, with no change to the Contract Sum.

F. RFIs and responses to RFIs shall be numbered consecutively. RFIs reissued for additional clarification or information shall be given decimal extensions (e.g. 12.1).

G. Responses shall be recorded weekly on record drawings and specifications.

1.5 ARCHITECT’S SUPPLEMENTAL INSTRUCTION (ASI)

A. Prepared by Architect or Engineer.

B. Form provided by Architect or Engineer.

C. No change in time or cost as determined by Architect or Engineer.

D. Acceptance by Owner required prior to issuance to Contractor.

E. Transmitted to Contractor for signature.

F. Contractor must either:
   1. Proceed upon receipt.
   2. Submit a statement of cost impact within 7 days of receipt.
      a. If cost impact is justified, Owner shall issue a CCD and/or COP.
      b. If cost impact is not justified, Owner will issue a Notice to Proceed, directing the Contractor to proceed with the work in question, with no change to the Contract Sum.
G. Architect’s or Engineer’s Supplemental Instructions shall be numbered consecutively. Reissued ASIs shall be given decimal extensions (e.g. 17.1).

H. Changes shall be recorded weekly on record drawings and specifications.

1.6 CONSTRUCTION CHANGE DIRECTIVE (CCD)

A. Issued by Owner in response to:
   1. An unresolved Architect’s or Engineer’s Supplemental Instruction.
   2. The absence of agreement on Change Order Proposal costs submitted by Contractor.
   3. The need to expedite the work and avoid delays.

B. Form provided by Architect or Engineer.

C. Signed by Owner.

D. Contractor must proceed immediately with the work identified in the CCD.

E. Method of adjustment of the Contact Sum shall be determined per General Conditions.

1.7 CHANGE ORDER PROPOSAL (COP)

A. Issued by Owner and distributed to Contractor and Architect.

B. May be initiated by Contractor by submitting a written notice to Owner indicating justification and proposed cost impact.

C. Contractor must provide cost data and substantiating documentation within 14 days of receipt of COP.

D. All costs must be summarized on the forms provided by the Owner, utilizing the fees indicated.

E. Direct costs of labor and fringe benefits shall be limited to the amounts shown in Statements of Intent to pay Prevailing Wages. Additional labor burden costs shall be limited to actual costs substantiated in writing by the Contractor and approved by the Owner and Architect or Engineer.
   1. All indirect costs, including but not limited to such items as insurance, taxes, (except Sales Tax), general conditions, small tool allowance, plant and equipment costs, and the like, shall be included in the fees as provided for on the forms, which shall not exceed the percentages specified in the General Conditions.

F. Prime Contractor Change Order Proposal provided to the Owner, must be submitted together with all necessary substantiating documentation.
G. Each subcontractor or sub-subcontractor of any tier must prepare and submit, through the Contractor, all of its costs together with all necessary substantiating documentation.

H. Architect or Engineer makes recommendation.

I. Owner accepts or rejects:
   1. Owner prepares Change Order, or,
   2. Owner requests additional cost data, and/or issues CCD.
   3. Owner may issue Notice to Proceed to expedite Work.

J. Accepted and signed COP is binding on both Owner and Contractor. It is the Notice to Proceed and authorization to do the work as soon as practicable.

K. COPs shall be numbered consecutively. Reissued COPs shall be given decimal extensions.

L. Changes shall be recorded on record drawings and specifications.

1.8 CHANGE ORDER (CO)

A. Prepared by Owner.

B. May include several COPs or CCDs.

C. Shall be signed by Contractor as soon as practicable.

D. Change Orders shall be numbered consecutively.

E. Changes shall be marked on record drawings and specifications.

F. Costs May be included in Applications for Payment only following approval of the Change Order by the Board of Directors.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 29 00
APPLICATION FOR PAYMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 0 (Bidding & Contract Requirements) – Section E. City Programs: LEAP Requirements
   B. Section 01 26 00 – Contract Modification Procedures
   C. Section 01 78 00 - Closeout Submittals: Project record documents.

1.02 SECTION INCLUDES
   A. Procedures for preparation and submittal of applications for progress payments.
   B. Procedures for preparation and submittal of application for final payment.

1.03 SCHEDULE OF VALUES
   A. Forms: Use AIA G703 or other form agreed to by the Engineer or Architect & Owner for the Schedule of Values.
   B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Engineer or Architect for approval.
   C. Forms filled out by hand will not be accepted.
   D. Submit Schedule of Values electronically within 15 days after the Notice to Proceed.
   E. On a monthly basis, Contractor provide an updated Schedule of Values for the Work with actual start and/or finish dates and percentages complete
   F. Format: At the times set forth herein, Contractor will submit Schedule of Values for the Project in such a form and supported by such data to substantiate its accuracy in reflecting the breakdown for administrative and payment purposes as the Owner may require. The Schedule of Values shall be further organized to confirm to the Construction Specifications Institute (CSI) standard format for divisions and sections.
      1. Identify each line item with number and title of the specification section.
      2. Identify site mobilization, bonds and insurance, and Contractor's General Conditions.
      3. Sum of all values listed in Schedule of Values shall equal Contract Price.
      4. Provide additional breakdown of line items if requested by the Architect or the Owner's Representative.
   G. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 PRIOR TO APPLICATION FOR PROGRESS PAYMENT
   A. Submit Contractor's Construction Schedule for information and Submittal Schedule.
   B. Submit a list of all Subcontractors and Suppliers.
C. City of Tacoma LEAP Program Documentation Forms.

1.05 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit monthly.

B. Forms: Use modified AIA G702 or other form provided by or agreed to by the Engineer or Architect & Owner for Applications for Payment.
   1. Application for Payment must identify sales tax as a separate item.
C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect or Engineer for approval.

D. Forms filled out by hand will not be accepted.

E. For each item, provide a column for listing each of the following:
   1. Item Number.
   2. Description of work.
   4. Previous Applications.
   5. Work in Place and Stored Materials under this Application.
   6. Authorized Change Orders.
   7. Total Completed and Stored to Date of Application.
   8. Percentage of Completion.
  10. Retainage.

F. Execute certification by signature of authorized officer.

G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
   1. Stored Materials: Requests for payment on materials stored shall be for materials properly stored on the site. Materials stored off-site may be included subject to the following conditions:
      a. A paid invoice from Supplier is provided.
      b. Materials are stored in a secure facility.
      c. Contractor and its bonding company accepts total responsibility for the stored materials.

H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

I. Submit one electronic copy of each Application for Payment.

J. Include the following with the application:
   1. Transmittal letter as specified for submittals in Section 01 30 00.
   2. Partial release of liens from major subcontractors and vendors.
   3. Affidavits attesting to off-site stored products.

K. When Architect requires substantiating information, submit data justifying dollar amounts in question.

L. Submit City of Tacoma LEAP Program Documentation Forms.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
B. Application for Final Payment will not be considered until the following have been accomplished:

1. All closeout procedures specified in Section 01 78 00.

2. Satisfactory completion of the following:
   a. Ensure that unsettled claims will be settled. Receipt by the Owner of General Release of Liens.
   b. Receipt by the Owner of proof of all project tax payments to the State of Washington Department of Revenue and Department of Labor and Industries for the entire length of the project.
   c. Receipt by the Owner of release by the Washington State Employment Security Department.
   d. Receipt by the Owner of all approved Affidavit of Wages Paid.
   e. Punch list items complete and accepted.
   f. Contract closeout document submittals received and accepted.
   g. Original documentation of all required permits signed off by Authorities Having Jurisdiction.
   h. Submittal of Operating and Maintenance Data.
   i. LEAP Program Documentation Forms.

C. Retainage payment will be made separately. Once all completion and release forms have been received, the retainage payment may be released and a Final Acceptance Letter issued by the Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and Procedural Requirements for:
   1. Project Management
   2. Coordination
   3. Variations, revisions and clarifications
   4. Request For Information
   5. Preconstruction conference
   6. Progress meetings

1.02 PROJECT MANAGEMENT

A. General: Provide direct, effective, experienced, cooperative, team-oriented, hands-on management of the Work including the daily construction operations on the project site and that part of the Work that the Contractor chooses to delegate to Subcontractors / Suppliers.
   1. Project management personnel shall be employees of the Contractor and shall not be subcontracted, or delegated to others.
   2. Failure to provide the specified project management personnel is a breach of Contract and subject to Owner’s termination of Contract for cause.
   3. Site Management Personnel: This Project requires a minimum of one (1) project management personnel on the Project site as follows:
      a. Superintendent on site full time.
      b. If the Superintendent is not available to be on site for some reason, provide management personnel such as a Foreman or similar on site to carry out the duties of the Superintendent.
      c. The management personnel listed herein are minimums and shall not be construed as limiting the Contractor from employing additional or other types of management personnel.

B. SUPERINTENDENT: Employ a Project Superintendent to oversee, direct, and manage the construction of the Work and including, but not limited to, the following minimum characteristics and responsibilities:
1. A good communicator, organized, effective and capable of managing multiple tasks, difficult personalities and tight deadlines without losing self-control or management effectiveness.

2. Trained, knowledgeable and experienced in jobsite safety and shall be responsible for managing safety issues on site in conformance with Federal, State and Local regulations.

3. Superintendent shall become thoroughly familiar with the requirements of the Contract Documents before work is started.

4. Responsible for executing the Work in conformance with the Construction Schedule specified in Section 01 3215 so that Project is completed on time.

5. Oversee and direct the work of Subcontractors and suppliers and confirm they are conforming to the requirements of the Contract Documents.

6. Jointly with the Project Engineer, coordinate the Work of this project as specified under “Coordination” in this section.

7. Responsible for determining the means and methods used to execute the Work.

8. Responsible for managing and controlling the quality of the Work (including work by Subcontractors) in conformance with the Contract Documents and good construction practice.

9. Responsible for coordinating with the local Building Department and Building Inspector(s) inspections and requirements.

10. Responsible for coordinating the final inspections required by Authorities having jurisdiction required for issuance of the Certificate of Occupancy.

11. Responsible for inspecting the work and preparing the Contractor’s Punch List as specified in Section 01 7800.

1.04 COORDINATION

A. General: Coordinate the Work and construction operations required in different sections of the Specifications:

1. Ensure efficient and orderly installation of each part of the Work.

2. Coordinate different work and trades that depends on each other for proper installation, connection, and operation.

3. No additional compensation will be approved for extra work incurred through the lack of cooperation and coordination.
B. Coordination Planning and Administration: Plan out the Work in advance and anticipate the interrelationships between each subcontractor and their relationship to the overall Project.

1. Provide the leadership, direction and decisions necessary to prevent subcontractor and supplier problems and disputes from affecting the project schedule or the quality of the work.

2. Coordinate scheduling, submittals, and Work of the various sections of Specifications to assure proper, efficient and orderly sequence of preparation and installation of interdependent construction elements, with provisions for accommodating items installed later.

3. Hold coordination meetings with each trade to determine Work requiring coordination with other trades / sections.

4. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordination Drawings: Before materials are fabricated or Work begun, prepare coordination drawings including plans, elevations, sections and other details as required to clearly define relationships between Work sharing the same space / area, or installed within or passing through Work by other trades so as to avoid any conflicts.

1. Calculate, backcheck and lay out the horizontal dimensions in conformance with the design concept indicated on the Drawings.

2. Consult with Owner whenever available space or conditions do not permit any element of the Work to be accomplished in conformance with the design concept indicated on the Drawing.

3. When requested by Owner, provide copy of coordination drawings; submit with any Request for Information involving coordination issues.

4. Distribute coordination drawings to affected Subcontractors / suppliers.

D. Subcontractor Coordination: Provide direct supervision and coordination of each Subcontractor and each part of the Work; require each Subcontractor to coordinate their portion of the Work and provide their requirements for coordination of their Work with other related Work.

1. Schedule such work so as to prevent delays in dependent work and so that related work will progress together.

2. Fully inform each trade or Subcontractor of the relation of its work to other work, and require each to make necessary provisions for the requirements of such other work.
3. Do not delegate Subcontractor coordination responsibility to any subcontractor.

E. Sequence of Work Coordination: Coordinate the Work of trades and other sections to ensure that elements of the work are installed in their proper sequence, without the need for unplanned modifications to work already installed.

F. Completion and Closeout Coordination: Coordinate the efficient completion and closeout of the Work by each Subcontractor.
   1. Coordinate completion and cleanup of Work of separate trades in preparation for Completion.
   2. After substantial completion, coordinate access to site for correction punch list items; minimize disruption to the building occupants if applicable.

G. Existing Conditions Coordination:
   1. Lay out and mark existing utilities requiring protection or which remain operational or active during construction, to prevent any accidental damage or disruption of building services during this Project.

H. Coordination With Owner:
   1. Cooperate with the Owner to resolve any scheduling or construction coordination concerns or problems that arise during the course of this Project and coordinate the work accordingly to minimize the disruption to the Owner and to the construction schedule.
   2. Schedule shutdowns of existing equipment, utilities and building systems with the Owner, refer to Section 01 50 00 for requirements.
   3. Coordinate with the Owner for the scheduling of any construction activities that could potentially disturb or threaten the life safety of any building occupants involving the building structure, chemical fumes and smells, noise, change of exiting or access, blocking of any site path or road, or that could potentially result in disruption or damage to any existing utility or building system. Work that involves any of these potential disturbances, poses a threat to life safety, or involves any element of risk to building occupants shall be subject to the Owner’s direction to accomplish this work at a time when the building is not occupied.
   4. Coordinate with and follow Owner’s security procedures and requirements to maintain building and area / room security throughout the Project.
   5. Follow Owner’s security requirements for notification and arrival at Security Gate to access the Work site. At no time will any of Contractor’s or Subcontractors’ workers be permitted to proceed past the Work site into the watershed on Headworks Road without a Tacoma Water escort.
   6. Coordinate deliveries in advance with the Owner. Schedule delivery times
so that Owner’s use of the site is not hindered.

1.05 VARIATIONS, REVISIONS AND CLARIFICATIONS

A. Variations, revisions and clarifications to the work not involving an adjustment to the Contract Sum or Contract Time will be confirmed in writing. These written confirmations may be included in the project minutes, memos to the Contractor and Owner, e-mail correspondence, or in answers to written Requests for Information (RFI).

1.06 PRECONSTRUCTION CONFERENCE

A. Owner will schedule a preconstruction conference at start of construction.

B. Attendance Required: Contractor, Mechanical Subcontractor (HVAC), Owner and Architect / Engineer.

C. Agenda:


2. City’s contract requirements for Equity in Contracting and LEAP


5. Discussion of list of Subcontractors, list of Products, schedule of values, and progress schedule.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.

7. Scheduling

8. Coordination with Owner including building remaining operational twenty-four (24) hours per day, seven (7) days per week.


10. Requirements for start-up of equipment.

11. Inspection and acceptance of equipment put into service during construction period.

1.07 PROGRESS MEETINGS

A. Progress meetings will be held on a regularly scheduled basis not exceeding once per week.
1. Owner will administer the meeting, record decisions and actions from the meeting and send copies of meeting notes to Owner and Contractor.

2. The Contractor will be responsible to distribute copies to his field representative and to Subcontractors.

B. Location of Meeting: Progress meetings will be held at the job site. The contractor shall make physical arrangements for the meeting space, unless agreed upon otherwise with Owner.

C. Attendance: Contractor’s management team, Owner, Architect and professional Consultants; subcontractors; suppliers and others as appropriate to agenda may attend.

D. Agenda:

1. Safety/Security
2. EIC and LEAP compliance
3. Approval of minutes of previous meetings.
4. Review of Work progress since previous meeting and work planned.
5. Review project schedule (4-week and Master Project Schedule).
6. Review submittal schedules; expedite as required.
7. Review of Request for Information (RFI).
8. Review deliveries.
9. Review proposed changes.
10. Review technical and administrative questions / concerns from Contractor, Owner, Architect, Consultants.
11. Review As-Built Drawings.
12. Field Observations.

E. Four-Week Schedule:

1. Prior to each meeting, prepare a four (4) week schedule showing work completed during the previous week, work that is in progress for the current week and work planned for the following two weeks. This four week schedule, which is revised weekly by the Contractor, will be presented by the Contractor at the progress meeting and a copy will be given to the Owner at that time.

2. In the event that a progress meeting is not scheduled for the current week, prepare the 4 week schedule and forward it to the Owner in the same week.
PART 2 - PRODUCTS Not Used
PART 3 - EXECUTION Not Used

END OF SECTION
SECTION 01 32 15

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for the contractor's construction schedule.

1.02 GENERAL

A. The intent of the construction schedule is to assist the Contractor in planning and execution of the Work in a timely manner and assist the Contractor, Architect and Owner in monitoring the construction progress for the purpose of coordination, communication, evaluation of Applications and Certificates for Payment, and evaluation of time extension requests.

B. The Owner's review of the schedule will be to ensure that it conforms to the requirements of the specifications. The sequence and scheduling of the work is the Contractor's responsibility. Contract completion date(s) is as specified in the Contract Documents. The Owner's review of the schedule does not change, revise, or amend that date(s).

C. This section supplements the General Conditions and the Modifications to the General Conditions with additional schedule requirements, where conflicts exist, the most restrictive requirement shall govern.

D. Any plan by the Contractor to complete the Work or any part of the Work earlier than any contract required milestone or specific completion date shall not be construed as creating any responsibility or liability for the Owner or Architect should their actions, or lack thereof, prevent the Contractor from achieving the planned early completion. The Owner and Architect shall not be liable to the Contractor for any costs or other damages if the Contractor is unable to achieve early completion of the Work before a milestone or completion date.

E. Float Time: Float time is the amount of time between the earliest start date and the latest start date, or between the earliest finish date and the latest finish date of a chain of activities on the CPM Schedule. Float time belongs to the project and is not for the exclusive use or benefit of either the Contractor or the Owner; float time may be used by either the Contractor or Owner for offsetting delays. Use of float suppression techniques such as preferential sequencing, special lead / lag logic restraints, zero total or free float constraints, extended activity times or imposed dates shall be cause for rejection of the Construction Schedule or any revisions or updates.
F. Schedule shall anticipate and include sufficient float time for weather dependent work tasks to allow for any delays due to normal inclement weather (defined as any inclement weather within the ten year average of accumulated record mean values from climatological data compiled by the National Oceanic and Atmospheric Administration (NOAA), for the locale of the project, over the full duration of the Contract Time).

1.03 FORMAT

A. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: 11 x 17 inches or as approved by Owner.

C. Scale and Spacing: Weekly increments to be a minimum of 5/8-inch long. Lettering to be a minimum of 1/16-inch high. Schedule to be legible and allow for notations and revisions.

1.04 SCHEDULES

A. Provide a time scaled diagram with a separate activity bar for each work activity. Diagram to illustrate order and interdependence of activities and sequence of work, how start of a given activity depends on completion of preceding activities and how completion of the activity may restrain start of subsequent activities. Indicate early and late start, early and late finish, manpower loading and description of each activity. Indicate critical path.

B. Provide as many activities as necessary to clearly show how the project will be constructed within the time allowed. As a minimum, every item on the schedule of values must be shown on the progress schedule. Provide sub-net schedules where necessary to enhance clarity.

C. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities.

D. Show accumulated percentage of completion of each item of work at time of each Application for Progress Payment.

E. As a sub-net show submittal dates including specified Architects' review time for shop drawings, product data and samples. Indicate decision date for selection of finishes.

F. Show product delivery dates, including those furnished and / or installed by Owner.

G. Show dates when application for separate permits (i.e., fire alarm, fire sprinkler, etc.) will be made and when permit will be received.

H. Show dates when application for warranties / guarantees will be made and when warranties will be delivered. Final payment will not be made until all warranties / guarantees have been received and found to be acceptable.

I. Show dates for Commissioning and Startup.
1.05 UPDATING SCHEDULES

A. Update the construction schedules monthly to reflect actual work activity dates accomplished and any revised work activity dates.

B. Maintain Construction Schedules to record actual start and finish dates of activities as they are completed.

C. Indicate progress of each activity at the time of the revision date. Update diagrams to graphically depict current status of Work.

D. Indicate revision date on revised schedule.

E. Show changes occurring since previous Schedule submission such as:
   1. Any major changes in scope;
   2. Activities modified since previous submission;
   3. Revised projections for progress and completion, as applicable;
   4. Any other identifiable changes.

F. Provide narrative report as needed to define:
   1. Problem areas; anticipated delays; and impact on schedule.
   2. Corrective action to be taken by the Contractor to get the project back on schedule. This report will define how and when the Contractor will accomplish this.

1.06 SUBMITTALS

A. Prepare and submit proposed construction schedule to Owner and Architect within thirty (30) days of Notice to Proceed.
   1. Submit schedule in both paper and digital computer formats acceptable to the Owner.

B. Submit updated schedule with each Application for Payment or more frequent if required.

C. Applications for Payment will not be processed until schedule is in conformance with requirements of the specifications.

1.07 DISTRIBUTION

A. Distribute copies of construction schedule to project site file, subcontractors, suppliers, Owner, Architect, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and Procedural Requirements for Project Submittals

1.02 SUBMITTAL PROCEDURES

A. Schedule submittals to expedite the Project. Transmit submittals in accordance with Construction Schedule and in such sequence to avoid delay in the Work. Coordinate submission of related items with schedule.

B. Electronic Submittals – Format: Shop Drawings, Product Data, Certificates, Warranties and any similar submittals, other than physical samples, shall be provided as digital submittals in PDF format suitable for sending via electronic mail or downloaded from internet file transfer website.

1. PDF security permissions shall be formatted to allow printing, reviewing and editing functions by Architect and Owner using any PDF compatible computer program.

2. When electronic submittals are required to be accompanied by a physical sample, the submittal will not be returned until both the electronic submittal and physical sample are reviewed.

C. Contractor Shall:

1. Prepare / obtain submittals for each item required in the specifications in accordance with the Contractor’s submission schedule and as required to prevent delays in the ordering, fabrication, delivery and installation of the Work.

   a. Sequence the frequency rate of submittals sent to the Architect to avoid submitting more submittals within the same week than can receive a thorough, timely review, generally 4 to 5 submittals per week. Include a review priority for Architect if multiple and / or large submittals are transmitted to Architect in the same week and plan for longer review times by Architect.

2. Review each submittal for compliance to the Contract Documents, note any deviations and approve in writing prior to submission to Architect; each submittal shall bear the Contractor’s review and approval stamp, with the review date and name of reviewer.

3. Reproduce and distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with
provisions. Pay costs for reproduction, distribution and materials.

4. Coordinate submittals into logical groupings to facilitate inter-relation of the several items:
   a. Finishes which involve Architect selection of colors, textures, or patterns.
   b. Associated items which require correlation for efficient function or for installation.

5. Identify, in writing, variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.

6. Accompany submittals with transmittal letter containing:
   a. Date.
   b. Project title and number.
   c. Contractor's name and address.
   d. Number of copies of Shop Drawings, Product Data and Samples submitted.
   e. Identification of submittal as it relates to:
      1) Subcontractor / Supplier / Manufacturer:
         Name.
         Address.
         Telephone number.
         Representative's name.
      2) Detail number and location in Construction Documents.
      3) Specification reference number and paragraph.
      4) Applicable Standards.
      5) Finishes.
      6) Identification of deviations from Contract Documents.

D. Additional Information Required:
1. Relation to adjacent structure or materials.

2. Fabrication methods, assembly, special installation requirements, accessories, fasteners, and other pertinent information.

3. Field dimensions, clearly identified.

4. Coordination with other trades. Stamped and signed by affected trades.

E. Distribution:

1. Send submittals to Owner and Architect via electronic mail or from internet file transfer website.

2. Architect will return reviewed submittals to Contractor and Owner via electronic mail or Architect’s internet file transfer system.


1.03 SUBCONTRACTOR AND SUPPLIER LIST

A. Prior to submission of First Application for Payment, submit complete list of subcontractors and suppliers to be used for the Work. Provide specification section identification number, addresses and telephone numbers for each listed subcontractor and supplier providing materials.

1.04 SHOP DRAWINGS

A. Present in clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents.

B. Identify field dimensions; show relation to adjacent or critical features or Work or products.

C. Do not submit freehand drawings.

D. Shop Drawings Requiring Code Agency Approval: Submit on format and media required by Approval Agency. Include information required by Project Documents and Approval Agency.

1.05 PRODUCT DATA

A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.

B. Modify manufacturer’s standard schematic drawings and diagrams to supplement
standard information and to provide information specifically applicable to the Work. Delete information not applicable.

### 1.06 SAMPLES

A. Submit two samples of the specified color and texture for each product unless specified otherwise in individual specification sections; samples will be retained by Architect.

B. Where a specific color has not been specified, submit full range of manufacturer's standard and special finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Architect selection.

C. Label each sample with identification required for transmittal letter.

D. Field samples are to be maintained at the site of the Work and are to be removed after substantial completion unless directed otherwise.

### 1.07 CONTRACTOR REVIEW

A. Coordinate submittals with requirements of the Work and Contract Documents.

B. Apply Contractor's approval stamp with signature. The submittal signed by the Contractor certifies that the Contractor has reviewed the submittal for accuracy, completeness and compliance with the Contract Documents. It also certifies that the Contractor has verified products required, field dimensions, adjacent construction work, and coordination of information, in accordance with the requirements of the Work and Contract Documents. Submittals without Contractor's stamp and signature are rejected. Notify Architect in writing at time of submittal, of any deviations from requirements of Contract Documents.

### 1.08 RESUBMITTALS

A. Revise and resubmit submittals as required, identify changes made since previous submittal.

B. Shop Drawings, Product Data and Calculations:
   1. Revise initial drawings, data or calculations and resubmit as specified for the initial submittal.
   2. Indicate any changes which have been made including those requested by the Architect.

C. Samples: Submit new samples as required.

D. Architect reserves the right to charge the Contractor for reviewing non-responsive resubmittals.
1.09 ARCHITECT REVIEW

A. Architect or their consultant(s) will review shop drawings, product data, calculations and samples and return submittals to Contractor as soon as possible, generally within 10 working days, except Contractor shall plan for large submittals such as mechanical and electrical product binders or numerous submittals sent to Architect at the same timing taking a longer period of time.

B. Architect’s review is qualified by the following language included on the review stamp: “This review is only for general conformance with design concept of the Project and general compliance with the information given in the Contract Documents. Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her Work with that of all other trades; and for performing all work in a safe and satisfactory manner”.

1. Any action shown is subject to Contract Document’s requirements. Architect / Engineer will mark the review submittal in one of the following boxes on review stamp:

- Reviewed
- Reviewed with Comments / Corrections
- Rejected
- Revise and Resubmit
- Submit Specified Item
- Informational Submittal – Not Reviewed

C. Architect / Engineer review of individual or separate items does not constitute review of assembly in which it functions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Alteration Project Procedures.
B. Cutting and Patching.

1.02 REGULATORY REQUIREMENTS

A. Obtain required permits from authorities.
B. Do not close or obstruct egress from any building exit.
C. Do not disable or disrupt existing building utilities or fire and life safety systems without 3 days prior written notice to the Owner; proceed only after receiving the Owner’s confirmation of approval.
D. Conform to procedures and requirements of authorities having jurisdiction when hazardous or contaminated materials are discovered. Notify the Owner and Architect or Engineer immediately.

1.03 QUALIFICATIONS

A. Contractor’s on-site management personnel shall be competent to survey the condition of the structures and building systems to determine both their condition and the possibility of unplanned structural collapse or failure. Management Personnel shall be capable of taking prompt corrective action when necessary to protect the safety of persons and the integrity of the building structure or systems.

B. DEFINITIONS:

1. SKILLED CRAFTSMAN is someone who has journeyman level abilities in a specific trade or craft and is currently working at that trade or craft on a regular basis, is capable of competently performing all aspects of the specific trade or craft and, if work has special warranties involved, has received special training to qualify their work for warranty.

2. QUALIFIED INSTALLER is someone who has journeyman level abilities for installing a particular product or system and is currently doing this installation work on a regular basis, is capable of competently performing all aspects of the installation and, if work has special warranties involved, has received special training to qualify their work for warranty.
C. Demolition, moving, removing, cutting and drilling is required to be performed by trades qualified to perform the work in a manner to cause the least damage and disruption to existing structure and finishes. Use skilled craftsmen or qualified installers wherever waterproof integrity, structural integrity, sight-exposed finishes or materials or systems that are under warranty are involved.

D. Patching, repair and restoration work shall be accomplished by skilled craftsmen and qualified installers in those specific trades that normally perform the type of work required (e.g. finish carpentry work by a finish carpenter, plaster work by a plasterer, etc.).

1.04 QUALITY ASSURANCE

A. Assign the specific demolition, cutting and patching work required for the work of this contract to the appropriate skilled craftsman or qualified installer.

B. Lay out, coordinate, and direct the demolition and cutting accomplished by the various trades to:
   1. Minimize patching work required for restoration.
   2. Accommodate the existing conditions.
   3. Prevent damage to existing building structure, finishes or equipment / systems.
   4. Prevent removal or cutting of existing elements intended to remain.

1.05 PROTECTION

A. Protect and prevent damage to existing finishes, equipment / systems and adjacent work scheduled to remain.

B. Protection shall include, but not be limited to, wood timbers or framing, plywood panels, plastic sheeting, canvas drop cloths, carpet scraps etc. or anything required to protect item(s) or areas from damage.

C. Protection shall be in place prior to specific demolition, cutting or patching work is started.

1.06 EXISTING CONDITIONS

A. UNFORESEEN CONDITIONS: Should unforeseen conditions be encountered that affect the design or function of the project or the structural or functional integrity of the structure or any building system, notify the Architect and Owner immediately in writing.
PART 2 - PRODUCTS

2.01 PRODUCTS / MATERIALS FOR PATCHING AND EXTENDING WORK

A. New Products / Materials: As specified in Product sections; match existing products / materials and work for patching and extending work.

B. Type and Quality of Existing Products / Materials: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

C. As applicable, salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when materials are not obtainable on the current market. Do not incorporate salvaged or used materials in new construction except with permission of Architect and Owner. Protect stored salvage items in dry, secure place.

PART 3 - EXECUTION

3.01 COORDINATION

A. Review, coordinate and accommodate work of other trades that interface with, affect or are affected by the work of this section so as to facilitate the execution of the overall Work of this project in a coordinated and efficient manner.

3.02 ALTERATION PROJECT PROCEDURES

A. PREPARATION

1. Replace and restore at completion.

2. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals and deteriorated masonry and concrete. Replace materials as specified for finished Work.

3. Remove debris and abandoned items from area and from concealed spaces.

4. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

5. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity. Insulate duct work and piping to prevent condensation in exposed areas.

B. INSTALLATION

1. Coordinate and direct the work of alterations and renovations to expedite completion sequentially.
2. Remove, cut and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original condition. If original condition is substandard or damaged, restore to level of quality required for new work.

3. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

4. Install Products as specified in individual sections.

C. TRANSITIONS

1. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patched Work to match existing adjacent Work in texture and appearance.

2. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and provide trim appropriate to new surface or as determined by Architect.

D. ADJUSTMENTS

1. Where a change of plane occurs, provide a smooth transition.

2. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

3. Fit work at penetrations of surfaces as described in Cutting and Patching.

E. REPAIR OF DAMAGED SURFACES

1. Patch or replace portions of existing surfaces which are damaged, lifted, discolored or showing other imperfections.

2. Repair substrate prior to patching finish.

F. FINISHES

1. Finish surfaces as specified in individual Product sections.

2. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.03 CUTTING AND PATCHING

A. EXAMINATION:
1. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

2. After uncovering existing work, inspect conditions affecting performance of work.

3. Beginning of cutting or patching means acceptance of existing conditions.

B. PREPARATION

1. Layout and coordinate the cutting work so that new work can be completed free from conflicts with work of other trades and existing conditions/systems not scheduled for removal. Do not proceed with cutting work until conflicts are resolved.

2. Provide, erect and maintain temporary barriers and exterior enclosures and protect existing and installed work.

3. Provide temporary supports, braces or shoring to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

4. Provide protection from elements for areas which may be exposed by uncovering work.

5. Maintain excavations free of water.

C. CUTTING AND PATCHING

1. Provide the tools and equipment best suited for the specific type of cutting and patching required.

2. Plan and execute cutting work in a manner that results in the least negative impact to the surrounding work.

3. Execute cutting, fitting and patching including excavation and fill, wherever necessary to construct the work.

4. Fit products together, to integrate with other work.

5. Uncover work to install ill-timed work.

6. Remove and replace defective or non-conforming work.

7. Remove samples of installed work for testing, when requested.

8. Provide openings in the work for penetration of mechanical and electrical work.
9. Provide access for installation of items too large to fit through permanent openings.

D. PERFORMANCE

1. Execute work using methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

2. Employ skilled craftsmen and / or qualified installer to perform cutting and patching for weather exposed and moisture resistant elements, sight-exposed surfaces and warranted work.

3. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval. Do not overcut corners of materials exposed to view or where overcutting would weaken its structural integrity.

4. Restore work with new products in accordance with requirements of Contract Documents.

5. Fit work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

6. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with fire rated material of equal fire rating.

7. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.04 EXISTING ITEMS FOR REUSE

A. Remove the existing item carefully so as not to damage the item.

B. Carefully clean item and store item in a protected location.

C. If the item is damaged during the removal process, replace with new that matches the existing at the Contractor’s expense.

D. Reinstall item using procedures for installing new work.

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for project quality control.

1.02 REFERENCES

A. References shall be the edition current as of the date of the Contract Documents.

B. Obtain current copies of referenced standards.


D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

E. International Code Council (ICC):

1. ICC / ANSI A117 - Accessible and Usable Buildings and Facilities

1.03 CONTRACTOR’S QUALITY ASSURANCE / CONTROL OF CONSTRUCTION

A. Employ / assign quality control personnel to monitor the work of this project for conformance to the requirements of the Contract Documents and to good construction practices.

1. Prior to starting their work, review the scope of work, performance requirements, materials and workmanship requirements with each trade and subcontractor.

2. Review materials when delivered to the site for conformance to the Contract Documents and submittals.

3. Monitor work in progress for conformance to the Contract Documents and submittals.

B. Contractor is solely responsible for managing and controlling the quality of the work and conformance with the requirements of the Contract Documents.

C. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Work shall be performed by trained and experienced workers qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion and disfigurement.

1.04 ADA TOLERANCES

A. ADA Tolerances: The ADA tolerances shown on the Drawings represent the allowable tolerances required for conformance with the ADA and ICC / ANSI A117. Strict conformance with the ADA tolerances shown on the Drawings is required for this project; non-conforming work will require correction at Contractor's expense.

1. ADA tolerances shown on the Drawings supersede industry standard tolerances and any other tolerances included in any specification section.

B. Submittal Review: Review submittals for conformance with the accessibility requirements of ICC / ANSI A117 and the ADA tolerances shown on the Drawings; mark up submittals that have incorrect or missing ADA tolerance information.

C. Review with Workers: Review the accessibility requirements of ICC / ANSI A117 and the ADA tolerances shown on the Drawings with workers performing work that is required to conform to the accessibility requirements of ICC / ANSI A117.

D. Monitoring: Monitor the work of this project for compliance with the accessibility requirements of ICC / ANSI A117 and the ADA tolerances shown on the Drawings on work that is required to conform to ICC / ANSI A117.

E. Inspection: Inspect the completed work that is required to conform to ICC / ANSI A117 for conformance with the ADA tolerances shown on the Drawings. Inspection shall require accurate measurements to confirm that dimensions, slopes and relationships shown on the Drawings have been constructed within the ADA tolerances shown on the Drawings.

1.05 MANUFACTURER'S INSTRUCTIONS

A. Comply with manufacturer's installation / assembly instructions in full detail, including each step in sequence.

B. Substrates, Site Conditions And Work By Others shall conform to manufacturer's requirements:

1. Inspect substrate, site conditions and work by others for conformance to manufacturer's requirements for material and condition prior to starting any work.
2. Do not start work if substrate construction, site conditions or work by others does not comply with manufacturer's recommendations; report any problems to Contractor and Architect.

3. Start of work / installation indicates installer's acceptance of substrate, site conditions and work by others as meeting manufacturer's requirements.

C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Architect or Engineer before proceeding.

PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES
   A. Requirements for the contractor’s construction facilities and temporary controls.

1.02 DESCRIPTION
   A. This section specifies minimum actions required. Other actions may be specified elsewhere in the Contract Documents, manufacturer’s literature, and governing regulations.
   B. Nothing in this section is intended to limit types or amounts of construction facilities and temporary controls.
   C. No omission from this section will be recognized as a temporary activity that is not required to complete the Work.

1.03 PROTECTION OF EXISTING UTILITIES
   A. If unknown utilities are encountered in the course of construction, protect them from damage and notify the utility Owner immediately. Do not remove or disable any unknown existing utility without the approval of the Owner.
   B. In the event utilities are damaged during construction, temporary services and/or repairs must be made immediately to maintain continuity of services at Contractor’s expense.

1.04 DISPOSAL OF WASTE MATERIALS
   A. Transportation and disposal of solid waste shall meet the requirements of KCC 10.04 King County Solid Waste Code.
   B. Dispose of refuse and waste material off Owner’s property. Do not stockpile waste material on Owner’s property. Immediately clean up any spilled material.
   C. Clean trash and debris from work area daily. Keep work area, site, and adjacent properties free from accumulations of waste materials, rubbish and windblown debris resulting from construction operations.
   D. Provide on-site containers for collection of waste materials, debris and rubbish. Periodically remove waste from the site.
E. Waste Construction Liquid Disposal: Provide portable containers for disposal of any waste construction liquids or fluids that are generated by or needed for the construction work. Do not dump any waste construction liquid or fluid (including oil, solvent, cleaning compound, paint, plaster mud, brush and tool cleanup water, etc.) onto the ground or down the building sanitary or storm drain systems or anywhere on the site. Dispose of contents of all portable containers off site daily.

F. Dispose of flammable, hazardous, and toxic waste materials daily.

G. Conform to work place safety regulations for storage, mixing, application and disposal of all cleaning, sealing and repair related materials to requirements of those authorities having jurisdiction, including Federal, State and Local.

H. Conform to safety precautions in accordance with the latest requirements to Health and Safety regulations, latest edition, of authorities having jurisdiction.

1.05 TEMPORARY ELECTRICITY

A. The Owner will allow the Contractor to use the existing building’s electricity for the duration of the construction without charge.

B. Provide power outlets for construction operations, with branch wiring and distribution boxes. Provide OSHA / WISHA approved flexible power cords as needed.

C. Provide over current protection at convenient locations for large loads on the existing electrical panels.

D. Permanent convenience receptacles may be utilized during construction, provided they are replaced if damaged or defaced in any way.

1.06 TEMPORARY LIGHTING

A. Provide and maintain temporary lighting for construction operations. Provide sufficient lighting to ensure proper workmanship everywhere.

1. The Owner will allow the Contractor to use the existing building’s lighting for the duration of the construction without charge. If the lighting levels are too low, temporary lighting may be required at Contractor’s expense.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required to do the Work safely and at the light levels required by each trade to produce work conforming to the quality specified.

C. Maintain lighting and provide routine repairs.

1.07 TEMPORARY TELEPHONE SERVICE

A. Superintendent shall carry a cellular phone to allow voice communication at all times.
1.08 TEMPORARY WATER SERVICE
   A. The Owner will allow the Contractor to use the existing building’s water service for the duration of the construction without charge.
   B. Provide backflow prevention device approved by State of Washington Department of Health for any water connection to domestic water main or system serving the public.

1.09 TEMPORARY SANITARY FACILITIES
   A. Contractor shall provide and maintain required facilities and enclosures. Provide at time of project mobilization. Maintain daily in clean and sanitary condition.

1.10 TEMPORARY HEAT
   A. The Owner will allow the Contractor to use the existing building’s heating system for the duration of the construction without charge. Direct fired gas / oil heaters are not allowed for supplemental heat, all combustion / exhaust gases shall be vented to building exterior.
   B. Install MERV 8 HEPA filters at return air intakes where construction activities are occurring.
   C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless required otherwise by manufacturers, trade associations, and / or the specification sections.
   D. Maintain current temperature settings in the existing building. Coordinate with the Owner to determine the correct temperature setting. Contractor to plan for temporary heat source for occupied areas of the building if HVAC system is out of service due to replacement and outdoor temperature is forecasted to be below 65 degrees Fahrenheit.
   E. Provide temporary ventilation equipment to assist curing and drying out of materials, to dissipate humidity, to maintain consistent temperature in areas and to prevent accumulation of dust, fumes, vapors, or gases.

1.11 TEMPORARY DEHUMIDIFICATION
   A. Provide temporary dehumidification equipment as required to lower the moisture content of the building interior and allow materials to dry out to required levels.

1.12 BUILDING MATERIALS ACCLIMATIZATION AND DRY OUT
   A. Prior to installation of any wall surfaces or finishes, the Contractor shall provide the equipment and expertise required to dry out the building structure and materials, including concrete slabs, to conform with the following minimum criteria:
1. Contractor is responsible for selecting the means and methods utilized to dry out, ventilate and acclimate the building materials, including deciding the proper sequence of construction and other determinates affecting the dry out process; and shall hire an expert consultant to advise in this process if problems or questions are encountered.

2. Acclimate, ventilate and dry out structure and materials as required by manufacturers of finishes or coverings applied over, onto or within the structure or material.

3. Acclimate, ventilate and dry out structure and materials as required to allow installed materials to dry evenly and rapidly as recommended by manufacturer or reference standard.

4. Acclimate, ventilate and dry out structure and materials as required to prevent the formation of water condensation on any material.

5. Test and record moisture content of each different material on a daily basis during and after acclimatization and dry out process.

1.13 TEMPORARY BARRIERS AND TRAFFIC CONTROL

A. Provide temporary barriers within the building as required.

B. Provide barriers to protect the public from any potentially unsafe conditions, and from damage from construction operations.

C. Provide protection for existing plant life designated to remain. Replace damaged plant life.

C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

D. Provide vehicular and pedestrian traffic control as appropriate for the work.

1.14 TEMPORARY STORAGE

A. Make whatever provisions are necessary to ensure the safe and weathertight protection of materials and equipment temporarily stored. Coordinate location of any temporary storage with Owner.

1.15 PROTECTION OF EXISTING AND INSTALLED WORK

A. Protect installed work. Provide special protection where specified in individual specification sections or as required to prevent any type of damage or defacement.

B. Provide temporary and removable protection for existing and installed products. Control activity in immediate work area to minimize damage.

C. Prohibit traffic in landscaped areas.
D. Prohibit construction worker access to rooms and areas which do not have construction work. After work in any area or room is complete, prohibit further worker access.

E. Prevent any construction dust and dirt from entering the HVAC equipment and ductwork, computer equipment, electrical switchgear, building systems / equipment, smoke detectors or anything that will be adversely affected.

1.16 SECURITY

A. Provide site and building security as required to protect work in progress, stored materials, tools and equipment from vandalism and theft.

B. Maintain security until Substantial Completion when Owner takes responsibility for security.

1.17 ACCESS ROADS

A. Provide and maintain access to fire hydrants, free of obstructions. Do not block access roads or prevent emergency vehicles access to site.

B. Maintain the emergency vehicle access road on the site in good, drivable condition for any type of emergency vehicle as required by King County code and permit conditions.

1.18 PROGRESS CLEANING

A. Provide periodic cleaning to prevent any buildup or accumulation of construction debris in the building or on the site.

B. Pre-Cover Cleaning: Remove construction debris and vacuum clean dirt and dust from concealed spaces that will be enclosed or inaccessible after completion of the work, including concealed spaces within walls, shafts, attics, and void spaces.

C. Maintain building and site in a clean and orderly condition.

D. Remove waste materials, debris, and rubbish from building and site weekly and dispose off-site at approved recycler or dump location.

E. Provide final cleaning at substantial completion

1.19 ENVIRONMENTAL PROCEDURES

A. Comply with environmental and health safety regulations. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.

B. Burning on site is not permitted.
1.20 MACHINERY AND EQUIPMENT RESTRICTIONS

A. Equipment and Internal Combustion Engine Noise: The noise level of each vehicle or piece of equipment shall not be greater than 90 DB(A) at a distance of 50 feet as measured under noisiest operating conditions. Mufflers for stationary engines shall be hospital-area quality of silencing.

1.21 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, etc.
B. Clean and repair damage caused by installation or use of temporary work.

1.22 EMERGENCY CONTACTS

A. Provide Owner with two emergency contact names (Superintendent and Project Manager), with cell phone numbers.

1.23 CONSTRUCTION PARKING

A. Contractor is responsible to provide temporary parking areas for construction personnel. Owner will provide recommended area for construction parking.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Section 01 25 00 – Substitution Procedures

1.02 SECTION INCLUDES
A. Requirements for Materials and Equipment related to:
   1. Transportation and handling
   2. Storage and protection
   3. Product options

1.03 PRODUCTS
A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work. Products may also include existing materials or components required for reuse.

B. Provide interchangeable components of the same manufacturer, for similar components.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

1.04 TRANSPORTATION AND HANDLING
A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

1.05 STORAGE AND PROTECTION
A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above
C. Provide and pay for off-site storage and protection when site does not permit on-site storage or protection.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

H. Owner reserves the right to reject any product that is not stored in conditions required by manufacturer.

1.06 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by naming a Manufacturer “or approved equal”, or with a provision for Substitution Request: Submit a request for substitution for any manufacturer not named.

D. Products Specified by "or approved equal" to a Listed Manufacturer: Products with same function and similar quality and features to listed manufacturer.

E. Products Specified by "Similar To" a Listed Manufacturer: Products with same function and similar quality and features to listed manufacturer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General Installation of Products
2. Progress Cleaning
3. Starting and Adjusting
4. Protection of Installed Construction
5. Correction of the Work

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Acceptance of Conditions: Start of work / installation indicates acceptance of existing conditions as not conflicting with the requirements of the Contract Documents or the design intent and being acceptable without any modification.

3.02 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.


3.03 INSTALLATION
A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer’s written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

G. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.04 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.


2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Pre-Cover Cleaning: Remove construction debris and vacuum clean dirt and dust from concealed spaces that will be enclosed or inaccessible after completion of the work, including concealed spaces within walls, shafts, attics, and void spaces.

C. Site: Maintain Project site free of waste materials and debris.

D. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
E. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

F. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

G. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.05 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each installed utility and piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Arrange for a factory-authorized service representative to inspect and repair any piece of equipment that does not function properly or cannot be made to operate as specified.

3.06 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

3.07 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

C. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION
SECTION 01 78 00
CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and Procedural Requirements for the Contract Closeout.
   1. Final Cleaning
   2. Adjusting
   3. Extra Stock
   4. Project Record Documents
   5. AHJ Approved Permit Drawing Set
   6. Operation And Maintenance Data
   7. Warranties
   8. Spare Parts And Maintenance Materials
   9. Punch List
   10. Final Adjustment of Accounts

1.02 CLOSEOUT PROCEDURES

A. Comply with the General Conditions of the Contract.

1.03 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion review and during the period between Substantial and Final Completion where punch list work causes waste, rubbish or debris.

B. Clean surfaces exposed to view, remove temporary labels, stains and foreign substances. Follow manufacturer’s recommendations for cleaning installed products.

C. Clean equipment and fixtures to sanitary condition.

D. Clean site; sweep paved areas, rake clean landscaped surfaces if they were impacted by the work of this Project.
E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.04 ADJUSTING

A. Adjust operating products and equipment in accordance with manufacturer's recommendations and specification section to ensure smooth and unhindered operation.

1.05 EXTRA STOCK

A. Make arrangements with the Owner to deliver extra stock items.

B. Document receipt of extra stock by Owner's representative by listing each extra stock item and obtaining the signature of the Owner's representative for it. Include this document in Part 1 of the O and M Manual.

1.06 PROJECT RECORD DOCUMENTS

A. The Project Record Documents shall consist of the following:


B. Maintain on-site throughout the construction period, one set of the project record documents and record actual revisions to the work on these documents. Project record documents and recordings specified below may be kept in electronic format with on-site access and with off-site weekly backup.

1. Store Record Documents separate from documents used for construction.

2. Record information concurrent with construction progress.

3. Project Manual: Legibly mark, cloud and flag Project Manual changes and include a description of actual Products installed, including the following:
   a. Manufacturer's name and product model and number.
   b. Product substitutions or alternates utilized.
   c. Changes made by Addenda and Change Order.

4. Contract Drawings: Legibly mark, cloud and flag each item to record actual construction including:
   a. Measured location of internal utilities concealed in construction, referenced to visible and accessible features of the work.
   b. Field changes of dimensions and detail.
c. Details not on original Contract Drawings.

d. Transcribe Addenda to Project Record Documents.

e. Transcribe Change Orders to Project Record Documents.

C. Prior to contract closeout, prepare and deliver record documents to Owner as follows:

1. Project Record Drawings: One photocopy set of Drawings legibly marked in red ink to show revisions and changes made during construction and as-built conditions. Mark or stamp bottom of each sheet “As-Built Drawings, Name of Construction Company, Date”

   a. Digital Copy: Provide a digital copy of each sheet of the Project Record Drawings on a 4-1/2 inch compact disc or USB compatible flash/thumb drive in PDF format.

2. Project Record Manual: One copy of Project Manual (in good, clean condition) legibly marked with red ink to record construction changes and as-built conditions.

   a. Digital Copy: Provide a digital copy of each sheet of the Project Record Manual on a 4-1/2 inch compact disc or USB compatible flash drive in PDF format.

3. A copy of each addendum and each change order in three-ring binder(s) (match binders specified for Operations and Maintenance Data), 4-1/2 inch compact disc, or USB compatible flash drive in PDF format. Include the Field Authorizations and / or Change Order Proposals directly behind each Change Order. Insert a labeled, tabbed divider for each Addendum and Change Order. Label front cover and spine of binder as follows:

   Record Addendums and Change Orders
   
   Project Name – City of Tacoma
   
   Prepared by (Name of Contractor and Date)

1.07 AHJ APPROVED PERMIT DRAWING SET

A. Transmit the AHJ approved Permit Set of drawings to the Owner for their permanent record.

B. Maintain Permit Set of drawings in good, clean condition, protect from damage or marks.
1.08 OPERATION AND MAINTENANCE DATA

A. Submit three (3) sets, on 8-1/2 x 11 inch text pages, bound in black three ring binders and in also in PDF electronic format. Binders shall have heavy-duty durable vinyl covers, heavy duty metal D-rings with cover label on front and on spine. All binders shall be same manufacturer, size and color where more than one binder is required.

B. Prepare binder cover labels with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, year project completed, and volume number and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers similar to Avery PI Series dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified. Type on 30 lb. white paper.

E. Part 1: Directory, listing names, addresses, and telephone numbers of Architect / Engineer, Contractor, Subcontractors, and major equipment suppliers. Name and signature of Owner’s representatives instructed in operation of equipment. Extra parts listing with signature of Owner’s representative acknowledging receipt.

F. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category identify names, addresses and telephone numbers of Subcontractors and suppliers. Identify the following:

1. Significant design criteria.
2. List of equipment.
3. Parts list for each component.
4. Operating instructions.
5. Maintenance instructions for equipment and systems.
6. Maintenance instructions for special finishes, including recommended cleaning methods and materials and any special precautions.

G. Part 3: Project documents, certificates, and test reports including the following:

1. Shop drawings and product data.
2. Certificate of Readiness
3. Certificates of completion of installation, prestart, and startup activities
4. Certificates required by specification sections.
5. Test reports
H. Submit one (1) draft copy of completed volumes in final form prior to Substantial Completion for review by Owner. These copies will be returned to Contractor with Owner comments. Revise content of documents as required by Owner comments.

I. Submit three (3) sets of the final revised volumes no later than the Substantial Completion date.

1.09 WARRANTIES

A. Execute and assemble warranty documents from Subcontractors, suppliers, and manufacturers.

B. Provide Table of Contents and assemble in one, three ring binder with durable plastic cover matching the binders provided for operation and maintenance data.

C. Submit at same time as operation and maintenance manuals.

D. For items of Work delayed beyond date of Project Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period for those items.

1.10 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to project site and place in location as directed. Obtain receipt signed by Owner's representative prior to final payment and include receipts in Part 1 of Operation and Maintenance binders.

1.11 PUNCH LIST

A. Upon completion of the Work, the Contractor shall walk-through each room / area of the Project and prepare a punch list of each item of work that is not completed or does not conform to the requirements of the Contract Documents.

B. After completion of the punch list by the Contractor, provide written notice that the Work has been substantially completed and schedule a room by room punch list walk-through with the Architect or Engineer and Owner to review the finished work and Contractor’s punch list items.

1. Any additional items of uncompleted or unacceptable work that are found during this walk-through shall be added onto the Punch List for completion / correction.
PART 2 - PRODUCTS Not Used

PART 3 - EXECUTION Not Used

END OF SECTION
SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

B. Commissioning is systematic processes to provide documented confirmation that building systems perform according to the criteria set forth in the design intent and satisfy the owner’s operational needs. This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance and the warranty period with actual verification of performance. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment startup, control system calibration, testing and balancing, performance testing and training.

C. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:

1. Verify that applicable equipment and systems are installed according to the manufacturer’s recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
2. Verify and document proper performance of equipment and systems.
3. Verify that O&M documentation left on site is complete.
4. Verify that the Owner’s operating personnel are adequately trained.

D. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

E. Abbreviations. The following are common abbreviations used in the Specifications and in the Commissioning Plan. Definitions are found in Section 1.3.

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<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>A/E-</td>
<td>Architect and design engineers</td>
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<td>CxA-</td>
<td>Commissioning authority</td>
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<td>CC</td>
<td>Controls contractor</td>
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<td>CM-</td>
<td>Construction Manager</td>
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<td>Cx Plan-</td>
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<td>GC-</td>
<td>General contractor (prime)</td>
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<td>MC-</td>
<td>Mechanical contractor</td>
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<tr>
<td>OR-</td>
<td>Owner’s Representative</td>
</tr>
<tr>
<td>PC-</td>
<td>Construction checklist</td>
</tr>
<tr>
<td>PM-</td>
<td>Project manager (of the Owner)</td>
</tr>
<tr>
<td>Subs-</td>
<td>Subcontractors to General</td>
</tr>
</tbody>
</table>

GENERAL COMMISSIONING REQUIREMENTS
F. Related Sections:

1. Division 22 Section "Commissioning of Plumbing" for commissioning process activities for plumbing systems, assemblies, equipment, and components.

2. Division 23 Section "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.

3. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.

1.3 DEFINITIONS

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

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

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

D. **BoD:** Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

E. **CxA:** Commissioning Authority. An independent agent, not otherwise associated with the A/E team members or the Contractor, hired by the Owner. The CxA directs and coordinates the day-to-day commissioning activities. The CxA does not take an oversight role like the CM. The CxA is part of the Construction Manager (CM) team or shall report directly to the CM.

F. **Cx Plan:** Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

G. **Datalogging:** Monitoring flows, currents, status, pressures, etc. of equipment using stand-alone dataloggers separate from the control system.

H. **Deferred Functional Tests:** FTs that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions that disallow the test from being performed.
1. **Deficiency**: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).

2. **Design Intent**: A dynamic document that provides the explanation of the ideas, concepts and criteria that are considered to be very important to the owner. It is initially the outcome of the programming and conceptual design phases.

3. **Design Narrative or Design Documentation**: Sections of either the Design Intent or Basis of Design.

4. **Factory Testing**: Testing of equipment on-site or at the factory by factory personnel with an Owner’s representative present.

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

6. **General Contractor (GC)**: The prime contractor for this project. Generally refers to all the GC’s subcontractors as well. Also referred to as the Contractor, in some contexts.

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

8. **Manual Test**: Using hand-held instruments, immediate control system readouts or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the “observation”).

9. **Monitoring**: The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of control systems.

10. **Non-Compliance**: See Deficiency.

11. **Non-Conformance**: See Deficiency.

12. **Over-written Value**: Writing over a sensor value in the control system to see the response of a system (e.g., changing the outside air temperature value from 50F to 75F to verify economizer operation). See also “Simulated Signal.”
U. **OPR**: Owner’s Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

V. **Construction Checklist (PC)**: A list of items to inspect and elementary component tests to conduct to verify proper installation of equipment, provided by the CxA to the Sub. Construction checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some construction checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three phase pump motor of a chiller system). The word construction refers to before functional testing. Construction checklists augment and are combined with the manufacturer’s start-up checklist. Even without a commissioning process, contractors typically perform some, if not many, of the construction checklist items a commissioning authority will recommend. However, few contractors document in writing the execution of these checklist items. Therefore, for most equipment, the contractors execute the checklists on their own. The commissioning authority only requires that the procedures be documented in writing, and does not witness much of the construction checklisting, except for larger or more critical pieces of equipment.

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

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

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

Z. **Simulated Signal**: Disconnecting a sensor and using a signal generator to send an amperage, resistance or pressure to the transducer and DDC system to simulate a sensor value.

AA. **Systems, Subsystems, Equipment, and Components**: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

BB. **Startup**: The initial starting or activating of dynamic equipment, including executing construction checklists.

CC. **Subs**: The subcontractors to the GC who provide and install building components and systems.

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

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

FF. **Trending**: Monitoring using the building control system.

GG. **Vendor**: Supplier of equipment.
HH. **Warranty Period:** Warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

### 1.4 COORDINATION

A. **Commissioning Team.** The members of the commissioning team consist of the Commissioning authority (CxA), the Owner's Representative (OR), the designated representative of the owner's Construction Management firm (CM), the General Contractor (GC or Contractor), the architect and design engineers (particularly the mechanical engineer), the Mechanical Contractor (MC), the Electrical Contractor (EC), the TAB representative, the Controls Contractor (CC), any other installing subcontractors or suppliers of equipment. If known, the Owner's building or plant operator/engineer is also a member of the commissioning team.

B. **Management.** The CxA is hired by the Owner directly. The CxA directs and coordinates the commissioning activities and the reports to the OR. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

C. **Scheduling.** The CxA will work with the CM and GC according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CM and GC for scheduling commissioning activities. The GC will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

D. The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The *Commissioning Plan—Construction Phase* provides a format for this schedule. As construction progresses more detailed schedules are developed by the CxA. The Commissioning Plan also provides a format for detailed schedules.

### 1.5 COMMISSIONING PROCESS

A. **Commissioning Plan.** The *Commissioning Plan*, provided as part of the bid documents, is binding on the Contractor. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CxA will update the plan which is then considered the "final" plan, though it will continue to evolve and expand as the project progresses. The *Specifications* will take precedence over the *Commissioning Plan*.

B. **Commissioning Process.** The following narrative provides a brief overview of the typical commissioning tasks during construction and the general order in which they occur.

1. Commissioning during construction begins with a scoping meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members.
2. Additional meetings will be required throughout construction, scheduled by the CxA with necessary parties attending, to plan, scope, coordinate, schedule future activities and resolve problems.
3. Equipment documentation is submitted to the CxA during normal submittals, including detailed start-up procedures.
4. The CxA works with the Subs in developing startup plans and startup documentation formats, including providing the Subs with construction checklists to be completed, during the startup process.

5. In general, the checkout and performance verification proceeds from simple to complex; from component level to equipment to systems and intersystem levels with construction checklists being completed before functional testing.

6. The Subs, under their own direction, execute and document the construction checklists and perform startup and initial checkout. The CxA documents that the checklists and startup were completed according to the approved plans. This may include the CxA witnessing start-up of selected equipment.

7. The CxA develops specific equipment and system functional performance test procedures. The Subs review the procedures.

8. The procedures are executed by the Subs, under the direction of, and documented by the CxA.

9. Items of non-compliance in material, installation or setup are corrected at the Sub’s expense and the system retested.

10. The CxA reviews the O&M documentation for completeness.

11. Commissioning is completed before Substantial Completion.

12. The CxA reviews, pre-approves and coordinates the training provided by the Subs and verifies that is was completed.

13. Deferred testing is conducted, as specified or required.

1.6 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, the Construction Manager (CM) and representatives of the Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.

2. Representatives of the facility user and operation and maintenance personnel.

3. The Owners Representative.

4. Architect and engineering design professionals.

1.7 OWNER’S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.
C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

D. Follow the Commissioning Plan.

E. Attend commissioning scoping meetings and additional meetings as necessary.

1.8 OWNERS REPRESENTATIVE’S RESPONSIBILITIES

A. The Owner’s Representative OR shall represent the Owner during the commissioning process as follows:

1. Manage the contract of the A/E, CxA, CM and Contractor.
2. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions according to the Commissioning Plan – Construction Phase.
3. Provide final approval for the completion of the commissioning work.
4. Ensure that any seasonal or deferred testing and any deficiency issues are addressed.
5. Follow the Commissioning Plan.
6. Attend commissioning scoping meetings and additional meetings as necessary.

1.9 ARCHITECT/ENGINEERS (AE) RESPONSIBILITIES

A. The AE shall participate in and perform commissioning process activities including, but not limited to, the following:

1. Attend the commissioning scoping meeting and selected commissioning team meetings.
2. Perform normal submittal review, construction observation, as-built drawing preparation, O&M manual preparation, etc., as contracted.
3. Provide any design narrative and sequence documentation requested by the CxA. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.
4. Coordinate resolution of system deficiencies identified during commissioning, according to the contract documents.
5. Prepare and submit final as-built design intent documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.
6. Coordinate resolution of design non-conformance and design deficiencies identified during warranty-period commissioning.
7. Participate in the resolution of non-compliance, non-conformance and design deficiencies identified during commissioning during warranty-period commissioning.

1.10 CONSTRUCTION MANAGER’S (CM) RESPONSIBILITIES

A. The construction manager shall participate in and perform commissioning process activities including, but not limited to the following:
1. Facilitate the coordination of the commissioning work by the CxA, and, with the GC and CxA, ensure that commissioning activities are being scheduled into the master schedule.

2. Review and approve the final Commissioning Plan—Construction Phase.

3. Attend a commissioning scoping meeting and other commissioning team meetings.

4. Perform the normal review of Contractor submittals.

5. Furnish a copy of all construction documents, addenda, requests for information, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.

6. Review and approve the functional performance test procedures submitted by the CxA, prior to testing.

7. Review commissioning progress and deficiency reports.

8. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.


10. Attend commissioning scoping meetings and additional meetings as necessary.

1.11 CONTRACTOR’S RESPONSIBILITIES

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.

3. Attend commissioning team meetings held on a monthly basis.

4. Integrate and coordinate commissioning process activities with construction schedule.

5. Review commissioning progress and deficiency reports.

6. Review and accept construction checklists provided by the CxA.

7. Complete paper or electronic construction checklists as Work is completed and provide to the CxA on a weekly basis.

8. Review and accept commissioning process test procedures provided by the Commissioning Authority.


10. Include the cost of commissioning in the total contract price.

11. Coordinate the training of Owner personnel and provide the times and dates of training to the CxA.

12. Execute seasonal or deferred functional performance testing witnessed by the CxA to facilitate the Cx process.

13. Provide a list of final settings, setpoints, ranges, schedules, and / or trend logs required by the CxA.

14. Follow the Commissioning Plan.

15. Attend commissioning scoping meetings and additional meetings as necessary.

16. From the red-line drawings, edit and update one-line diagrams developed as part of the design narrative documentation and those provided by the vendor as shop drawings for the chilled and hot water, condenser water, domestic water, steam and condensate systems; supply, return and exhaust air systems and emergency power system.
1.12  **SUB CONTRACTOR'S RESPONSIBILITIES**

A. Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Prime.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CxA.
4. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
5. Review test procedures for equipment installed by factory representatives.
6. Follow the Commissioning Plan.
7. Attend commissioning scoping meetings and additional meetings as necessary.

1.13  **EQUIPMENT SUPPLIERS RESPONSIBILITIES**

A. The equipment suppliers shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Subs.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone datalogging equipment that may be used by the CxA.
4. Through the contractors they supply products to, analyze specified products and verify that the designer has specified the newest most updated equipment reasonable for this project’s scope and budget.
5. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
6. Review test procedures for equipment installed by factory representatives.
7. Follow the Commissioning Plan.
8. Attend commissioning scoping meetings and additional meetings as necessary.

1.14  **CxA'S RESPONSIBILITIES**

A. The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving non-conformance or deficiencies, but ultimately that responsibility resides with the general contractor and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document performance—that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, check-out
and functionally test equipment and systems, except for specified testing with portable data-loggers, which shall be supplied and installed by the CxA.

1. Coordinates and directs the commissioning activities using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
2. Coordinate the commissioning work and, with the GC and CM, ensure that commissioning activities are being scheduled into the master schedule.
3. Revise, as necessary, the Commissioning Plan—Construction Phase.
4. Plan and conduct a commissioning scoping meeting and other commissioning meetings.
5. Request and review additional information required to perform commissioning tasks, including O&M materials, contractor start-up and checkout procedures.
6. Before startup, gather and review the current control sequences and interlocks and work with contractors and design engineers until sufficient clarity has been obtained, in writing, to be able to write detailed testing procedures.
7. Review and comment on normal Contractor submittals applicable to systems being commissioned for compliance with commissioning needs, concurrent with the A/E reviews.
8. Write and distribute construction tests and checklists.
9. Develop an enhanced start-up and initial systems checkout plan with Subs.
10. Perform site visits, as necessary, to observe component and system installations. Attends selected planning and job-site meetings to obtain information on construction progress. Review construction meeting minutes for revisions/substitutions relating to the commissioning process. Assist in resolving any discrepancies.
11. Witness all or part of the HVAC piping test and flushing procedure, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify owner's representative of any deficiencies in results or procedures.
12. Witness all or part of any ductwork testing and cleaning procedures, sufficient to be confident that proper procedures were followed. Document this testing and include the documentation in O&M manuals. Notify owner's representative of any deficiencies in results or procedures.
13. Approve construction tests and checklist completion by reviewing construction checklist reports and by selected site observation and spot checking.
14. Approve systems startup by reviewing start-up reports and by selected site observation.
15. Review TAB execution plan.
16. Oversee sufficient functional testing of the control system and approve it to be used for TAB, before TAB is executed.
17. Approve air and water systems balancing by spot testing, by reviewing completed reports and by selected site observation.
18. With necessary assistance and review from installing contractors, write the functional performance test procedures for equipment and systems. This may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing. Submit to CM for review, and for approval if required.
20. Coordinate, witness and approve manual functional performance tests performed by installing contractors. Coordinate retesting as necessary until satisfactory performance is achieved.
21. Maintain a master deficiency and resolution log and a separate testing record. Provide the CM with written progress reports and test results with recommended actions.
22. Witness performance testing of smoke control systems by others and all other owner contracted tests or tests by manufacturer’s personnel over which the CxA may not have direct control. Document these tests and include this documentation in Commissioning Record in O&M manuals.
23. Review equipment warranties to ensure that the Owner’s responsibilities are clearly defined.
24. Oversee and approve the training of the Owner’s operating personnel.
25. Compile and maintain a commissioning record and building systems book(s).
26. Review and approve the preparation of the O&M manuals.
27. Provide a final commissioning report.
28. Coordinate and supervise required seasonal or deferred testing and deficiency corrections.
29. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

1.15 SYSTEMS TO BE COMMISSIONED

A. The following checked systems will be commissioned in this project.

<table>
<thead>
<tr>
<th>Equipment and System</th>
<th>Equipment and System</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HVAC System</strong></td>
<td><strong>Electrical System</strong></td>
</tr>
<tr>
<td>X Fan Coil Units</td>
<td>X Sweep or scheduled lighting controls</td>
</tr>
<tr>
<td>X Exhaust Fans</td>
<td>X Daylight dimming controls</td>
</tr>
<tr>
<td>X Energy Recovery Ventilators</td>
<td>X Lighting Controls</td>
</tr>
<tr>
<td>X Condensing Units</td>
<td><strong>Other</strong></td>
</tr>
<tr>
<td>X Ductwork</td>
<td>X Domestic water heaters</td>
</tr>
<tr>
<td>X Testing, Adjusting and Balancing work</td>
<td></td>
</tr>
<tr>
<td>X HVAC control system</td>
<td></td>
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</tbody>
</table>
PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. Two-way radios shall be provided by the Division Contractor.

B. Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone datalogging equipment that may be used by the CxA.

C. Datalogging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

E. Refer to Section 019113, Part 3.6 E for details regarding equipment that may be required to simulate required test conditions.

PART 3 - EXECUTION

3.1 MEETINGS

A. Scoping Meeting. Within 90 days of commencement of construction, the CxA will schedule, plan and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the CxA. Information gathered from this meeting will allow the CxA to revise the Commissioning Plan to its “final” version, which will also be distributed to all parties.

B. Miscellaneous Meetings. Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with particular Subs. The CxA will plan these meetings and will minimize unnecessary time being spent by Subs. These meetings may be held monthly, until the final 3 months of construction when they may be held as frequently as one per week.
3.2 REPORTING

A. The CxA will provide regular reports to the CM and OR, with increasing frequency as construction and commissioning progresses. Standard forms are provided and referenced in the Commissioning Plan.

B. The CxA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

C. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.

D. A final summary report (about four to six pages, not including backup documentation) by the CxA will be provided to the CM and OR, focusing on evaluating commissioning process issues and identifying areas where the process could be improved. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report. Construction checklists, functional tests and monitoring reports will not be part of the final report, but will be stored in the Commissioning Record in the O&M manuals.

3.3 SUBMITTALS

A. The CxA will provide appropriate contractors with a specific request for the type of submittal documentation the CxA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer's printed installation and detailed start-up procedures, full sequences of operation, O&M data, performance data, any performance test procedures, control drawings and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning authority. All documentation requested by the CxA will be included by the Subs in their O&M manual contributions.

1. Requested Submittals:
   a. Building Automation Systems (including graphic submittal)
   b. Domestic Water Heaters
   c. Domestic Hot Water Piping Insulation
   d. Energy Recovery Ventilators
   e. Exhaust Fans
   f. Lighting Controls
   g. Testing, Adjusting, and Balancing
   h. VRF Fan Coil Units

2. Requested Shop Drawings:
   a. Building Distribution Piping
   b. Building Automation System
   c. Ductwork
   d. Lighting Control System

B. The Commissioning authority will review and provide comment on submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the
commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review is intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The Commissioning authority will notify the CM, Owner Representative, or A/E as requested, of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

C. The CxA may request additional design narrative from the A/E and Controls Contractor, depending on the completeness of the design intent documentation and sequences provided with the Specifications.

D. These submittals to the CxA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor, though the CxA will review and approve them.

E. Contractor’s responsibility for deviations in submittals from requirements of the Contract Documents is not relieved by the Commissioning Authority’s review.

3.4 START-UP, CONSTRUCTION CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment to be commissioned, according to Section 1.13, Systems to be Commissioned. Some systems that are not comprised so much of actual dynamic machinery, e.g., electrical system power quality, may have very simplified PCs and startup.

B. General. Construction checklists are important to ensure that the equipment and systems are hooked up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full construction checkout. No sampling strategies are used. The construction testing for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Start-up and Initial Checkout Plan. The CxA shall assist the commissioning team members responsible for startup of any equipment in developing detailed start-up plans for all equipment. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. Parties responsible for construction checklists and startup are identified in the commissioning scoping meeting and in the checklist forms. Parties responsible for executing functional performance tests are identified in the testing requirements in Sections 220800, 230800, and 260800.

1. Checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.
2. These checklists and tests are provided by the CxA to the Contractor. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks and notes that trade on the form. Each form will have more than one trade responsible for its execution.
3. The subcontractor responsible for the purchase of the equipment develops the full start-up plan by combining (or adding to) the CxA’s checklists with the manufacturer’s detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The plan will include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and
a summary statement with a signature block at the end of the plan. The full start-up plan could consist of something as simple as:

a. The CxA’s construction checklists.
b. The manufacturer’s standard written start-up procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
c. The manufacturer’s normally used field checkout sheets.

4. The subcontractor submits the full startup plan to the CxA for review and approval.
5. The CxA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
6. The full start-up procedures and the approval form may be provided to the CM for review and approval, depending on management protocol.

D. Sensor and Actuator Calibration.

1. All field-installed temperature, relative humidity, CO, CO2 and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described below. Alternate methods may be used, if approved by the Owner before-hand. All test instruments shall have had a certified calibration within the last 12 months. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

2. All procedures used shall be fully documented on the construction checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.


a. All Sensors. Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable, are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2°F of each other for temperature and within a tolerance equal to 2% of the reading, of each other, for pressure. Tolerances for critical applications may be tighter.

b. Sensors Without Transmitters--Standard Application. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gage or building automation system (BAS)) is within the tolerances in the table below of the instrument-measured value. If not, install offset in BAS, calibrate or replace sensor.

c. Sensors With Transmitters--Standard Application. Disconnect sensor. Connect a signal generator in place of sensor. Connect ammeter in series between transmitter and BAS control panel. Using manufacturer’s resistance-temperature data, simulate minimum desired temperature. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the BAS. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction. Reconnect sensor. Make a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gage or building automation system (BAS)) is within the tolerances in the table below of the instrument-measured value. If not, replace...
sensor and repeat. For pressure sensors, perform a similar process with a suitable signal generator.

d. Critical Applications. For critical applications (process, manufacturing, etc.) more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.

Tolerances, Standard Applications

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Required Tolerance (±/-)</th>
<th>Required Tolerance (±/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling coil, chilled and condenser</td>
<td>0.4F</td>
<td>Flow rates, water</td>
</tr>
<tr>
<td>Water temps</td>
<td>2.0F</td>
<td>Relative humidity</td>
</tr>
<tr>
<td>AHU wet bulb or dew point</td>
<td>1.5F</td>
<td>Combustion flue temps</td>
</tr>
<tr>
<td>Hot water coil and boiler water temp</td>
<td>0.4F</td>
<td>Oxygen or CO₂ monitor</td>
</tr>
<tr>
<td>Outside air, space air, duct air temps</td>
<td>1% of design</td>
<td>CO monitor</td>
</tr>
<tr>
<td>Watthour, voltage &amp; amperage</td>
<td>3% of design</td>
<td>Natural gas and oil flow rate</td>
</tr>
<tr>
<td>Pressures, air, water and gas</td>
<td>10% of design</td>
<td>Steam flow rate</td>
</tr>
</tbody>
</table>

4. Valve and Damper Stroke Setup and Check.

a. EMS Readout. For all valve and damper actuator positions checked, verify the actual position against the BAS readout.

b. Set pumps or fans to normal operating mode. Command valve or damper closed, visually verify that valve or damper is closed and adjust output zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn’t reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

5. Closure for heating coil valves (NO): Set heating setpoint 20°F above room temperature. Observe valve open. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set heating setpoint to 20°F below room temperature. Observe the valve close. For pneumatics, by override in the EMS, increase pressure to valve by 3 psi (do not exceed actuator pressure rating) and verify valve stem and actuator position does not change. Restore to normal.

6. Closure for cooling coil valves (NC): Set cooling setpoint 20°F above room temperature. Observe the valve close. Remove control air or power from the valve and verify that the valve stem and actuator position do not change. Restore to normal. Set cooling setpoint to 20°F below room temperature. Observe valve open. For pneumatics, by override in the EMS, increase pressure to valve by 3 psi (do not exceed actuator pressure rating) and verify valve stem and actuator position does not change. Restore to normal.

E. Execution of Construction Checklists and Startup.
1. Four weeks prior to startup, the Subs and vendors schedule startup and checkout with the CM, GC and CxA. The performance of the construction checklists, startup and checkout are directed and executed by the Sub or vendor. When checking off construction checklists, signatures may be required of other Subs for verification of completion of their work.

2. The CxA shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, (in which case a sampling strategy may be used as approved by the CM). In no case will the number of units witnessed be less than four on any one building, nor less than 20% of the total number of identical or very similar units.

3. For lower-level components of equipment, (e.g., VAV boxes, sensors, controllers), the CxA shall observe a sampling of the construction and start-up procedures. The sampling procedures are identified in the commissioning plan.

4. The Subs and vendors shall execute startup and provide the CxA with a signed and dated copy of the completed start-up and construction tests and checklists.

5. Only individuals that have direct knowledge and witnessed that a line item task on the construction checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

F. Deficiencies, Non-Conformance and Approval in Checklists and Startup.

1. The Subs shall clearly list any outstanding items of the initial start-up and construction procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies are provided to the CxA within two days of test completion.

2. The CxA reviews the report and submits either a non-compliance report or an approval form to the Sub or CM. The CxA shall work with the Subs and vendors to correct and retest deficiencies or uncompleted items. The CxA will involve the CM and others as necessary. The installing Subs or vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, and shall notify the CxA as soon as outstanding items have been corrected and resubmit an updated start-up report and a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CxA recommends approval of the execution of the checklists and startup of each system to the CM using a standard form.

3. Items left incomplete, which later cause deficiencies or delays during functional testing may result in back charges to the responsible party. Refer to Part 3.7 herein for details.

3.5 PHASED COMMISSIONING

A. The project will not require startup and initial checkout to be executed in phases.

3.6 FUNCTIONAL PERFORMANCE TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.

B. The general list of equipment to be commissioned is found in Section 019113, Part 1.13. The specific equipment and modes to be tested are found in Sections 239951, and 269951.

C. The parties responsible to execute each test are listed with each test in Sections 220800, 230800, and 260800.
D. Objectives and Scope. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

1. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested. Specific modes required in this project are given in Division 22, 23, and 26.

2. Development of Test Procedures. Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. The CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Sub or vendor responsible to execute a test, shall provide limited assistance to the CxA in developing the procedures review (answering questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment and warranty protection. The CxA may submit the tests to the A/E for review, if requested.

3. The CxA shall review owner-contracted, factory testing or required owner acceptance tests which the CxA is not responsible to oversee, including documentation format, and shall determine what further testing or format changes may be required to comply with the Specifications. Redundancy of testing shall be minimized.

4. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

5. The test procedure forms developed by the CxA shall include (but not be limited to) the following information:

   a. System and equipment or component name(s)
   b. Equipment location and ID number
   c. Unique test ID number, and reference to unique construction checklist and start-up documentation ID numbers for the piece of equipment
   d. Date
   e. Project name
   f. Participating parties
   g. A copy of the specification section describing the test requirements
   h. A copy of the specific sequence of operations or other specified parameters being verified
   i. Formulas used in any calculations
   j. Required pre-test field measurements
   k. Instructions for setting up the test.
   l. Special cautions, alarm limits, etc.
   m. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format
n. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
o. A section for comments
p. Signatures and date block for the CxA

E. Test Methods.

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system’s trend log capabilities or by stand-alone dataloggers. The CxA may substitute specified methods or require an additional method to be executed, other than what was specified, with the approval of the CM. This may require a change order and adjustment in charge to the Owner. The CxA will determine which method is most appropriate for tests that do not have a method specified.

2. Simulated Conditions. Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.

3. Overwritten Values. Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

4. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.

5. Altering Setpoints. Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the AC compressor lockout work at an outside air temperature below 55F, when the outside air temperature is above 55F, temporarily change the lockout setpoint to be 2F above the current outside air temperature.

6. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification is completed during construction testing.

7. Setup. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Sub executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Sub shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.

8. Sampling. Multiple identical pieces of non-life-safety or otherwise non-critical equipment may be functionally tested using a sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not
constitute a difference. It is noted that no sampling by Subs is allowed in construction checklist execution.

a. A common sampling strategy referenced in the Specifications as the "xx% Sampling—yy% Failure Rule" is defined by the following example.

\[ xx = \text{the percent of the group of identical equipment to be included in each sample.} \]

\[ yy = \text{the percent of the sample that if failing, will require another sample to be tested.} \]

b. The example below describes a 20% Sampling—10% Failure Rule.

1) Randomly test at least 20% (xx) of each group of identical equipment. In no case test less than three units in each group. This 20%, or three, constitute the "first sample."
2) If 10% (yy) of the units in the first sample fail the functional performance tests, test another 20% of the group (the second sample).
3) If 10% of the units in the second sample fail, test all remaining units in the whole group.
4) If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the CxA may stop the testing and require the responsible Sub to perform and document a checkout of the remaining units, prior to continuing with functionally testing the remaining units.

F. **Coordination and Scheduling.** The Subs shall provide sufficient notice to the CxA regarding their completion schedule for the construction checklists and startup of all equipment and systems. The CxA will schedule functional tests through the CM, GC and affected Subs. The CxA shall direct, witness and document the functional testing of all equipment and systems. The Subs shall execute the tests.

1. In general, functional testing is conducted after construction testing and startup has been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems is checked.

G. **Test Equipment.** Refer to Section 019113, Part 2 for test equipment requirements.

H. **Problem Solving.** The CxA will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the GC, Subs and A/E.

3.7 **DOCUMENTATION, NON-CONFORMANCE AND APPROVAL OF TESTS**

A. **Documentation.** The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the CM for review and approval and to the Subs for review. The CxA will include the filled out forms in the O&M manuals.
B. Non-Conformance.

1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the CM on a standard non-compliance form.

2. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.

3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the CM.

4. As tests progress and a deficiency is identified, the CxA discusses the issue with the executing contractor.

   a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:

      1) The CxA documents the deficiency and the Sub’s response and intentions and they go on to another test or sequence. After the day’s work, the CxA submits the non-compliance reports to the CM for signature, if required. A copy is provided to the Sub and CxA. The Sub corrects the deficiency, signs the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and sends it back to the CxA.

      2) The CxA reschedules the test and the test is repeated.

   b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible:

      1) The deficiency shall be documented on the non-compliance form with the Sub’s response and a copy given to the CM and to the Sub representative assumed to be responsible.

      2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Project Manager.

      3) The CxA documents the resolution process.

      4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.

5. Cost of Retesting.

   a. The cost for the Sub to retest a construction or functional test, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for retesting costs shall be negotiated with the GC.

   b. For a deficiency identified, not related to any construction checklist or start-up fault, the following shall apply: The CxA and CM will direct the retesting of the equipment once at no “charge” to the GC for their time. However, the CxA’s and
CM’s time for a second retest will be charged to the GC, who may choose to recover costs from the responsible Sub.

c. The time for the CxA and CM to direct any retesting required because a specific construction checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be backcharged to the GC, who may choose to recover costs from the party responsible for executing the faulty construction test.

d. Refer to the sampling section of Section 019113, Part 3.6 for requirements for testing and retesting identical equipment.

6. The Contractor shall respond in writing to the CxA and CM at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.

7. The CxA retains the original non-conformance forms until the end of the project.

8. Any required retesting by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the prime contractor.

C. Failure Due to Manufacturer Defect. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the CM or OR. In such case, the Contractor shall provide the Owner with the following:

1. Within one week of notification from the CM or OR, the Contractor or manufacturer’s representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CM or OR within two weeks of the original notice.

2. Within two weeks of the original notification, the Contractor or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

3. The CM or OR will determine whether a replacement of all identical units or a repair is acceptable.

4. Two examples of the proposed solution will be installed by the Contractor and the CM will be allowed to test the installations for up to one week, upon which the CM or OR will decide whether to accept the solution.

5. Upon acceptance, the Contractor and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA and by the CM, if necessary. The CxA recommends acceptance of each test to the CM using a standard form. The CM gives final approval on each test using the same form, providing a signed copy to the CxA and the Contractor.

3.8 DEFERRED TESTING

A. Unforeseen Deferred Tests. If any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and
functional testing may be delayed upon approval of the OR. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

B. **Seasonal Testing.** During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system’s design) shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate Subs, with facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-builds due to the testing will be made.

### 3.9 TRAINING OF OWNER PERSONNEL

A. The CM shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

B. The CxA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

1. The CxA shall interview the facility manager and lead engineer to determine the special needs and areas where training will be most valuable. The Owner and CxA shall decide how rigorous the training should be for each piece of commissioned equipment. The CxA shall communicate the results to the Subs and vendors who have training responsibilities. In addition to these general requirements, the specific training requirements of Owner personnel by Subs and vendors is specified in Division 22, 23, and 26.

2. Each Sub and vendor responsible for training will submit a written training plan to the CxA for review and approval prior to training. The plan will cover the following elements:
   a. Equipment (included in training)
   b. Intended audience
   c. Location of training
   d. Objectives
   e. Subjects covered (description, duration of discussion, special methods, etc.)
   f. Duration of training on each subject
   g. Instructor for each subject
   h. Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.)
   i. Instructor and qualifications
   j. For the primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.

3. The CxA develops an overall training plan and coordinates and schedules, with the CM and GC, the overall training for the commissioned systems. The CxA develops criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CxA recommends approval of the training to the CM using a standard form. The CM also signs the approval form at one of the training sessions, the CxA presents a one hour presentation discussing the use of the blank functional test forms for re-commissioning equipment. Video recording of the training sessions will be provided by the Trade Contractor with media cataloged by the CxA and added to the O&M manuals.
4. The mechanical design engineer shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall be one to two hours in length and include a review of all systems using the simplified system schematics (one-line drawings) including chilled water systems, condenser water or heat rejection systems, heating systems, fuel oil and gas supply systems, supply air systems, exhaust system and outside air strategies.

3.10 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals.

1. The specific content and format requirements for the standard O&M manuals are detailed in Section 017823.

2. Contractor shall submit two draft copies of the complete operating and maintenance manual to the CM for review by the architect/engineer and CxA within 60 calendar days after review of equipment shop drawings. One copy will be returned to the contractor within 30 days after receipt by the A/E.

3. Contractor shall submit corrected final approved manuals prior to substantial completion. Prior to final submittal, the CxA shall review the O&M manuals (in addition to the initial draft O&M manual), and documentation, with redline as-builds, for systems that were commissioned to verify compliance with the specifications. The CxA will communicate, through the CM, deficiencies in the manuals to the contractor or A/E, as requested. Upon a successful review of the corrections, the CxA will recommend approval and acceptance of these sections of the O&M manuals to the CM. The CxA will also review each equipment warranty and verify that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E’s review of the O&M manuals according to the A/E’s contract.

4. A/E Contribution. The A/E will include in the beginning of the O&M manuals a separate section describing the systems including:
   a. The design intent narrative prepared by the A/E and provided as part of the bid documents, updated to as-built status by the A/E.
   b. Simplified professionally drawn single line system diagrams on 8 ½” x 11” or 11” x 17” sheets. These shall include chillers, water system, condenser water system, heating system, supply air systems, exhaust systems and electrical distribution system. These shall show major pieces of equipment such as pumps, chillers, boilers, control valves, expansion tanks, coils, service valves, switchboards, motor control centers, panel boards, etc.

5. CxA Review and Approval. Prior to substantial completion, the CxA shall review the O&M manuals, documentation and redline as-builds for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the CM, OR or A/E, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the CM, OR or A/E. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E’s review of the O&M manuals according to the A/E’s contract.
B. Commissioning Record in O&M Manuals.

1. The CxA is responsible to compile, organize and index the following commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the GC, to be included with the O&M manuals. Three copies of the manuals will be provided. The format of the manuals shall be:

   Tab I-1 Commissioning Plan
   Tab I-2 Final Commissioning Report (see (B.2) below)
   Tab 01 System Type 1 (chiller system, packaged unit, boiler system, etc.)
      Sub-Tab A Design narrative and criteria, sequences, approvals for Equipment 1
      Sub-Tab B Startup plan and report, approvals, corrections, blank construction checklists
         Colored Separator Sheets—for each equipment type (fans, pumps, chiller, etc.)
      Sub-Tab C Functional tests (completed), trending and analysis, approvals and corrections, training plan, record and approvals, blank functional test forms and a recommended recommissioning schedule.
   Tab 02 System Type 2......repeat as per System 1

2. Final Report Details. The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas: 1) Equipment meeting the equipment specifications, 2) Equipment installation, 3) Functional performance and efficiency, 4) Equipment documentation and design intent, and 5) Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

3. Other documentation will be retained by the CxA

3.11 WRITTEN WORK PRODUCTS

A. The commissioning process generates a number of written work products described in various parts of the Specifications. The Commissioning Plan—Construction Phase, lists all the formal written work products, describes briefly their contents, who is responsible to create them, their due dates, who receives and approves them and the location of the specification to create them. In summary, the written products are:

<table>
<thead>
<tr>
<th>Product</th>
<th>Developed By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final commissioning plan</td>
<td>CxA</td>
</tr>
</tbody>
</table>
2. Cx meeting minutes CxA
3. Commissioning schedules CxA with GC and CM
4. Equipment documentation submittals Subs
5. Sequence clarifications Subs and A/E as needed
6. Construction checklists CxA
7. Startup and initial checkout plan Subs and CxA (compilation of existing documents)
8. Startup and initial checkout forms filled out Subs
9. Final TAB report TAB
10. Issues log (deficiencies) CxA
11. Commissioning Progress Record CxA
12. Deficiency reports CxA
13. Functional test forms CxA
14. Filled out functional tests CxA
15. O&M manuals Subs
16. Commissioning record book CxA
17. Overall training plan CxA and CM
18. Specific training agendas Subs
19. Final commissioning report CxA
20. Misc. approvals CxA

END OF SECTION 01 91 13
SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of building elements.

B. Utility Services and Mechanical/Electrical System.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section.

1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.03 SUBMITTALS

A. Qualification Data: For demolition contractor listing projects and references.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of partitions, barricades and fences.

2. Include procedures and coordination with other work in progress, a disconnection schedule of utility services, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

3. Identify demolition firm and submit qualifications.

4. Include a summary of safety procedures.

C. Engineering Survey.

D. Existing Condition Survey.

E. Shop Drawings: extents of demolition, locations of existing utilities, and locations of utility capping. Indicate structural members and elements that will be demolished.

F. Closeout Submittals: Accurately record actual locations of capped and active utilities and subsurface construction.
1.04 QUALITY ASSURANCE

A. Demolition Contractor Qualifications: Company specializing in selective demolition comparable in scope, environmental and historical sensitivity of work specified in this section with minimum 5 years’ experience.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Demolition of existing elements to accommodate tie-in of new work to existing conditions.

2.02 PERFORMANCE AND DESIGN CRITERIA

D. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
E. Storage or sale of removed items or materials on-site is not permitted.
F. 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.
G. Comply with governing EPA notification regulations before beginning selective demolition.
H. Comply with hauling and disposal regulations of authorities having jurisdiction.

2.03 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped before start of work.
B. Engage a professional engineer to perform an engineering survey to determine if removing indicated elements may result in a structural deficiency or unsafe condition during scope of work.

C. Perform a survey of existing conditions by use of measured drawings and preconstruction photographs.

D. It is not expected that hazardous materials will be encountered in the Work.
   1. 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.

3.02 PREPARATION

A. 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.

B. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Provide fire watch during hot work while sprinklers are offline.

3.03 SELECTIVE DEMOLITION OF BUILDING ELEMENTS

A. 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.

B. 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.

C. 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.

D. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

3.04 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition. Return adjacent areas to condition existing before selective demolition rations began.
B. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Dispose of all waste material in accordance with project's Waste Management Plan.

3.05 PROTECTION

A. Remove temporary barricades and protections where hazards no longer exist.

3.06 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. 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. Arrange to shut off utilities with utility companies.

2. If services/systems are required to be removed, relocated or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove the 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. Equipment to be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

END OF SECTION
SECTION 03 35 43

POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. (DC1) Polished concrete finish on existing cast-in-place concrete work.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section.
   1. Review preparation and installation procedures, and coordinating and scheduling required with related work.

1.03 SUBMITTALS

A. Qualification Data: For installer.

B. Samples: Submit two, 12 inch square samples, illustrating aggregate size, color and the extremes of color range.

C. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

1.04 QUALITY ASSURANCE

A. Installer's Qualifications:
   1. Certified Polished Concrete installer.
   2. Certified PCI or CSDA installer.

B. Perform Work in accordance with ACI 301 and ACI 303R.
   1. Maintain one copy of each document on project site.

1.05 MOCKUP

A. Construct in-place mockup comprised of one horizontal field sample panel, minimum 10 feet long by 10 feet wide. Use same techniques and equipment that will be used in permanent installation.
   1. Location: Coordinate location with Architect. Current proposed location is existing Break Room.
   2. Provide lighting equivalent to finished facility for polishing and examination.
3. Approved mockup may remain as part of the Work.
   a. If mockup is deemed unacceptable by Architect, Architect may propose a sheet flooring covering in lieu of polished concrete.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:
   1. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
   2. Keep materials from freezing.

C. Handling: Protect materials during handling and application to prevent contamination or damage.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Polished concrete finishing for cast in place concrete.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Wet Dynamic Coefficient of Friction (DCOF): Not less than 0.42 as tested in accordance with ANSI/NFSI B101.3 Wet DCOF of Common Hard-Surface Floor Materials.

B. Finished floor surface to have a minimum hardness rating of 6.5 Mohs (Hardness Pencil Test) in accordance with ASTM D3363.

2.03 MANUFACTURERS

A. Specification is based on RetroPlate Concrete Polishing System by CureCrete Distribution Inc., as provided by Diamond-S Polished Concrete Inc.

2.04 CONCRETE DENSIFIER / SEALER

A. Prosoco Consolideck LS.

B. Vexcon Certi-Shine Clear FSR Diamond Polished.

C. Lythic Densifier / Lythic SPD Protector.

D. Substitutions: See Section 01 25 00 - Substitution Procedures.
2.05 EQUIPMENT TO BE USED FOR INSTALLATION

A. Floor Grinder: Type: Multi-orbital, planetary-action, opposing-rotational, diamond-headed floor grinder.

B. Vacuum System: Ruwac / Ermator (or equivalent) model as determined by installer to perform required dust extraction during grinding and polishing of concrete floor.

   Diamond Tooling for Initial Grinding, and Preparing Floor for Polishing:

   1. 60-grit metal-bonded diamonds (or equivalent).

C. Diamond Tooling for Polishing Concrete:

   1. 800-grit resin-bonded diamonds (or equivalent).

2.06 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3  EXECUTION

3.01 EXAMINATION

A. Examine floor to receive polished concrete floor finish.

B. Notify Architect of conditions that would adversely affect installation or subsequent use.

C. Verify the Following for Concrete Floors:

   1. Floor Finish:

      a. Slabs and flatwork shall be placed and finished monolithically.
      b. Strike off and screed slabs to true, plane surfaces at required elevations.
      c. Thoroughly compact concrete with vibrators, floats, and tampers to force coarse aggregate below the surface.
      d. Power trowel with no hand finishing.
      e. Surface should not be burned or burnished due to excessive troweling.
      f. Imprints are not acceptable.

   2. Floor and Joints:

      a. Free of debris and excessive dirt, dust, clay, and mud.
b. Dry.

3. Concrete Adjacent to Floor Penetrations: Troweled flat and level with surrounding concrete.

4. Concrete Adjacent to Drains, clean-outs, etc: Finish level to the top of the structure.

3.02 PREPARATION

A. Protection: Protect surrounding areas and adjacent surfaces from the following:

1. Minimal accumulation of dust from grinding and polishing.

2. Contact with overspray of concrete densifier.

B. Surface Preparation: Prepare surfaces in accordance with installer's instructions.

C. Clean Surfaces: Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, and other surface contaminants which could adversely affect installation of polished concrete floor system.

3.03 INSTALLATION

A. Install polished concrete floor system in accordance with installer's instructions at locations indicated on the Drawings.

B. Polished Concrete Floor System:

1. Preparation Step:

   a. For exposure of standard aggregate: Open-up concrete to accept concrete densifier by grinding with 60-grit metal-bonded diamonds.

2. Apply concrete densifier to deeply saturate floor.

3. Remove residue of concrete densifier dried on floor surface by grinding with 80-grit metal-bonded diamonds.

4. Floor Closure Polishing:

   a. Remove 80-grit metal-bonded diamond scratches by grinding with 100-grit hybrid diamonds.

   b. Remove 100-grit resin-bonded diamond scratches by grinding with 200-grit hybrid diamonds.

   c. Remove 200-grit resin-bonded diamond scratches by grinding with 400-grit resin-bonded diamonds.
d. Remove 400-grit resin-bonded diamond scratches by grinding with 800-grit resin-bonded diamonds.

e. Apply protective sealer.

f. High speed burnish protective sealer with diamond impregnated pad.

3.04 TESTING

A. Test each concrete surface in accordance with ANSI/NFSI B101.3 to confirm compliance with performance criteria.

3.05 FIELD QUALITY CONTROL

A. Inspect completed polished concrete floor system with Owner, Contractor, Architect, and Installer.

B. Review procedures with Architect to correct unacceptable areas of completed polished concrete floor system.

3.06 PROTECTION

A. Protect completed polished concrete floor system from damage until Substantial Completion.

   1. Do not allow vehicle and pedestrian traffic on unprotected floor.

   2. Do not allow construction materials, equipment, and tools on unprotected floor.

B. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed polished concrete floor system.

C. Repair damaged areas of completed polished concrete floor system to satisfaction of Architect.

3.07 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

END OF SECTION
SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Preservative treated wood materials.
B. Miscellaneous wood

1.02 RELATED REQUIREMENTS
A. Structural Notes: For additional requirements.

1.03 DEFINITIONS
A. Fire-Retardant-Treated Wood: Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced surface-burning characteristics and resist propagation of fire.
   1. When tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10-1/2 feet beyond the centerline of the burners at any time during the test.
B. Preservative-treated wood: Wood products that, conditioned with chemicals by a pressure process or other means, exhibit reduced susceptibility to damage by fungi, insects or marine borers.

1.04 SUBMITTALS
A. Qualification Data: For fabricator.
B. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.
C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualification: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.
B. Fabricators Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.
1.06 MOCKUP

A. Provide rough carpentry as required to construct mockups specified in other sections.

1.07 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Preservative Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 DESCRIPTION

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Provide Preservative-Treated Wood in locations required by ICC (IBC)-2018, Section 2304.12.1 through 2304.12.7, "Locations requiring water-borne preservatives or naturally durable wood," complying with the following requirements:

1. Comply with American Wood Protection Association AWPA U1 and AWPA M4.

2. Identification of Preservative-Treated Wood:
   a. Provide all preservative-treated wood, identified in accordance with ICC (IBC)-2018, Section 2303.1.9.1, to include: identification of the treating manufacturer; type of preservative used; minimum preservative retention (pcf); end use for which the product is treated; AWPA standard to which the product was treated; identity of the accredited inspection agency.

3. Moisture Content of Preservative-Treated Wood:
   a. Where preservative-treated wood is used in enclosed locations where drying in service cannot readily occur, such wood shall be at a moisture content of 19 percent or less before being covered with insulation, interior wall finish, floor covering or other materials; in accordance with ICC (IBC)-2018, Section 2302.1.9.2.

4. Fastener requirements at Preservative-Treated Wood:
   a. Fasteners and connectors in contact with preservative-treated wood and fire-retardant-treated wood, in accordance with ICC (IBC)-2018, Section 2304.10.5; ASTM A153/A153M, ASTM F1667.
      1) Fasteners or connectors for preservative-treated wood, including exceptions, in accordance with ICC (IBC)-2018, Section 2304.10.5.1.
2.03 MATERIALS

A. Lumber, General:

1. Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee’s (ALSC) Board of Review. Provide dressed lumber, S4S, with each piece factory marked with grade stamp of inspection agency.

B. Wood-Preservative-Treated Materials:

1. Comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC’s Board of Review. Dimension Lumber: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated. Refer to Structural “General Notes” located in the Drawings.

C. Miscellaneous Lumber:

1. Provide No. 3 or Standard grade lumber of any species for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, and similar members.

2.04 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Fasteners and Anchors:

1. Metal and Finish: Stainless steel for high humidity or preservative-treated wood locations, unfinished steel elsewhere.

C. Sill Flashing:

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer’s requirements before starting work.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer’s instructions.
3.03 INSTALLATION - GENERAL
   A. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.04 FRAMING INSTALLATION
   A. Refer to Structural drawings.

3.05 BLOCKING, NAILERS, AND SUPPORTS
   A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
   B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
   C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
   D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
   E. Provide the following specific non-structural framing and blocking:
      1. Handrails.
      2. Grab bars.
      3. Towel and bath accessories.
      4. Wall paneling and trim.
      5. Joints of rigid wall coverings that occur between studs.

3.06 TOLERANCES
   A. Framing Members: 1/4 inch from true position, maximum.
   B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.07 CLEANING
   A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
   B. Prevent sawdust and wood shavings from entering the storm drainage system.
C. Dispose of all waste material in accordance with project's Waste Management Plan.

3.08 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria and warranty.

END OF SECTION
SECTION 06 41 00
ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cabinetry.

B. Cabinet Hardware.

1.02 RELATED REQUIREMENTS

A. 06 10 00 - Rough Carpentry: For hidden shelf supports.

B. 09 22 16 - Non-Structural Metal Framing: Support framing, grounds, and concealed blocking for metal stud construction.

C. 09 90 00 - Painting and Coating: Site finishing of cabinet exterior.

D. 12 36 00 - Countertops: For countertops installed with casework.

1.03 SUBMITTALS

A. Qualification Data: For fabricator and installer.

B. Product Data: Provide data for hardware, accessories, and finishes.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
   2. Provide the information required by AWI/AWMAC/WI (AWS) Architectural Woodwork Standards.
   3. Provide schedule of drawer locations where soft-close drawer slide features are not available; Architect to review and revise style as required.

D. Sample: Submit sample of cabinet panel construction, minimum 12 inches square, illustrating proposed cabinet substrate and finish.

E. Hardware Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

F. Manufacturer's Installation Instructions: For finishes and hardware. Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
G. Maintenance Data: For user operation and maintenance of system including:

1. Methods for maintaining system’s materials and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.04 MAINTENANCE MATERIAL
A. Furnish extra materials described below, before installation begins, that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

1.05 QUALITY ASSURANCE
A. Fabricators Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience.

1.06 MOCKUP
A. Visual and Constructability Mockup:
   1. Construct and participate in mockup.
B. Construct mockup of single base cabinet; minimum 9 inches wide, to include door representing laminate, wood grain direction, and matching of material, cabinet interior, fit, finish, matching edgebanding and selected hardware.
C. Mockup may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING
A. As required by the quality standard and fabricator for a warrantable installation of the installed products to meet the Performance and Design Criteria.

PART 2 PRODUCTS

2.01 SELECTED INDUSTRY GRADES
A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) Architectural Woodwork Standards.
   1. Grade: Custom.
2.02 MATERIALS

A. Cores:
   1. Hardwood Plywood: HPVA HP-1; made with binder containing no urea-formaldehyde.
   2. MDF: ANSI A208.2, Grade 130; made with binder containing no urea-formaldehyde resin.
      a. For use at doors and drawers to reduce movement and warping, unless otherwise indicated.

B. (PL1, PL2) Plastic Laminate Materials:
   1. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.
   2. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
      a. Horizontal Surfaces: HGS, 0.048 inch nominal thickness.
      b. Vertical Surfaces: VGS, 0.028 inch nominal thickness.
      c. Flame Retardant Surfaces: HGF, 0.048 inch nominal thickness.
      d. Cabinet Liner: CLS, 0.020 inch nominal thickness.
      e. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.03 CABINET HARDWARE

A. Drawer Slides:
   2. Performance Criteria:
      a. Rated medium duty grade for drawer size indicated.
         1) Drawer slides rated for 100 lbs. minimum; soft-close feature available.
      b. Rated extra heavy-duty grade for drawer size indicated.
         1) Drawer slides rated for 250 lbs. minimum; soft-close feature not available.
3. Features:
   a. Full extension.
   b. Soft-close, stay-closed feature where indicated above.

B. Door and Drawer pulls:
   1. Basis of Design: Zurich Collection, 4" Centers Wire Pull by Berenson Decorative Hardware.
   2. Performance Criteria:
      a. ADA Standards Compliant.
   3. Features:
      a. Finish: Satin Aluminum.
      b. Required lengths as indicated on drawings.

C. Hinges: European-style, concealed, opening to 135 degrees; soft-closing.

D. Seat and Counter Support Brackets:
   2. Accepted substitutions: Brackets meeting performance criteria and features matching the Basis of Design profile
   3. Performance Criteria:
      a. Capacity: 450 lbs./bracket.
   4. Features:
      a. Hidden support bracket.
      b. Style and Length: As required by condition.
      c. Inside wall configuration.

2.04 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions meet the manufacturer’s requirements before starting work.

3.02 PREPARATION
   A. Prepare surfaces to receive work in accordance with Quality Standards.

3.03 INSTALLATION
   A. General: Install all materials in accordance with manufacturer’s instructions based on conditions present.
   
   B. Assemble cabinets and complete fabrication.
   
   C. Anchor cabinets to structure. Secure with countersunk, concealed fasteners
      1. For shop finished items, use color matched wood filler.
   
   D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.
      1. Scribe and cut cabinets to fit adjoining work and repair damaged finish at cuts.
      2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned.
      3. Maintain veneer sequence matching of cabinets with transparent finish.
   
   E. Shop Finishes: Touch up finishing after installation of architectural cabinets. Fill nail holes with matching filler.
      1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.

3.04 ADJUSTING
   A. Adjust and lubricate hardware for proper operation. Adjust hardware to center doors and drawers in openings and to provide smooth operation. Complete installation of hardware and accessory items as indicated.

3.05 CLEANING
   A. Dispose of all waste material in accordance with project’s Waste Management Plan.
3.06 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants for interior surfaces.

1.02 SUBMITTALS

A. Qualification Data: For Manufacturer, Installer, Testing Agency.

B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Preliminary Selection Sample: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Field Samples for Confirmation: Provide sealant samples in the color selected based on Manufacturer's charts for sealants other than the ones included in the Visual and Performance Mockup. Field samples shall be minimum 12 inches long and installed at joints intended for each particular sealant use. Mockup and field samples will be used to confirm sealant color selection.

E. Sanded sealant samples: Include in the Visual and Performance mockup, as part of the brick portion of the mockup.

F. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

G. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

H. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.

I. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
J. Field Test Report Log: For each elastomeric sealant application.

K. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

L. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

M. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

N. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining system's materials and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.
   3. Recommendations on maintenance schedule.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.

B. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project. Minimum 5 years of documented experience in facilities of this size and scope.

C. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.04 MOCKUP

A. Construct mockup of 4 lineal feet of sealant at narrowest joint width and widest joint width, representing finished work including internal and external corners and control joints.

B. Locate where directed.

C. Mockup may remain as part of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.
1.06 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Special warranties exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.

2. Disintegration of joint substrates from natural causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Joint sealers for properly designed joints in interior materials; selected for durability, movement capacity, adhesion to substrates and non-staining characteristics.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
C. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C1248 and have not stained porous joint substrates indicated for Project.

2.03 MANUFACTURERS

A. Specification is based on products listed below.

2.04 SEALANTS FOR INTERIOR SURFACES

A. (S-10): General Purpose Interior Sealant: polyurethane; single, or multi-component, paintable.
   2. Product: Dymonic FC, Dymeric 240FC by Tremco Inc.
   3. Designed for interior movement and non-moving joints adjacent to painted surfaces.

   1. Colors other than white may be required.
   3. Sealant Used in Food preparation area must be USDA approved for that use.

C. (S-12): Acoustical Sealant: Acrylic sealant; ASTM C834.
   1. Product: Tremco "Acoustical Sealant".
   2. Non-hardening type.
   3. Tested as part of acoustical assemblies.

   1. Approved by manufacturer for wide joints up to 1-1/2 inches.
3. Product: Vulkem 45 SSL by Tremco Inc.

4. Designed for exposed, trafficked joints with pourable self-leveling installation.

2.05 ACCESSORIES

A. Joint sealant backing:

1. General:
   a. Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2. Cylindrical Sealant Backings:
   a. ASTM C1330, Type C (closed-cell material with a surface skin), O (open-cell material), B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

3. Elastomeric Tubing Sealant Backings:
   a. Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to -26 degrees F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

4. Bond-Breaker Tape:
   a. Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

B. Miscellaneous Materials:

1. Primer:
   a. Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

2. Cleaners for Nonporous Surfaces:
a. Chemical cleaners acceptable to manufacturers of sealants and sealant-backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

3. Masking Tape:

   a. Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

C. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

   A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.02 PREPARATION

   A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

   A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

3.04 FIELD QUALITY CONTROL

   A. Field quality control to include field adhesion testing, field stain testing, test methods and evaluation of field test results.

   B. Perform all corrections necessary for issuance of warranty.

3.05 CLEANING

   A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

   A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire rated steel doors.
B. Non-fire rated steel frames.

1.02 RELATED REQUIREMENTS

A. 09 90 00 - Painting and Coating: For field painting.

1.03 SUBMITTALS

A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
C. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
D. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
E. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining system's materials and finishes
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.
PART 2 PRODUCTS

2.01 DESCRIPTION

A. Hollow metal frames for hollow metal doors, wood doors and glazing. Hollow metal doors for non-fire rated and insulated openings.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Accessibility Requirements: For doors required to be accessible, comply with applicable provisions in the Accessible and Usable Building Facilities ICC A117.1 and 2010 ADA Standards for Accessible Design – Department of Justice.

B. Comply with ANSI A250.8 in general and for grade and style specified.

C. SDI doors of equivalent or better construction are allowed.

2.03 MANUFACTURERS

A. Specification is based on Doors and Frames by one of the following:
   1. Ceco.
   2. Curries.
   4. Steelcraft.

2.04 NON-FIRE RATED STEEL DOORS

A. Performance Criteria:
   1. Grade: ANSI A250.8 Level 3, physical performance Level C, Model 2, seamless.

B. Features:
   1. Door Top and Closures: Steel, Flush with top of faces and edges.
   2. Door Edge Profile: Beveled on both edges.
   3. Face Texture: Smooth.
   4. Glazed Lights: Sizes and configurations as indicated on drawings. Provide secure glazing stops on secure side of door.
   5. Finish: Factory primed for field finishing.
6. Field Finish: In accordance with Section 09 90 00 - Painting and Coating.

7. Field Finish Color: To be selected from manufacturer's full range.

2.05 NON-FIRE RATED FRAMES

A. Performance Criteria:

1. Comply with the requirements of grade specified for corresponding door.

2. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 2.

3. Frames for Glass: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gauge.

B. Features:

1. Assembly: Face welded per ANSI/SDI A250.8.

2. Finish: Factory primed, for field finishing.

2.06 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

2.07 FINISHING

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

C. Field Finish: In accordance with Section 09 90 00 - Painting and Coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

B. Coat inside of frames to be installed in masonry, with bituminous coating, prior to installation.

C. Coat inside of other frames with bituminous coating to a thickness of 1/16 inch.
3.03 INSTALLATION

A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

B. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.

C. Seal seam at top closures after finish is applied to create a smooth surface without groove or pits.
   1. Seal with sealant Per Section 07 92 00 - Joint Sealants.

D. Coordinate installation of hardware.

E. Coordinate installation of electrical connections to electrical hardware items.

F. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: As specified in ANSI A250.8.

B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust and lubricate hardware for proper operation.

B. Adjust for smooth and balanced door movement in accordance with manufacturer's instructions.

3.06 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.07 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Non-fire rated wood doors.

1.02 RELATED REQUIREMENTS
   A. 09 90 00 - Painting and Coating: For field painting.

1.03 SUBMITTALS
   A. Qualification Data: For manufacturer.
   B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
   C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles.
   D. Sample: Submit two samples face material, manufacturer's standard size showing factory finishes, colors, and surface texture.
   E. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
   F. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
   G. Maintenance Data: For user operation and maintenance of system including:
      1. Methods for maintaining system's materials and finishes.
      2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
      1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.06 WARRANTY

A. Interior Doors: Provide manufacturer’s warranty for the life of the installation.
   1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Wood doors for non-fire rated openings.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Accessibility Requirements: For doors required to be accessible, comply with applicable provisions in the Accessible and Usable Building Facilities ICC A117.1 and 2010 ADA Standards for Accessible Design – Department of Justice.

B. Quality Level: Custom Grade, Extra Heavy Duty performance, in accordance with WDMA I.S. 1A for all doors with the following exceptions.

C. Construction: Flush.

D. Vertical Edges: Same species as face veneer.

E. Edge type (AWI “E” type) edge set in between door face veneers.

F. Door Edge Profile: Beveled on both edges.

G. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

H. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

I. Source Limitations: For doors and frames, obtain products from single source from single manufacturer.

2.03 MANUFACTURERS

A. Specification is based on doors and frames by one of the following:
2. Lynden Doors: www.lyndendoor.com

3. VT Industries, Inc: www.vtindustries.com

B. Substitutions for products by manufacturers other than those listed above: See Section 01 25 00 - Substitution Procedures.

2.04 MATERIALS

A. Cores:

1. Non-Rated Solid Core and 20 Minute Rated Doors: Type: No Added Urea Formaldehyde particleboard core (PC), plies and faces as indicated.

B. Non-fire rated wood doors.

1. Features:
   b. Core: Solid.
   c. Facing Material:
      1) Wood veneer facing with factory clear transparent finish. Match existing door species and finish.
   d. Color/Finish: Refer to drawings
   e. Glazed Lites: Sizes and configurations as indicated on drawings. Provide secure glazing stops on secure side of door.

2.05 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

2.06 FINISHING

A. Factory Finish: Finish work in accordance with AWI/AWMAC/WI (AWS) Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:

1. Transparent:
   a. System - 11, Polyurethane, Catalyzed.
   b. Stain: To match sample.
   c. Sheen: Semigloss.
B. Field Finish: In accordance with Section 09 90 00 - Painting and Coating.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer’s requirements before starting work.

3.02 INSTALLATION

A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

B. Field-Finished Doors: Trimming to fit is acceptable.
   1. Adjust width of non-rated doors by cutting equally on both jamb edges.
   2. Trim maximum of 3/4 inch off bottom edges.

C. Coordinate installation of hardware.

D. Touch up damaged finishes.

3.03 TOLERANCES

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

A. Adjust and lubricate hardware for proper operation.

B. Adjust for smooth and balanced door movement in accordance with manufacturer's instructions.

3.05 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 08 43 13

ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Modification of existing interior storefront framing systems.

B. Modification of existing interior entrance systems.

C. Glazing.

D. Finishes.

1.02  ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section.

1. Review preparation and installation procedures and coordinating and scheduling
   required with related work.

1.03  PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Provide glazed storefronts that comply with test-
   performance requirements indicated, as evidenced by reports based on Project-
   specific preconstruction testing or of tests performed on manufacturer's standard
   assemblies by a qualified testing agency.

B. Preconstruction Sealant Testing: Perform sealant manufacturer's standard tests for
   compatibility with and adhesion of each material that will come in contact with sealants
   and each condition.

1. Test a minimum five production-run samples each of metal, glazing, and other
   material.

2. Prepare samples using techniques and primers required for installed assemblies.

3. Perform tests under environmental conditions that duplicate those under which
   assemblies will be installed.

4. For materials that fail tests, determine corrective measures necessary to prepare
   each material to ensure compatibility with and adhesion of sealants including, but
   not limited to, specially formulated primers. After performing these corrective
   measures on the minimum number of samples required for each material, retest
   materials.
1.04 SUBMITTALS

A. Product Data: Provide product criteria, characteristics, accessories, material descriptions, dimensions of individual components and profiles, and finishes.

1. Include sealants tested and approved as part of entrance and storefront system.

2. Indicate glazed storefronts comply with performance requirements indicated, as evidenced by tests performed on manufacturer's standard assemblies by a qualified testing agency

B. Qualification Data: For manufacturer, installer, and design engineer.

C. Shop Drawings: Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction.

2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed Storefronts, showing the following:

   a. Joinery, including concealed welds.

   b. Anchorage templates and details.

   c. Interface with adjoining building construction.

   d. Referenced to detail numbers indicated on the Contract Drawings.

   e. Expansion and seismic provisions.

   f. Glazing.

   g. Entrance Systems.

D. Coordination Drawings: Show tie-back and intermittent stabilization anchors.

1. Include required slab edge configuration, post tensioning locations, embedded or surface attachment anchors and channels, structural supports such as steel posts and girts, and door locations.

E. Product Test Reports:

1. Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for glazed storefronts, indicating compliance with performance requirements.

F. Sample: For each type of exposed finish required, in manufacturer's standard sizes.
G. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

H. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

I. Maintenance Data: For user operation and maintenance of system including:

1. Methods for maintaining system's materials and finishes.

2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

3. Recommendations on maintenance schedule.

4. Include ASTM C1401 recommendations for postinstallation-phase quality-control program.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.07 WARRANTY

A. Manufacturer's Finish Warranty: Correct defective work within a 10-year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

1. Finish Criteria are listed AAMA 2605.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Factory fabricated and finished aluminum framing system with infill, and related flashings, anchorage and attachment devices. Systems do not typically equalize pressure or manage water intrusion within the system and are designed to bear on floor plates and be less than 12 feet tall.
2.02 PERFORMANCE AND DESIGN CRITERIA

A. The storefront system begins at the primary structural members of the building frame and the edges of concrete slabs, include all support embeds, plates, angles and ancillary framing members required for structural integrity and support of the Storefront from the building structure.

B. The Drawings:
   1. Indicate the design intent for profile, joints and configuration required together with relationship to structural frame and interior building elements.
      a. Drawings do not purport to identify or solve completely the problems of structural movement, fixings and anchorage, or flatness and stability of facing.

C. General Performance:
   1. Glazed storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure includes the following:
      a. Deflection exceeding specified limits.
      b. Framing members transferring stresses.
      c. Glazing-to-glazing contact.
      d. Sealant failure.
      e. Glass breakage.
      f. Loosening or weakening of fasteners, attachments, and other components.
      g. Failure of operating units.

D. Structural Performance:

E. Accessibility:
   1. Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 lbf maximum.
      a. ANSI/ICC A117.1 - 309.4 Operation.
2.03 MANUFACTURERS

A. Match existing manufacturers, systems, products, and finishes.

   1. Substitutions for products by manufacturers other than those listed above: Not allowed.

2.04 GLAZING

A. Glazing Gaskets, Spacers, Setting Blocks, Sealant Backings, and Bond Breakers: Manufacturer's standard permanent, nonmigrating types compatible with sealants and suitable for joint movement and assembly performance requirements.

B. Weatherseal Sealant: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and structural-sealant-glazed curtain-wall manufacturers for this use.

   1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.05 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Concealed Flashing:

   1. Dead-soft, 0.018 inch thick stainless steel, ASTM A240/A240M of type recommended by manufacturer, or prefinished aluminum only.

C. Framing Sealants:

   1. Manufacturer's standard sealants with VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and 100 percent silicone.

D. Manufacturer's recommended compensation head channels.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.
3.02 PREPARATION
A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION
A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

3.04 ERECTION TOLERANCES
A. Erection Tolerances: Install glazed Storefronts to comply with the following non-accumulating maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.05 ADJUSTING
A. Adjust operating windows, ventilators, hardware, and accessories for smooth function and tight fit at contact points. Lubricate hardware and moving parts.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

3.06 CLEANING
A. Dispose of all waste material in accordance with project's Waste Management Plan.
3.07 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Locks and latches.
B. Hinges.
C. Mortise locksets.
D. Auxiliary Locks.
E. Gasketing and thresholds.
F. Finishes.

1.02 RELATED REQUIREMENTS

A. Drawing Sheet AI600 - Door and Sidelight Schedules: For Hardware Groups.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section in accordance with Section 01 30 00 - Administrative Requirements.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.
B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
C. Coordinate Owner's keying requirements with hardware manufacturers.

1.04 SUBMITTALS

A. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
B. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
C. Keying Schedule: Submit for approval of Owner.
D. Prior to preparation of hardware schedule:
1. Submit one (1) sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.

2. Samples will be returned to supplier.

E. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

F. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

G. Maintenance Data: For user operation and maintenance of system including:
   
   1. Manufacturer's parts lists and templates.
   
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.
   

H. Closeout Submittals: Deliver keys with identifying tags to Owner by security shipment direct from hardware supplier.

I. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

1.05 MAINTENANCE MATERIAL

A. Extra Lock Cylinders: Ten for each master keyed group.

B. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.
B. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Mechanical hardware for doors.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

B. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's 2010 ADA Standards for Accessible Design.

C. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.

D. Provide items of a single type of the same model by the same manufacturer.

2.03 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following or one of their subcompanies/subbrands:

1. Allegion.
2. ASSA ABLOY.
3. Dormakaba.

2.04 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.

1. Hardware Sets indicate locking functions required for each door.
2. If no hardware set is indicated for a swinging door provide an office lockset.
3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
5. In door sections, where a lock cylinder referenced to this Section is specified, furnish and install a mortise lock cylinder keyed to the building keying system.
B. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.

2.05 HINGES

A. Self-Closing Hinges: Comply with BHMA A156.17.

B. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated.
   4. Provide non-removable pins on exterior outswinging doors.
   5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

C. Quantity of Hinges Per Door: As follows unless otherwise indicated on drawings.
   1. Doors up to 60 inches High: Two hinges.
   2. Doors From 60 inches High up to 90 inches High: Three hinges.
   3. Doors 90 inches High up to 120 inches High: Four hinges.
   4. Doors over 120 inches High: One additional hinge per each additional 30 inches in height.

2.06 MORTISE LOCKSETS

A. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

B. Locking Functions: As defined in BHMA A156.13, and as follows:
   1. Passage: F01.
   2. Privacy: F19, or F02 with retraction of deadbolt by use of inside lever/knob.
   3. Communicating: F03, deadbolts operated independently from each side, not an exit.
   4. Entry, Deadbolt: F20, may be locked without key, free egress.

2.07 AUXILIARY LOCKS

A. Bored Auxiliary Locks: BHMA A156.36: Grade 1; with strike that suits frame.
B. Locking Functions: As defined in BHMA A156.5, and as follows:

1. Deadbolt, Classroom: E017.
2. Public Entry/Exit (“nightlatch”): E023, D012
3. Deadbolt, Unoccupied: E015 or F17, deadbolt by key outside and turn inside.
4. Deadbolt, Classroom, Unoccupied: E010 or F18, deadbolt by key outside.

2.08 OCCUPANCY INDICATORS

A. Bolt complying with requirements in this section, with integrated red/green occupancy indicator.

2.09 GASKETING AND THRESHOLDS

A. Gaskets: Complying with BHMA A156.22.

1. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
   a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.

2. On each exterior door, provide door bottom sweep, unless otherwise indicated.

B. Thresholds: Complying with BHMA A156.21.

1. At each exterior door, provide a threshold unless otherwise indicated.

2. Field cut threshold to frame for tight fit.

2.10 STOPS

A. Wall- and Floor-Mounted Stops: ANSI/BHMA A156.16.

1. Finish: Architect to select from manufacturer's full range.

2.11 CONCEALED CLOSERS

A. Concealed Closers: ANSI/BHMA A156.4

1. Rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2. Grade 1
3. Concealed overhead type.

2.12 FINISHES

A. Provide finishes complying with BHMA A156.18.
   1. Finishes to be selected by Architect during submittal process.

2.13 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.

B. Verify that doors and frames are ready to receive work; labeled, fire rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

B. Use templates provided by hardware item manufacturer.

C. Do not install surface mounted items until finishes applied to substrate are complete.

D. Install hardware on fire rated doors and frames in accordance with code and NFPA 80.

E. Mounting heights for hardware from finished floor to center line of hardware item.
   1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
   2. For Wood Doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

F. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.
3.04 FIELD QUALITY CONTROL

A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.05 ADJUSTING

A. Adjust and lubricate hardware for proper operation.

3.06 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

B. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality.

3.07 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
PART 1  GENERAL

1.01  SECTION INCLUDES

A. Moisture measurement of concrete floor slabs.
B. Moisture mitigation for concrete floor slabs.

1.02  ADMINISTRATIVE REQUIREMENTS

A. Coordinate self-leveling underlayment and moisture mitigation system work in relation to both flooring applications and slabs damaged during construction in most cases the underlayment manufacturer requires placement above the moisture mitigation system.

1.03  SUBMITTALS

A. Qualification Data: For manufacturer, applicator, and supervisor.
B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of materials VOC emission of paints, coatings, adhesives, and sealants.
C. Test results of slab verification.
D. Existing condition reports: Prior to installation of flooring moisture mitigation system, submit written report by system rep of existing relative humidity and alkalinity sub-floor.
E. Certification: Upon completion of flooring moisture mitigation system, submit written certification by system manufacturer's representative that the sub-floor meets requirements for relative humidity, moisture vapor transmission and pH neutrality specified in this section.
F. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
   1. Include information on mixing and application.
G. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04  QUALITY ASSURANCE

A. Certify that products meet or exceed specified requirements.
B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum 5 years of experience.

C. Applicator Qualifications: Company specializing in performing work of this section with minimum 5 years of experience and approved by the manufacturer.

D. Supervisor Qualifications: Trained by product manufacturer.

E. Provide all materials of the system including but not limited to: Primers, resins, hardening agents and finish or sealing coats, from a single manufacturer's recommendations

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store all materials under cover and elevated above grade.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Keep dry and protect from direct sun exposure and freezing.

1.06 FIELD CONDITIONS

A. Do not install system until floor penetrations and peripheral work are complete.

B. Maintain minimum ambient temperatures of 70 degrees F 72 hours before, during and 24 hours after installation of the system.

C. During the curing process, ventilate spaces to remove excess moisture.

1.07 WARRANTY

A. Manufacturer warrants product for a term of five (5) years that:

1. The product is free from manufacturing defects.

2. Relative humidity reduction and moisture vapor levels are maintained and the moisture mitigation product will remain adhered to the concrete substrate and adhesive or bonding agents applied on top of the moisture mitigation product will remain adhered.

3. Warranty covers the removal and replacement of flooring products.
PART 2 PRODUCTS

2.01 DESCRIPTION

A. Restrict concrete relative humidity and alkalinity levels to those acceptable to the flooring manufacturers: Relative humidity of not greater than 75 percent, and Alkalinity-pH of not greater than 9.0 pH. Test per ASTM F2170, ASTM F710, and ASTM E96/E96M.

2.02 MANUFACTURERS

A. Subject to compliance with requirements, provide one of the following:


2.03 MATERIALS

A. System Main Component: Epoxy or Acrylic based materials.

1. Properties:
   a. ASTM F2170 In-Situ Relative Humidity: Tolerant to 100 percent RH + 3 percent.
   b. ASTM D1308 Alkali Resistance, 30 days: Resistant to 14pH.
   c. ASTM D1308 Alkali Resistance, 30 days: Resistant to application of 35 percent Potassium Hydroxide solution.
   d. VOC content: Not greater than 300g/liter.
   e. ASTM D4541 Adhesion Strength: 300 psi (100 percent Concrete Adhesive Failure).

B. Crack filler:

1. Manufacturer's approved products for use.

C. Primers for self-leveling materials:

1. Manufacturer approved two-component non-porous type primer.

D. Top coat:
1. Calcium aluminate based self-leveling underlayment and patching compound meeting a minimum compressive strength of 4000 psi per ASTM C109/C109M. Minimum of 1/8 inch thickness.

E. Water:

1. Sufficiently cool so as not to speed up mix setting.

2.04 MIXING

A. Site mix materials in accordance with manufacturer's instructions.

B. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.01 EXAMINATION

A. Record condition of floor.

B. All concrete substrates must have a minimum compressive strength of 3000 psi and be structurally sound.

C. Verify that surfaces are smooth, flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of the mitigation system to substrate.

1. Perform analysis of as many concrete cores as needed to verify lack of contaminants and warrantability of existing slab(s).
   a. If the condition of and chemicals applied to new slabs is not verifiable to the satisfaction of the mitigation system manufacturer, perform analysis of concrete cores of new slabs as required to satisfy system manufacturer.
   b. Vexcon Chemicals products do not require concrete coring.

D. Test that concrete sub-floor is significantly dry and ready for finish flooring installation by testing for moisture emission rate, internal relative humidity and alkalinity.

1. Calcium Chloride test in accord with the ASTM F1869.
   a. Perform this test, once the space has been conditioned next to the RH metering devices. Report both results to the manufacturer of the product prior to purchasing the floor mitigation system.

2. Use calibrated digital readout style equipment to ascertain ASTM F2170 relative humidity.
3. Use calibrated digital readout style equipment to ascertain ASTM F710 alkalinity.

E. Verify surfaces are within tolerances for a warranted mitigation system.

1. Test at a rate of three tests for the first 1,000 square feet and one additional test for each 1,000 square feet of flooring.

2. Obtain instructions if test results are not within limits recommended by mitigation system manufacturer.

F. Verify that required floor-mounted utilities are in correct location.

G. Verify on site temperature and humidity of interior conditions prior to application. Notify manufacturers of conditions not within tolerance for product application.

H. If results are not within requirements of finish flooring manufacturer, proceed with installation of mitigation system.

3.02 PREPARATION

A. All concrete substrates must be structurally sound, solid, and mechanically prepared to a minimum surface profile of ICRI CSP #3.

1. "Open" the floor surface using one of the following methods:

   a. Shot blast using #390 shot on equipment approved by mitigation system manufacturer.

   b. Grind the entire floor with a metal grit / diamond to open the floor and expose new concrete on 100 percent of the surface.

   c. Acid etching and the use of sweeping compounds and solvents are not acceptable means of preparing the concrete.

      1) If etching, diamond grind near wall base, columns, and difficult to reach areas.

   d. Method recommended in writing by mitigation system manufacturer and approved by Architect.

B. Vacuum surfaces, cracks and joints to remove dust, debris and contaminates.

C. Joint and Crack Preparation:

1. Moving Joints: Honor all expansion and isolation joints up through the System, and underlayment or topping.

2. Saw Cuts, Control Joints and Dormant Cracks: Fill all non-moving joints and cracks greater than 1/32 inch with manufacturer's approved product.
3. Once the cracks and joints have been properly filled, allow these areas to cure prior to proceeding with the installation of the system.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Where system stops, terminate under centerline of door and at wall edge.

3.04 FIELD TESTING

A. Retest for moisture vapor transmission and pH per tests listed above. Results must be acceptable to flooring and flooring adhesive manufacturer, and system description listed above.

3.05 CLEANING

A. Remove excess products from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's instructions.

C. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

A. Prohibit traffic on moisture mitigation system for a minimum of 12 hours and flooring installation for a period of 48 hours after installation.

B. Prior to the installation of the mitigation system, underlayment or topping, finish flooring or sealer, the system should be protected from abuse by other trades by the use of plywood, Masonite or other suitable protection course.

END OF SECTION
SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum board.
B. Moisture-resistant gypsum board.
C. Tile backer board.
D. Acoustic insulation.

1.02 RELATED REQUIREMENTS

A. 07 92 00 - Joint Sealants:  Acoustic sealant.
B. 09 22 16 - Non-Structural Metal Framing:  Blocking product and execution requirements.

1.03 SUBMITTALS

A. Qualification Data:  For Installer and design engineer.
B. Product Data:  Provide data on gypsum board, glass mat faced gypsum board, accessories, joint finishing system, and cement board.
C. Shop Drawings:  Indicate special details associated with acoustic seals.
D. Test Reports:  For all stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.04 QUALITY ASSURANCE

A. Designer Qualifications:  Professional structural engineer with 5 years of documented experience in design of this work and licensed in the location of the project.
B. Installer Qualifications:  Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.
PART 2 PRODUCTS

2.01 DESCRIPTION

A. Includes Gypsum wallboard finishing, metal trim and accessories, and acoustical sealants and insulation.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Provide completed gypsum board assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:

1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

2.03 MOISTURE-RESISTANT GYPSUM BOARD

A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Use at locations scheduled below, unless otherwise indicated.
2. Type X: Thickness 5/8 inch.
4. Products:
   a. ToughRock Mold-Guard Gypsum Board by Georgia-Pacific Gypsum.

2.04 TILE BACKER BOARD

A. Glass-Mat-Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.

1. Standard Type: Thickness 1/2 inch.
2. Fire-Resistant Type: Type X core, thickness 5/8 inch.
3. Products:
   a. Georgia-Pacific Gypsum; DensShield Tile Backer.

B. ANSI Cement-Based Board:
1. Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
   a. Thickness: 1/2 inch.
   b. Products:
      1) Custom Building Products; Wonderboard.

2.05 ACOUSTIC INSULATION

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
   1. Basis of Design: Rockboard 60 by ROCKWOOL.
   2. Thickness: 2 inches, unless noted otherwise.

2.06 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Acoustic Sealant:
   1. As specified in Section 07 92 00 - Joint Sealants.

C. Finishing Accessories:
   1. ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
      a. Types: As detailed or required for finished appearance.
      b. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

D. Joint Materials:
   1. ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
      a. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.

E. High Build Drywall Surfacer:
   1. Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 4 finish.
F. Anchorage to Substrate:

   1. Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

   A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.02 PREPARATION

   A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

   A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

   B. Comply with ASTM C840 and GA-216. Install to minimize butt end joints, especially in highly visible locations.

   C. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

   A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

      1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

   B. Corner Beads: Install at external corners, using longest practical lengths.

   C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.05 JOINT TREATMENT

   A. Glass Mat Faced Gypsum Board: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.


   C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 5: Substrate for wall coverings, at downlighting, and where indicated on drawings

2. Level 4: Walls and ceilings typical

3. Level 3: In utility areas, behind cabinetry, and on backing board to receive tile finish.

4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.

5. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project.

6. Level 0: Surfaces indicated to be finished in later stage of project.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.06 FIELD OBSERVATION AT "PUNCH"

A. Finish will be judged from a viewing difference of 4 feet.

B. Ceilings will be viewed from a standing position.

C. Finished lighting system or temporary lighting similar to proposed finished lighting should be used for judging the wall.

D. Eye catching discrepancies and or blemishes, including “fuzzy” wall board surfaces, will be rejected.

3.07 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.
3.08 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria and warranty.

END OF SECTION
SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal partition, ceiling, and soffit and shaftwall framing.

B.Blocking and backing panels.

1.02 RELATED REQUIREMENTS

A. 09 21 16 - Gypsum Board Assemblies: Execution requirements for anchors for attaching work of this section.

1.03 SUBMITTALS

A. Qualification Data: For installer and design engineer.

B. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

C. Shop Drawings: Indicate extents, special joint or termination conditions, and conditions of interface with other materials.
   1. Indicate acoustic details.
   2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.

D. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

E. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.
1.05 MOCKUP
   A. Mockup Size: Full height, minimum 12 feet long, including corner.
   B. Mockup may remain as part of the Work.
   C. The work of this section may be part of several different mockups. Coordinate with the mockups of other sections.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

PART 2 PRODUCTS

2.01 DESCRIPTION
   A. Non-structural metal support framing for gypsum board assemblies and other finishes.

2.02 PERFORMANCE AND DESIGN CRITERIA
   A. Perform Work in accordance with ASTM C754.
   B. Coordinate the placement of components to be installed within stud framing system.
   C. Suspended Assemblies: Coordinate with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
   D. Design and install framing and furring to limit deflection to the following under point loads of 100 lbs and uniform loads as noted below except where required to withstand greater load (pressurized shafts and stairwells for example).

1. Maximum Deflection of Vertical Assemblies:
   b. Assemblies spanning multiple floors: Sustained loads of 7.5 lbf/sq ft with a maximum mid span deflection of 1:240.


3. Maximum Deflection for assemblies under applied plaster finishes (Portland Cement or Gypsum) and ceramic tile is 1:360.
4. Use The SSMA Product Technical Information Book to look up the appropriate stud size, spacing and thickness.

E. Ceiling and Soffit Framing:

1. Seismic Requirements:
   a. Classification: Conform to ASTM C635/C635M, Heavy Duty Classification.
   b. Code Compliance: FBC, American Society of Civil Engineers ASCE 7 Section 13 and CISCA (AC) Guidelines.

F. Acoustic Attenuation for Interior Partitions: STC’s are calculated in accordance with ASTM E413 and based on published tests conducted in accordance with ASTM E90.

   1. Provide materials and construction identical to those tested in assembly indicated according to ASTM E90. See Section 09 21 16 - Gypsum Board Assemblies for STC requirement.

G. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

**2.03 MATERIALS**

A. Metal partition, ceiling, and soffit and shaftwall framing.

   1. Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and "SSMA Product Technical Information" book for the spacing indicated.

      a. Minimum Framing Component thickness is 20 Gauge.
      b. Studs: C shaped.
      c. Runners: U shaped, sized to match studs.
      d. Ceiling Channels: C shaped or T shaped.
      e. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
      f. Steel Stud Framing Connectors:

         1) Products:

            (a) Simpson Strong Tie, Bridging Connectors; DBC Bridging Connector: www.strongtie.com.
g. Single leg Resilient channels.

h. "Z's": Used for several different members.

i. Shaftwall framing CH and other sections as required for complete framing system.

2. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

3. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.

   a. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

   b. Material:

      1) Typical: ASTM A653/A653M steel sheet, SS Grade 50, with G40/Z120 hot dipped galvanized coating.

      2) Areas Subject to Moisture: ASTM A653/A653M steel sheet, SS Grade 50, with G60/Z180 hot dipped galvanized coating. Areas include non-conditioned space, shower rooms, locker rooms or other locations subject to regular wetting or high humidity.

4. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.

5. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.


   a. Also acceptable "Danback" flexible wood blocking system from ClarkDietrich.

   b. See backing schedule on architectural drawings.

8. Anchorage Devices: Power actuated or Drilled expansion bolts.

10. Acoustic Sealant: As specified in Section 07 92 00 - Joint Sealants.

11. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.

B. Blocking and backing panels.

1. Sheet Metal Backing (Blocking): 0.036 inch thick, galvanized. 4 inch minimum width
   a. See backing schedule on architectural drawings.

2. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

3. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

4. Specifically, provide the following non-structural framing and blocking:
   a. Cabinets and shelf supports.
   b. Wall brackets.
   c. Handrails.
   d. Grab bars.
   e. Towel and bath accessories.
   f. Wall-mounted door stops.
   g. Chalkboards and marker boards.
   h. Wall paneling and trim.
   i. Joints of rigid wall coverings that occur between studs.

2.04 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that rough-in utilities are in proper location.
C. Verify existing conditions meet the manufacturer's requirements before starting work.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION OF STUD FRAMING

A. General: Install all materials in accordance with manufacturer’s instructions based on conditions present.

B. Comply with requirements of ASTM C754.

C. Extend partition framing to structure where indicated and to ceiling in other locations.

D. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

E. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

F. At partitions indicated with an acoustic rating:
   1. Provide components and install as required to produce STC ratings as indicated.
   2. Place two beads of acoustic sealant (one on either side) between runners and substrate, studs, and adjacent construction.
   3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.
   4. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

H. Backing and Blocking: Use steel channels or flat sheets secured to studs minimum 4 inches wide. Provide blocking for support of all wall hung items and equipment.
   1. Use sheet metal backing for reinforcement of 16 gauge minimum.

I. Install supplementary framing and bracing at openings and terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer.
J. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement:
   1. Where edges of suspended ceilings abut building structure at ceiling perimeters and at penetrations of structural elements.
   2. Where partition and wall framing abuts overhead structure.
   3. Where studs are installed directly against exterior walls of masonry or concrete, install asphalt felt strips between studs and wall.

3.04 CEILING AND SOFFIT FRAMING

A. Comply with requirements of ASTM C754.
   B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
   C. Install furring independent of walls, columns, and above-ceiling work.
   D. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated.
   E. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.
   F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
   G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
   H. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
   I. Laterally brace suspension system.
      1. Sway-brace suspension systems with hangers used for support.

3.05 TOLERANCES

A. Maximum Variation from True Position: 1/8 inch in 10 feet.
   B. Maximum Variation from Plumb: 1/8 inch in 10 feet.
   C. Level ceiling to a tolerance of 1/1200. For tilted ceilings maintain this tolerance as a "flatness" tolerance.
3.06 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.07 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile.
B. Installation materials.
C. Installation methods.

1.02 RELATED REQUIREMENTS

A. 07 92 00 - Joint Sealants: For sealants installed with tiling.
B. 09 21 16 - Gypsum Board Assemblies: For tile backer board installation for tile substrate.
C. 09 22 16 - Non-Structural Metal Framing: For installation requirements of metal framing to meet tiling requirements.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.04 SUBMITTALS

A. Qualification Data: For installer.
B. Product Data: Provide manufacturers’ data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
C. Shop Drawings: Indicate membrane and tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details and related dimensioning as well as plumbing (drains) mechanical and electrical fixtures and lines installed.
D. Sample: Mount tile and apply grout on two plywood panels, minimum 18 x 18 inches in size illustrating pattern, color variations, and grout joint size variations.
E. Manufacturer’s Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
F. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

G. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

H. Maintenance Data: For user operation and maintenance of system including:
   1. Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.05 MAINTENANCE MATERIAL
   A. Extra Tile: 10 square feet of each size, color, and surface finish combination.

1.06 QUALITY ASSURANCE
   A. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience.

1.07 MOCKUP
   A. Visual and Constructability Mockup:
      1. Construct and participate in mockup.
   B. Construct tile mockup where indicated on the drawings, incorporating all components specified for the location.
      1. Minimum size of mockup is indicated on the drawings.
      2. Approved mockup may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING
   A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.09 WARRANTY
   A. Installation Warranty: Contractor shall correct defective Work within a 2 year period after Date of Substantial Completion.
   B. Manufacturer's Warranty: Provide five year warranty for tile setting materials failing to resist penetration of water.
1. Exception: Where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Tile assemblies and accessories installed in accordance with Tile Council of North America guidelines on walls, floors, and in showers.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Blending: For tiles with color variations, factory blend and package tile so each package has the same range of colors and quantities of each variation. If factory blending is not available, field blend prior to beginning installation.

B. Wet Dynamic Coefficient of Friction (DCOF): Not less than 0.42 as tested in accordance with ANSI/NFSI B101.3 Wet DCOF of Common Hard-Surface Floor Materials.

2.03 TILE

A. (CT1) Floor Tile:
   1. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.
   2. Comply with ANSI A137.1.

B. (CT2, CT3) Wall Tile:
   1. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.
   2. Comply with ANSI A137.1.

C. (CT4) Tile Cove Base:
   1. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.
   2. Comply with ANSI A137.1.

2.04 INSTALLATION MATERIALS

A. Non-Ceramic Trim:
   1. Basis of Design: Specification is based on products listed below by Custom Building Products.
   2. Satin natural anodized extruded aluminum, or stainless steel as scheduled, style and dimensions to suit application, for setting using tile mortar or adhesive.
a. Applications: Use in the following locations:

1) Open edges of wall tile.
2) Open edges of floor tile.
3) Wall corners, outside and inside.
4) Transition between floor finishes of different heights.
5) Thresholds at door openings.
6) Expansion and control joints, floor and wall.

B. Bond Coat:

1. Latex-Portland Cement Mortar Bond Coat: ANSI A118.15H.
   a. Specification is based on:
      1) ProLite Fortified Mortar by Custom Building Products.
      2) S28 Microtec (interior) or FB9L Pourable shearflex (interior)
      3) By Mapei.
   b. Performance:
      1) Dry-Set Cement Mortar for Large and Heavy Tile.
      2) Non-Sag Characteristics for Wall Tile Installations.

2. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
   a. Specification is based on:
      1) EBM-Lite Epoxy Bonding Mortar by Custom Building Products.
      2) WA Epoxy Adhesives by ARDEX Engineered Cements.
      3) Kerapoxy 410 by Mapei.
   b. Performance:
      1) Water Cleanable Setting Epoxy.
      2) Non-Sag Characteristics for Wall Tile Installations.

C. Grout:

a. Specification is based on:
   1) Laticrete or approved equal.

2. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
   a. Specification is based on:
      1) Prism SureColor Grout by Custom Building Products.
      2) FL Rapid set sanded grout by Ardex. If an unsanded grout is desired choose Ardex FG-C Microtec unsanded floor and wall grout.
      3) By Mapei.
   b. Performance:
      1) For Use in Grout Joints 1/16 inch to 1/2 inch width.
      2) Rated for Scratch/Abrasion Sensitive Tile/Stone Surfaces.

3. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
   a. Basis of Design: Subject to compliance with requirements, provide SPECTRALOCK PRO Premium Grout by LATICRETE or one of the following:
      1) CEG-IG Industrial Grade Commercial Epoxy Grout by Custom Building Products.
      2) WA Epoxy Grout by ARDEX Engineered Cements.
      3) Opticolor by Mapei.
   b. Performance:
      1) For Use in Grout Joints 1/16 inch to 1/2 inch in width.
      2) Resistant to Oleic Acids and No-Rinse Cleaning Agents Normally Associated with Commercial Kitchen Conditions.
      3) Rated for use in both floor and wall applications, maintaining non-sag characteristics for vertical grout joints.
      4) Water Cleanable 100 percent Solids Grouting Epoxy.
   c. Features:
      1) Color: Laticrete color 34 Sandstone.
      2) Finish: Clear grout sealer.
D. Grout Sealer:

1. Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
   
a. Specification is based on:
   
   1) AquaMix Sealers' Choice Gold by Custom Building Products.
   
   2) By Mapei.
   
b. Performance:
   
   1) Water-Based Penetrating Sealer – No Sheen Formula.
   
   2) Low VOC Content, below 100 g/L.

E. Waterproof Membrane:

1. Specifically designed for bonding to cementitious substrate and thinset tile over a sloped mortar bed or prefabricated shower pan; complying with ANSI A118.10 and ANSI A108.13.
   
a. Specification is based on:
   
   1) RedGard Waterproofing & Crack Prevention Membrane by Custom Building Products.
   
   2) 8+9 rapid waterproofing by ARDEX Engineered Cements.
   
   3) Mapelastic 400 by Mapei.
   
b. Performance:
   
   1) Thickness: 25 mils, minimum, dry film thickness.
   
   2) Thin-Load Bearing Membrane Designed to Suppress Horizontal In-Plane Cracks in Concrete Up to 1/8 inch in width.

F. Crack Isolation Membrane:

1. Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated.
   
a. Specification is based on:
   
   1) RedGard Waterproofing & Crack Prevention Membrane by Custom Building Products.
2) 8+9 Waterproof Membrane by Ardex.
3) Mapelastic AquaDefense by Mapei.

b. Performance:
1) Thin-Load Bearing Membrane Designed to Suppress Horizontal In-Plane Cracks in Concrete Up to 1/8 inch in width.

G. Sound Reduction Underlayment:
1. Comply with ANSI A118.13, bonded membrane.
   a. Specification is based on:
      1) EasyMat 5mm Sound Reduction Mat Underlayment by Custom Building Products.
      2) DS 70 acoustic mat 5mm by Ardex.
   b. Performance:
      1) Mat Underlayment to Maintain Delta of 20 or Greater.
      2) Mat Underlayment to be Compatible with Setting Mortar and Grouting Materials.

H. Joint Sealant:
1. For treatment of movement, expansion, and change of plane joints in tile work, complying with ASTM C920, and requirements of TCNA (HB) section EJ-171.
   a. Specification is based on:
      1) 100 percent Silicone Commercial Sealant by Custom Building Products.
      2) SX 100 percent silicone sealant by ARDEX Engineered Cements.
      3) Mapesil by Mapei.
   b. Performance:
      1) Sealant Material Must Maintain Shore A Hardness of 20 or Greater for conditions exposed to foot traffic.
      2) Sealant Material Must be Color Matched to Selected Grout Color.

I. Tile Backer Board:
1. Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
   
a. Specification is based on:
   1) DensShield Tile Backer by Georgia-Pacific Gypsum.
   
b. Performance:
   1) Core: Type X.
   2) Thickness: 5/8 inch.

2.05 INSTALLATION METHODS

A. Wall Installation over Gypsum: In accordance with The Tile Council of North America Handbook TCNA (HB):
   1. TCNA Installation Method: W244.
   2. Using waterproof membrane at toilet room walls containing plumbing.

B. Floor Installation over Concrete: In accordance with The Tile Council of North America Handbook TCNA (HB):

C. Shower Wall Installation over Tile Backer: In accordance with The Tile Council of North America Handbook TCNA (HB):
   1. TCNA Installation Method: B422.
   2. Carry membrane up shower walls to ceiling.

2.06 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.

B. Verify Deflection of floor using note "Maximum Allowable Deflection..." under the headline Notes / Definitions in the TCA manual. This limit 1/360 with a 300 lb concentrated load shall be doubled to 1/720 for stone tiles.
C. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

D. Large format tiles require very flat floors. Do not install if floors are not the equivalent of a floor flatness of Ff 50 (35 local) and Fl 50 (35 local).

E. Verify that concrete subfloor surfaces are ready for tile installation in accordance with Section 09 05 61 - Flooring Moisture Measurement and Mitigation for moisture emission rate and alkalinity; obtain instructions if test results are not within the following limits:

1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours, tested according to ASTM F1869.

2. Alkalinity: pH range of 5 to 9, tested according to ASTM F710.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General: Install all materials in accordance with manufacturer’s instructions based on conditions present.

B. Extend tile work into recesses and under or behind fixtures and cabinets to form a complete covering without interruptions. Terminate work neatly at obstructions, edges, and corners.

C. Ground Tile: When partial tiles must be used on exposed edges:

1. Grind the edges of cut unglazed thru-body tile to mimic the factory edge and place the cut edge in.

2. If a cut edge must face out, grind with fine enough grit to match the finish texture of the tile as close as possible.

3. Submit samples for approval prior to commencing work.

D. Lay tile to pattern indicated.

1. Do not interrupt tile pattern through openings.

2. Align floor, base, wall, and trim joints where sizes permit.

3. Lay out tilework and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting.
E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.


F. Sound tile after setting. Replace hollow sounding units.

G. Keep expansion joints free of adhesive or grout. Apply sealant to joints.

H. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

I. Grout tile joints.

J. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 ERECTION TOLERANCES

A. Lippage:

<table>
<thead>
<tr>
<th>Material</th>
<th>Size</th>
<th>Joint Width</th>
<th>Allowable Lippage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glazed Wall/Mosaics</td>
<td>1 inch x 1 inch to 6 inches x 6 inches</td>
<td>1/8 inch or less</td>
<td>1/32 inch</td>
</tr>
<tr>
<td>Quarry</td>
<td>6 inches x 6 inches and larger</td>
<td>1/4 inch or greater</td>
<td>1/16 inch</td>
</tr>
<tr>
<td>Paver/Stone</td>
<td>All</td>
<td>1/8 inch to 1/4 inch</td>
<td>1/32 inch</td>
</tr>
<tr>
<td>Paver/Stone</td>
<td>All</td>
<td>1/4 inch or greater</td>
<td>1/16 inch</td>
</tr>
</tbody>
</table>

1. The ANSI A137.1 standard defined allowed warpage according to the type of tile.

2. 5.3.1.2.6 Warpage: For example, paver tiles, when measured as described in ASTM C485, the warpage of each tile in the sample shall not exceed 1.0 percent along any edge nor 0.75 percent on either diagonal. From this formula the allowable warpage can be determined.

3. The amount of allowable tile warpage is not used in the calculation of allowable lippage. Rather, allowable lippage is the total of the inherent (i.e. actual) tile warpage and the allowable lippage from the table above. Of course, the actual warpage should not exceed the allowable warpage as calculated above.
4. Running Bond / Brick Joint Tile Patterns: For Running Bond/Brick Joint Patterns utilizing tiles (square or rectangular) where the side being offset is greater than 18 inches (nominal dimension), the running bond offset will be a maximum of 33 percent unless otherwise specified by the tile manufacturer. If an offset greater than 33 percent is specified, specifier and owner must approve mockup and lippage.

5. Floor/Substrate Flatness Requirements: Maximum allowable plane variation: 1/4 inch in 10.0 feet for installation of small format tiles (all edges of tile units less than 15 inches in length). Maximum allowable plane variation: 1/8 inch in 10.0 feet for installation of large format tiles (tile units maintaining any edge 15 inches in length or greater).

3.05 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

END OF SECTION
SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Acoustical units.
B. Suspension systems.

1.02 SUBMITTALS

A. Qualification Data: For manufacturer and installer.
B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, mechanical and electrical items installed in the ceiling, and perimeter molding and suspension/bracing details.
C. Product Data: Provide data on suspension system components, acoustical units, and perimeter molding/seismic connections.
D. Samples: Submit two samples 12 x 12 inch in size illustrating material and finish of acoustical units.
E. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
F. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.
G. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
H. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining system's materials and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience.

1.04 MOCKUP

A. Visual and Constructability Mockup:
   1. Construct and participate in mockup.

B. Locate where directed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.06 WARRANTY

A. Provide 10-year manufacturer's warranty on all acoustical panels for sagging and warping, grid system, rusting, and manufacturer's defects.

B. Provide 15-year warranty for all products using additional "Humidity and Sag resistance" control systems.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Suspended metal grid ceiling systems with seismic edge clips and manufactured edge trim at changes in plane, and acoustical units.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Seismic Requirements:
   1. Classification: Conform to ASTM C635/C635M, Heavy Duty Classification.

B. Components: Lock together in a positive manner.

C. Pull out tension:
D. Seismic Lateral Design: Conform to IBC and ASCE 7 especially requirement for independent support from structure above for light fixture and mechanical services installed into acoustical lay-in panel ceiling systems.

E. Install to conceal plenum space above acoustical ceiling system and to allow access.

F. Make provisions for vertical as well as horizontal suspension systems.

2.03 ACOUSTICAL UNITS

A. (ACT1) Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.

2.04 SUSPENSION SYSTEM(S)

A. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.

B. Suspension Systems - General: ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled light-duty.
   1. Profile as specified in Finish Schedule on the drawings.

2.05 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Support Channels and Hangers:
   1. Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

C. Perimeter Moldings at Changes in Elevation:
   1. Same material and finish as grid.
      b. At Concealed Grid: Provide concealed molding.

D. Seismic Suspension Edge Clips:
   1. Manufacturer's approved, to meet code required movement without 2 inch wall angles.
a. Basis of Design: Seismic RX BERC2 clip components by Armstrong or ACM7 seismic clips components by USG.

E. Demountable Ceiling Grid Clips:

F. Acoustical Sealant for Perimeter Moldings:

G. Touch-up Paint:
   1. Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.

B. Suspension system:
   1. Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions and as supplemented in this section.

   2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

   3. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
      a. See also reflected ceiling plans. Where 50 percent unit cannot be achieved, consult Architect before installation.

   4. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

   5. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
6. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

7. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

8. Do not support components on main runners or cross runners if weight causes excess deflection.

9. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

10. Do not eccentrically load system or induce rotation of runners.

11. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

C. Acoustical Units:

1. Install acoustical units in accordance with manufacturer's instructions.

2. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

3. Lay directional patterned units with pattern parallel to longest room axis if not shown on reflected ceiling plans.

4. Fit border trim neatly against abutting surfaces.

5. Install units after above-ceiling work is complete.

6. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

7. Cutting Acoustical Units:
   a. Cut to fit irregular grid and perimeter edge trim.
   b. Make field cut edges of same profile as factory edges.
   c. Double cut and field paint exposed reveal edges.
   d. Seal cut edges of ceiling panels to encapsulate edges to same level as factory finish using manufacturer's recommended touch up materials.

8. Where obstructions occur, provide preformed closures to match perimeter molding.
9. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.05 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria and warranty.

END OF SECTION
SECTION 09 65 13
RESILIENT BASE AND ACCESSORIES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Resilient base.

B. Resilient installation accessories.

1.02  SUBMITTALS

A. Qualification Data:  For manufacturer and installer.

B. Product Data:  Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings:  Indicate locations.

D. Base and Accessory Samples: Submit manufacturer’s complete set of color samples for initial selection.

E. Certificate:  Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.

F. Manufacturer’s Installation Instructions:  Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

G. Warranty:  Submit manufacturer’s warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.

H. Maintenance Data:  For user operation and maintenance of system including:

   1. Methods for maintaining system's materials and finishes.

   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

   3. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.03  MAINTENANCE MATERIAL

A. Maintenance Materials:  Furnish the following for Owner's use in maintenance of project.
1. Extra Wall Base: 20 linear feet of each type and color.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.06 WARRANTY

A. Provide minimum Manufacturers Limited 5 year commercial warranty for manufacturing defects.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Resilient base and installation accessories for transition to other flooring types.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.

2.03 RESILIENT BASE

A. (B1) Resilient Base: ASTM F1861, top set, and as follows:
   1. Basis of Design: Refer to Drawing Sheet AF101 Finish Plan.
   3. Length: Roll (4 foot sections are not acceptable except as maintenance stock).

2.04 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Primers, Adhesives, and Seaming Materials:
1. Waterproof; types recommended by flooring manufacturer.

C. Filler for Coved Base:
   1. Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work.

B. Verify that wall surfaces are smooth and flat within the tolerances specified, are dust-free, and are ready to receive resilient base.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General:
   1. Install all materials in accordance with manufacturer's instructions based on conditions present.
   2. Starting installation constitutes acceptance of subfloor conditions.
   3. Fit joints tightly.

B. Resilient Base:
   1. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. At exposed ends, use premolded units.
   2. Scribe and fit to door frames and other interruptions.

3.04 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Initial cleaning and finishing are the responsibility of the contractor.
   1. Follow manufacturer's recommendations for initial cleaning and finishing procedures.
   2. Not all types of flooring require finishing.

C. Dispose of all waste material in accordance with project's Waste Management Plan.
3.05 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile.

1.02 RELATED REQUIREMENTS

A. 09 65 13 - Resilient Base and Accessories: For resilient installation accessories installed with carpet tile.

1.03 SUBMITTALS

A. Qualification Data: For installer.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Shop Drawings: Indicate layout of joints.

D. Flooring Sample: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Accessory Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

F. Certificate: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of sub-floor is acceptable.

G. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

H. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

I. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

J. Maintenance Data: For user operation and maintenance of materials including:

1. Methods for maintaining materials and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

3. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.04 MAINTENANCE MATERIAL

A. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Flooring Material: 3 percent of each type and color (minimum of 10 yards) each type and color.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.06 MOCKUP

A. Visual and Constructability Mockup:

1. Construct and participate in mockup. Mockup a minimum of 5 foot by 5 foot for Architect's review. Approved mockup may remain in place.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.08 WARRANTY

A. Provide minimum Manufacturers Limited 5 year commercial warranty for manufacturing defects.

PART 2 PRODUCTS

2.01 PERFORMANCE AND DESIGN CRITERIA

A. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.

B. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").

2.02 CARPET TILE


2.03 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Subfloor Filler: Type recommended by adhesive material manufacturer.

C. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.

D. Moldings, Transition and Edge Strips: Section 09 65 13 - Resilient Base and Accessories.

E. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Cementitious Subfloor Surfaces: Verify that substrates meet moisture, internal relative humidity and alkalinity requirements of flooring and adhesive manufacturers in accordance with Section 09 05 61 - Flooring Moisture Measurement and Mitigation.

1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General:

1. Install all materials in accordance with manufacturer's instructions based on conditions present and CRI Carpet Installation Standard.

2. Blend carpet from different cartons to ensure minimal variation in color match.

3. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
4. Lay carpet tile in pattern scheduled in Finish Schedule on Drawing Sheet AF101, with pile direction parallel to next unit, set aligned as indicated on shop drawings.

5. Starting installation constitutes acceptance of subfloor conditions.

6. Fit joints tightly.

7. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

8. Adhere carpet tile to substrate along centerline of rooms, at perimeter of rooms, where tiles are cut, and at 15 foot intervals throughout rooms. Lay remainder of tile dry over substrate.

9. Trim carpet tile neatly at walls and around interruptions.

10. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
   a. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
   b. Resilient Strips: Attach to substrate using adhesive.

3.04 CLEANING

   A. Remove excess adhesive from floor, base, and wall surfaces without damage.
   B. Clean and vacuum carpet tile surfaces in accordance with manufacturer's instructions.
   C. Dispose of all waste material in accordance with project's Waste Management Plan.

3.05 PROTECTION

   A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior Painting System by Substrate.
B. Interior High-Performance Coating System by Substrate.
C. Surface Preparation for Field-Applied Painting and Coating.

1.02 RELATED REQUIREMENTS

A. 06 41 00 - Architectural Wood Casework: For finishing of wood casework.
B. 09 21 16 - Gypsum Board Assemblies: For finish levels required of substrates.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Surface Preparation Meeting: Convene within 30 days of paint scope award:
   1. Agenda items:
      b. Review proposed specialty surface preparation techniques.
B. Preinstallation Meeting: Convene one week before the start of work for this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.
C. Coordination Meeting: Matching site- and field-applied coatings required: Convene one week before application.

1.04 SUBMITTALS

A. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.
B. Substrate Preparation Plan:
   1. Cleaning sample area selection.
   2. Preparation and execution including pollution control and safety procedures.
   3. Coordination with other Work.
4. Proposed cleaning and restoration methods:
   a. Submit a descriptive narrative on cleaning and restoration methods to be employed in the Work. Organize description in sequence from preparation through completion of the Work. Include a schedule showing estimated time, in calendar days, for completion of each phase of the Work shall be included.
   b. Submit the cleaning and restoration methods, tools, and materials selected for each specific material, take into account adjacent materials, assemblies and location of the area to be worked upon when selecting cleaning materials and procedures.

C. Shop Drawings: Include annotated architectural drawing indicating scope and location of:
   1. Existing substrates to be cleaned and painted or coated.
   2. Exposed Overhead Work and Open to Structure areas to receive painting or coating.

D. Sample: Submit three cardstock "draw down" samples, 8.5 x 11 inch in size, including standard and custom paint color formula and availability information, illustrating range of color and texture available for each surface finishing product scheduled.

E. Manufacturer’s Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.

F. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.

G. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to finishes, and performance.
   3. Recommendations on maintenance schedule.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years of experience and approved by manufacturer.
1.06 MOCKUP

A. Required mockups:
   1. Paint one wall (from corner to corner) of the following rooms to serve as a mockup:
      a. Architect will select 3 different rooms or walls.

B. Visual and Constructability Mockup:
   1. Construct and participate mockup.
   2. Mockups may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

B. Store, mix, apply and dispose of paint related materials in accordance with requirements of Authorities Having Jurisdiction.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Field-applied painting and coatings and substrate preparation.

2.02 GENERAL

A. Provide all paint and coating products used in any individual system from the same manufacturer, unless noted otherwise below.

B. Sheen, unless otherwise noted:
   2. Ceilings: Flat.

C. "Dry-Fall" or other similar paint product formulation may be required depending upon the location and are allowed but must be submitted.

D. Surfaces to paint:
   1. Interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
2.03 MANUFACTURERS

A. Paints:

B. Transparent Coatings:

C. High-Performance Coatings:
   2. **C-B**: Carboline; www.carboline.com. (Distributed by Rodda Paints)
   5. **P-C**: Precision Coatings; www.precisioncoatingsinc.com. (Distributed by Rodda Paints)
D. Dry-Fall Paint:

5. R-C: Not Applicable.

2.04 INTERIOR PAINTING SYSTEM BY SUBSTRATE

A. Aluminum

1. Acrylic:
   a. B-M:
      1) Primer: Corotech V175 Water-based Bonding Primer; 1.5-2 mils dft.
      2) Topcoat: Ultra Spec 500 Interior Series; 1.8 mils dft.
   b. K-M:
      1) Primer: 5725 Acrylic Primer; 1.5-2.2 mils dft.
      2) Top Coat: 5885 Acrylic DTM; 1.6-2.3 mils dft.
   c. MPC:
      1) Primer: Acrimetal 3102 Int./Ext DTM Acrylic Primer; 1.5 mils dft.
      2) Top Coat: Acrimetal 3104 Satin Int./Ext DTM Acrylic; 2.3 mils dft.
   d. PPG:
      2) Topcoat: 4216 Series Pitt-Tech Plus HP/Devflex 4216 HP Semi-Gloss; 1.5-4.0 mils dft.
   e. R-C:
      1) Primer: EcoLogic Shop Primer 7032 Series; 2.0 mils dft.
2) Topcoat: Protech MultiMaster VST Acrylic Urethane Semi-Gloss 4489 Series; 1.7 mils dft.

f. **S-W:**

1) Primer: Pro Industrial Pro-Cryl Universal Primer B66-1310 Series; 1.9 mils dft.

2) Topcoat: Pro Industrial Eg-Shel Acrylic, B66-660 Series; 2.2 mils dft.

B. Ferrous Metal:

1. Acrylic:
   a. **B-M:**
      1) Primer: Ultra Spec Acrylic DTM Primer HP04; 1.7-2.3 mils dft.
      2) Topcoat: Ultra Spec Acrylic DTM Gloss HP29; 2.3 mils dft.
   b. **K-M:**
      1) Primer: 5725 Acrylic Primer; 1.5-2.2 mils dft.
      2) Top Coat: 5885 Acrylic DTM; 1.6-2.3 mils dft.
   c. **MPC:**
      1) Primer: Acrimetal 3102 Int./Ext DTM Acrylic Primer; 1.5 mils dft.
      2) Top Coat: Acrimetal 3104 Satin Int./Ext DTM Acrylic; 2.3 mils dft.
   d. **PPG:**
      1) Primer: 4020PF Series Pitt-Tech Plus Primer/Finish; 2.2-3.5 mils dft.
      2) Topcoat: 4216 Series Pitt-Tech Plus HP/Devflex 4216 HP Semi-Gloss; 1.5-4.0 mils dft.
   e. **R-C:**
      1) Primer: EcoLogic Shop Primer 7032 Series; 2.0 mils dft.
      2) Topcoat: Protech MultiMaster VST Acrylic Urethane Semi-Gloss 4489 Series; 1.7 mils dft.
      3) Alternative Topcoat: Protech Pre-Catalyzed Epoxy Semi-Gloss 4490 Series; 1.5-2.0 mils dft.
   f. **S-W:**
1) Primer: Pro Industrial Pro-Cryl Universal Primer B66-1310 Series; 1.9 mils dft.
2) Topcoat: Pro Industrial Eg-Shel Acrylic, B66-660 Series; 2.2 mils dft.

C. Gypsum Board

1. Acrylic-Enamel; two coats over primer:
   a. B-M:
      1) Primer: Ultra Spec Primer N534; 1.4 mils dft.
      2) Topcoat: Ultra Spec 500 Interior Enamel Series; 1.8 mils dft.
   b. K-M:
      1) Primer: Acryplex 971 PVA Primer Sealer; 1.4 mils dft.
      2) Topcoat: Premium Professional 1010 Eggshell; 1.5 mils dft.
   c. MPC:
      1) Primer: MPI 50 PVA Primer Sealer; 1.4 mils dft.
      2) Topcoat: Performance-Plus Acrylic Eggshell; 1.5 mils dft.
   d. PPG:
      1) Primer: 17-921XI Series Seal Grip Int/Ext Acrylic Universal Primer/Sealer; 1.6 mils dft.
      2) Topcoat: 9-110XI Series Pure Performance Interior 100% Acrylic Flat; 1.4-1.9 mils dft.
      3) Topcoat: 9-310XI Series Pure Performance Interior 100% Acrylic Eggshell; 1.2-1.6 mils dft.
      4) Topcoat: 9-510XI Series Pure Performance Interior 100% Acrylic Semi-Gloss; 1.3-1.7 mils dft.
   e. R-C:
      1) Primer: 503601 Master Painter UL VOC Interior Primer/Sealer; 1.5 mils dft.
      2) Topcoats: 523501 Horizon Interior Acrylic Satin; 1.5 mils dft.
f. **S-W:**
   
   1) Primer: PrepRite ProBlock Interior Latex Primer, B51-600 Series; 1.4 mils dft.
   
   2) Primer: ProMar 200 Zero VOC Primer B28 Series; 1.5 mils dft.
   
   3) Topcoat: Duration Home Interior Latex Satin, A97-1200 Series; 1.6 mils dft.
   
   4) Alternate Topcoat: ProMar 200 HP Zero VOC Latex Eg-Shel, B20-1900 Series; 1.7 mils dft.

D. **Insulation Service Jackets:**

   1. Latex; two topcoats over primer:
      
      a. **B-M:**
         
         1) Primer: Sure Seal Acrylic Primer 027; 1.3 mils dft.
         
         2) Topcoat: Ultra Spec 500 Interior Enamel Series; 1.8 mils dft.

      b. **K-M:**
         
         1) Primer: 973 AcryPlex Latex Interior Enamel Undercoat; 1.5-2 mils dft.
         
         2) Two Coats: Premium Professional 1010 Eggshell; 1.5-2 mils dft.

      c. **MPC:**
         
         1) Primer: Premium PVA Primer Sealer 6020; 1.5 mils dft.
         
         2) Two Coats: Performance Plus Eggshell; 1.5 mils dft.

      d. **PPG:**
         
         
         2) Topcoat: 6-4110XI Series Speedhide Zero Interior Zero VOC Flat; 1.4 mils dft.

      e. **R-C:**
         
         1) Primer: 503601 Master Painter Ultra-Low VOC Interior Primer/Sealer; 1.5 mils dft.
         
         2) Topcoat: 513601 Master Painter Ultra-Low VOC Interior; 1.5 mils dft.
f. **S-W:**

1) Primer: ProMar 200 Zero VOC Primer B28 Series; 1.5 mils dft.
2) Topcoat: ProMar 200 Zero VOC; B30 Series; 1.6 mils dft.

E. **Wood, high-touch areas:**

1. **Acrylic-Enamel; two topcoats over primer:**
   a. **B-M:**
      1) Primer: Sure Seal Acrylic Primer 027; 1.3 mils dft.
      2) Topcoat: Ultra Spec Scuff-X Eggshell 485; 1.7 mils dft.
   b. **K-M:**
      1) Primer: Kel bond 295 Universal Primer Int/Ext.
      2) Topcoat: Dura-Poxy Semi-Gloss 1685.
   c. **MPC:**
      1) Primer: Miller Prime 2840 Enamel Undercoat.
   d. **PPG:**
      1) Primer: 17-921XI Series Seal Grip Int/Ext Acrylic Universal Primer/Sealer; 1.6 mils dft.
      2) Topcoat: V70-610 Series Break-Through I/E Waterborne Acrylic Gloss; 1.5 mils dft.
   e. **R-C:**
      1) Primer: Unique Acrylic Enamel Undercoater 502001; 1.5 mils dft.
      2) Topcoat: 523501 Horizon Interior Acrylic Satin; 1.5 mils dft.
   f. **S-W:**
      1) Primer: PrepLite ProBlock Interior Latex Primer B51-600 Series; 1.4 mils dft.
2) Topcoat: Pro Industrial Water-Based Alkyd Urethane Enamel B53-1050 Series; 4.0 mils wet, 1.4 mils dry per coat.

F. Wood, low-touch areas:

1. Acrylic-Enamel; two topcoats over primer:
   a. **B-M:**
      1) Primer: Sure Seal Acrylic Primer 027; 1.3 mils dft.
      2) Topcoat: Ultra Spec 500 Interior Series; 1.8 mils dft.
   b. **K-M:**
      1) Primer: Kel bond 295 Universal Primer Int/Ext.
      2) Topcoat: Dura-Poxy Semi-Gloss 1685.
   c. **MPC:**
      1) Primer: Miller Prime 2840 Enamel Undercoat.
   d. **PPG:**
      2) Topcoat: 6-4110XI Series Speedhide Zero Interior Zero VOC Flat; 1.4 mils dft.
      3) Topcoat: 6-4310XI Series Speedhide Zero Interior Zero VOC Eggshell; 1.5 mils dft.
      4) Topcoat: 6-4410XI Series Speedhide Zero Interior Zero VOC Latex Satin; 1.5 mils dft.
   e. **R-C:**
      1) Primer: Unique Acrylic Enamel Undercoater 502001; 1.5 mils dft.
      2) Topcoat: 523601 Master Painter UL VOC Satin; 1.5 mils dft.
      3) Semi-Gloss Topcoats: 543601 Master Painter UL VOC Interior Semi-Gloss Enamel; 1.5 mils dft.
f. **S-W:**
   1) Primer: PrepLite ProBlock Interior Latex Primer B51-600 Series; 1.4 mils dft.
   2) Topcoat: Pro Industrial Eg-Shel Acrylic B66-660 Series; 2.2 mils dft.

**2.05 INTERIOR HIGH-PERFORMANCE COATING SYSTEM BY SUBSTRATE**

A. High-performance coatings below are defined as High Performance by the coating manufacturer.

B. **Aluminum:**
   
   1. **Urethane:**
      
      a. **B-M:**
         
         1) Primer: Corotech V150 Epoxy Primer; 2.4-2.8 mils dft.
         2) Topcoat: Corotech V500 Aliphatic Acrylic Urethane; 2.3-3.3 mils dft.
      
      b. **C-B:**
         
         1) Primer: Galoseal WB Waterborne Acrylic; 0.5-1.0 mils dft.
         2) Finish: Carbothane 133MC Urethane; 2.0-3.0 mils dft.
      
      c. **K-M:**
         
         2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
         3) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Gloss; 2.0-4.0 mils dft.
      
      d. **MPC:**
         
         2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
         3) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Gloss; 2.0-4.0 mils dft.
      
      e. **PPG:**

2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.

3) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Gloss; 2.0-4.0 mils dft.

f. S-W:

1) Primer: Pro Industrial Pro-Cryl Primer, B66-310 Series; 1.9 mils dft.

2) Topcoat: Water Based Acrolon 100, B65-720 Series; 1.8 mils dft.

C. Ferrous Metal:

1. Urethane:
   a. B-M:

   1) Primer: Corotech V150 Epoxy Primer; 2.4-2.8 mils dft.

   2) Topcoat: Corotech V500 Aliphatic Acrylic Urethane; 2.3-3.3 mils dft.

   b. K-M:


   2) Topcoat: 95-3300 Series Durethane DTM Urethane Mastic Gloss; 3.0-5.0 mils dft.

   c. MPC:


   2) Topcoat: 95-3300 Series Durethane DTM Urethane Mastic Gloss; 3.0-5.0 mils dft.

   d. PPG:


   2) Topcoat: 95-3300 Series Durethane DTM Urethane Mastic Gloss; 3.0-5.0 mils dft.

   e. R-C:

   1) Primer: EcoLogic Shop Primer 7032 Series; 2.0 mils dft.
2) Topcoat: Protech MultiMaster VST Acrylic Urethane Semi-Gloss 4489 Series; 1.7 mils dft.

f. **S-W:**
1) Primer: Pro Industrial Pro-Cryl Primer, B66-310 Series; 1.9 mils dft.
2) Topcoat: Water Based Acrolon 100, B65-720 Series; 1.8 mils dft.

D. Gypsum Board:

1. **Epoxy:**
   a. **B-M:**
      1) Primer: Sure Seal Acrylic Primer 027; 1.3 mils dft.
      2) Topcoat: Corotech V440 Water-Based Epoxy; 1.5-1.9 mils dft.
   b. **K-M:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   c. **MPC:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   d. **PPG:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   e. **R-C:**
      1) Primer: 503601 Master Painter UL VOC Interior Primer/Sealer; 1.5 mils dft.
      2) Topcoat: Protech Pre-Catalyzed Epoxy Semi-Gloss, 449001; 1.5-2.0 mils dft.
   f. **S-W:**
1) Primer: Quick Dry Interior Latex Stain Blocking Primer, B51W8670; 1.1 mils dft.
2) Primer: ProMar 200 Zero VOC Latex Primer B28W2600; 4.0 mils
3) Topcoat: Pro Industrial Water Based Catalyzed Epoxy Gloss B73-300 Series; 2.0 mils dft.
4) Alternate: Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss K46 Series; 4.0 mils wet, 1.4 mils dry per coat.

E. Wood, Opaque:

1. Epoxy: Two topcoats over primer:
   a. **B-M:**
      1) Primer: Sure Seal Latex Primer 027; 1.3 mils dft.
      2) Topcoat: Corotech V440 Waterborne Amine Epoxy; 2.0 mils dft.
   b. **K-M:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   c. **MPC:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   d. **PPG:**
      2) Topcoat: 98E-1 Series Aquapon WB EP Low VOC Water-Based Epoxy Semi-Gloss; 2.0-4.0 mils dft.
   e. **R-C:**
      1) Primer: Unique Acrylic Enamel Undercoater 502001; 1.5 mils dft.
      2) Topcoat: Protech Pre-Catalyzed Epoxy Semi-Gloss, 449001; 1.5-2.0 mils dft.
   f. **R-O:**
1) Primer: Zinsser Bulls-Eye 1-2-3 High Hide Water-Based; 1.0-2.0 mils dft.

2) Topcoat: S60/S62 Sierra Performance WB Epoxy; 2.0-3.0 mils dft.

g. **S-W:**

1) Primer: PrepRite ProBlock Interior Latex Primer B51-600 Series; 1.4 mils dft.

2) Topcoat: Pro Industrial Water-Based Catalyzed Epoxy Gloss B73-300 Series; 2.0 mils dft.

3) Alternate: Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss K46 Series; 4.0 mils wet, 1.4 mils dry per coat.

F. Wood, Transparent for medium-to-heavy trafficked horizontal surfaces:

1. Urethane:

   a. **B-M:**

      1) Primer: Lenmar 1Y519 Rapid Seal Dual Purpose Sealer; 1.1 mils dft.

      2) Topcoat: Lenmar 1Y724 Oil Polyurethane Wood Finish; 1.3 mils dft.

      3) Topcoat: Lenmar Water-Based Clear Coat Pro HT Floor Finish 1PR.50X Series; 1.0-1.5 mils dft.

   b. **PPG:**

      1) Topcoat: DFT159 Deft 159 Series Deft Polyurethane Int Water Based Acrylic Satin; 0.8 mils dft.

      2) Topcoat: DFT157 Deft 157 Series Deft Polyurethane Int Water Based Acrylic Gloss; 0.8 mils dft.

   c. **S-W:**

      1) ArmorSeal Rexthane I Moisture-Cure Urethane Clear Coat B65C60; 3 mils dft.

G. Wood, Transparent for heavy trafficked horizontal surfaces:

1. Polyurethane:

   a. **B-M:**

      1) Primer: Lenmar 1Y519 Rapid Seal Dual Purpose Sealer; 1.1 mils dft.

      2) Topcoat: Lenmar 1Y724 Polyurethane Wood Finish; 1.3 mils dft.
3) Topcoat: Lenmar Water-Based Clear Coat Pro HT Floor Finish 1PR.50X Series; 1.0-1.5 mils dft.

b. **K-M:**
   1) Topcoat: DFT159 Deft 159 Series Deft Polyurethane Int Water Based Acrylic Satin; 0.8 mils dft.
   2) Topcoat: DFT157 Deft 157 Series Deft Polyurethane Int Water Based Acrylic Gloss; 0.8 mils dft.

c. **MPC:**
   1) Topcoat: DFT159 Deft 159 Series Deft Polyurethane Int Water Based Acrylic Satin; 0.8 mils dft.
   2) Topcoat: DFT157 Deft 157 Series Deft Polyurethane Int Water Based Acrylic Gloss; 0.8 mils dft.

### 2.06 ACCESSORIES

A. Protective Backing Paint: As needed at dissimilar metals and at metal-to-concrete or metal-to-metal-to-masonry.

1. **B-M:**
   a. Primer/Finish: Corotech V157 Coal Tar Epoxy, 8.3-16.1 mils dft.

2. **C-B:**
   a. Bitumastic 300 M Coal Tar Epoxy, 6.0-10.0 mils dft.

3. **K-M:**
   a. Amercoat 78 HB Amine-cured Coal Tar Epoxy; 12.0-16.0 mils dft.

4. **MPC:**
   a. Amercoat 78 HB Amine-cured Coal Tar Epoxy; 12.0-16.0 mils dft.

5. **PPG:**
   a. Amercoat 78 HB Amine-Cured Coal Tar Epoxy; 12.0-16.0 mils dft.

6. **S-W:**
   a. Macropoxy HS High Solids Epoxy B58-400 Series; 5.0-6.0 mils dft.

B. Material for patching and concealing fastener heads: Latex filler.
PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate surfaces are ready to receive work to include the removal or protection of adjacent materials not to be painted and cleaning to remove particulate or residues that are incompatible or may impact the bonding capability of the coating.

B. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance.

C. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

   1. Wood: 15 percent.
   2. Gypsum Board: 12 percent.

3.02 SURFACE PREPARATION BY SUBSTRATE

A. Metal:

  1. Aluminum:

     a. Clean and remove loose surface oxidation. Mechanically abrade or abrasive blast in accordance with SSPC-SP 16 guidelines to achieve suitable anchor profile for material specified. Size and hardness of abrasive should be adjusted as necessary based on the hardness of the substrate and anchor profile desired for adhesion.

     b. Aluminum may be treated with a surface treatment compliant with Mil-DTL-5541 or equivalent (non-immersion applications only).

  2. Ferrous Metal:

     a. Solvent clean according to SSPC-SP 1.


     c. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer or blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
3. Shop-Primed Steel: Clean field welds, bolted connections, and areas where shop
paint is abraded. Paint exposed areas with the same material as used for shop
priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

B. Wood:

1. Wood Substrate, General:
   a. Wash with a detergent solution, rinse thoroughly with clean water, and allow
to dry. Remove grade stamps and pencil marks by sanding lightly. Remove
loose wood fibers by brushing.
   b. Remove mildew by scrubbing with a commercial wash formulated for mildew
removal and as recommended by stain manufacturer.

2. Wood for Opaque Coatings:
   a. Interior Wood:
      1) Scrape and clean knots, and apply coat of knot sealer before applying
         primer.
      2) Sand surfaces that will be exposed to view, and dust off.
      3) Prime edges, ends, faces, undersides, and backsides of wood.
      4) After priming, fill holes and imperfections in the finish surfaces with putty
         or plastic wood filler. Sand smooth when dried.

3. Wood for Staining or Transparent Coatings:
   a. Interior Wood:
      1) Scrape and clean knots, and apply coat of knot sealer before applying
         primer.
      2) Apply wood filler paste to open-grain woods to produce smooth, glasslike
         finish.
         (a) Sand surfaces exposed to view and dust off.
         (b) After priming, fill holes and imperfections in the finish surfaces with putty
             or plastic wood filler. Sand smooth when dry.

4. Doors:
   a. Wood Doors to be field finished: Seal wood door top and bottom edge
      surfaces with clear sealer.
b. Metal Doors to be field painted: Prime metal door top and bottom edge surfaces.

C. Existing Substrates to receive painting and coating specified in this section:
   1. Surface Preparation of substrate.

3.03 APPLICATION

A. General: Apply all coatings in accordance with manufacturer's instructions based on conditions present.

B. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

C. Apply products in accordance with manufacturer's written instructions.

D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry in accordance with manufacturer's instructions.

F. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

H. Sand wood and metal surfaces lightly between coats to achieve required finish.

I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

J. Wood to Receive Transparent Coatings: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

L. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.

3.04 FIELD QUALITY CONTROL

A. Owner will provide field inspection.

B. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
1. Contractor shall touch up and restore coated surfaces damaged by testing.

2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.05 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 SCHEDULE

A. (P1, P2) Paint Color and Sheen: Refer to Drawing Sheet AF101 Finish Plan.

END OF SECTION
SECTION 10 26 05
WALL AND CORNER PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Corner guards.
B. Fiber reinforced plastic sheet.

1.02 SUBMITTALS

A. Product Data: Provide product criteria, characteristics, accessories, jointing and methods, and termination details for curtains, track and accessories.
B. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
C. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining system's hardware, operation, materials and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.
   3. Recommendations on maintenance schedule.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in the manufacture of work specified in this section with minimum 5 years of experience.
B. Installer Qualifications: Company specializing in performing the work of this section with minimum of 5 years of experience.

1.04 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

1.05 WARRANTY

A. Installation Warranty: Contractor shall correct defective Work within a 2 year period after Date of Substantial Completion.
PART 2 PRODUCTS

2.01 DESCRIPTION

A. Surface applied wall protection.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.03 CORNER GUARDS

A. Plastic Corner Guards:
   1. Basis of Design: To be determined by Architect.

2.04 STAINLESS STEEL CORNER GUARDS

A. Basis of Design: To be determined by Architect.

2.05 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions meet the manufacturer's requirements before starting work, including location of blocking.

3.02 PREPARATION

A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.
   
B. Install components plumb, level, square, and in proper alignment with drawings.

3.04 ADJUSTING

A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
3.05 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 10 28 00
TOILET AND SHOWER ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Toilet Room Accessories.
   B. Shower Room Accessories.

1.02 SUBMITTALS
   A. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.
   B. Sample: Submit 1 sample of each accessory, illustrating color and finish.
   C. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
   D. Maintenance Data: For user operation and maintenance of system including:
      1. Methods for maintaining system's materials and finishes.
      2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

1.03 MAINTENANCE MATERIAL
   A. Keys: Provide 3 keys for accessories to Owner; master key all lockable accessories.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

PART 2 PRODUCTS

2.01 DESCRIPTION
   A. Accessories to be installed in toilet and shower rooms.
2.02 PERFORMANCE AND DESIGN CRITERIA

A. Comply with ANSI/ICC A117.1, Americans with Disabilities Act (ADA Standards).

B. Grab bars, shower seats, and dressing room benches shall be designed to resist a single concentrated load of 250 pounds applied in any direction, at any point on the grab bar or seat so as to produce the maximum loading effects, in accordance with ICC (IBC)-2018 Section 1607.8.2.

C. Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

2.03 MANUFACTURERS

A. Specification is based on products listed.

2.04 ACCESSORIES

A. Toilet Room Accessories:
   1. For all accessories: Reference Equipment Schedule on drawings and Drawing Sheet AI402 for product details.
   2. (E11) Lavatory Mounted Soap Dispenser:
      a. Basis of Design: Bobrick B-822
   3. (E10) Wall Mounted Soap Dispenser:
      a. Basis of Design: Bobrick B2112
   4. (E12) Paper Towel Dispenser:
      a. Basis of Design: Bobrick B-3940
   5. (E13) Toilet Paper Dispenser:
      a. Basis of Design: Bobrick B-2840
   6. (E14) Seat Cover Dispenser:
      a. Basis of Design: Bobrick B-221
   7. (E15) Sanitary Napkin Dispenser:
      a. Basis of Design: Bobrick B-270
   8. (E16) ADA Bench:
      a. Basis of Design: WB Manufacturing LBS20042/BKT1218
9. (E17) Coat Hooks:
   a. Basis of Design: American Specialties 7345-S

10. (E18) Framed Mirror:
   a. Basis of Design: Bobrick B-290

11. (E30) Sanitary Napkin Vendor:
   a. Basis of Design: Bobrick B-2706

2.05 ACCESSORIES
   A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions meet the manufacturer’s requirements before starting work.

3.02 PREPARATION
   A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION
   A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.
   B. Install plumb and level, securely and rigidly anchored to substrate.
   C. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings.

3.04 TOLERANCES
   A. Maximum Variation from True Position: 1/4 inch.
   B. Maximum Variation from Plumb: 1/8 inch.

3.05 ADJUSTING
   A. Adjust and lubricate hardware for proper operation.

3.06 CLEANING
   A. Dispose of all waste material in accordance with project's Waste Management Plan.
3.07 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 10 51 00
LOCKERS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A.  Metal lockers.

1.02  RELATED REQUIREMENTS
   A.  09 22 16 - Non-Structural Metal Framing: Blocking and nailers.

1.03  ADMINISTRATIVE REQUIREMENTS
   A.  Preinstallation Meeting: Convene one week before the start of work for this section.
      1.  Review preparation and installation procedures and coordinating and scheduling required with related work.

1.04  SUBMITTALS
   A.  Product Data: Provide data on locker types, sizes, and accessories.
   B.  Shop Drawings: Indicate locker plan layout, numbering plan.
   C.  Samples: Submit two samples 3 x 6 inches in size, of each color scheduled; applied to specified substrate.
   D.  Manufacturer's Installation Instructions: Indicate component installation assembly.

1.05  DELIVERY, STORAGE, AND HANDLING
   A.  Protect locker finish and adjacent surfaces from damage.

PART 2  PRODUCTS

2.01  PERFORMANCE AND DESIGN CRITERIA
   A.  Code required criteria.
      1.  Accessibility Requirements: For lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.02  MANUFACTURERS
   A.  Metal Lockers:
1. Subject to compliance with requirements, provide PDQ Lockers (standard steel lockers) by Republic Storage Systems Co or one of the following:

2.03 ASSEMBLIES

   A. Metal Lockers:


   2. Size:

   a. Typical Units:

      1) Width: 24 inches.
      2) Height: 36 inches per locker; 72 inches in height for double stacked assembly.
      3) Depth: 18 inches.

   b. Boxed End Panels: 24 inches wide by 18 inches deep by 72 inches high.

   3. Color(s): To be selected by Architect from manufacturer's full range.

   4. Mounting: Refer to drawings.

   5. Base: None from manufacturer; mounted on existing 4 inch raised plinth with rubber base.

   6. Top: Sloped metal with closures.

   7. Ventilation Method: Louvers at top and bottom of door.

   8. Locking: Equipped for user-provided padlock hasps.

   9. Accessories:

      a. Handles: Steel recessed, equipped for user-provided padlock.
      b. Number plate on each locker unit.
      c. Clothes Rod: One per unit.
      d. Panel and angle fillers as needed for complete assembly.

         1) Panel Fillers: Full height of units.
2) Angle Fillers: Minimum 12 inch wide by 72 inches high, 18 gauge.

2.04 METAL LOCKERS

A. Lockers: Factory assembled, made of formed sheet steel, ASTM A653/A653M SS Grade 33/230, with G60/Z180 coating, stretcher leveled; metal edges finished smooth without burrs; baked enamel finished inside and out.

B. Locker Body: Formed and flanged; with steel stiffener ribs; electric spot welded.
   1. Body and Shelves: 24 gauge, 0.0239 inch.

C. Frames: Formed channel shape, welded and ground flush, welded to body, resilient gaskets and latching for quiet operation.

D. Doors: Hollow double pan, sandwich construction, 1-3/16 inch thick; welded construction, channel reinforced top and bottom with intermediate stiffener ribs, grind and finish edges smooth.
   1. Door Outer Face: 16 gauge, 0.0598 inch, minimum.
   2. Door Inner Face: 20 gauge, 0.0359 inch, minimum.
   3. Form recess for operating handle and locking device.
   4. Provide louvers in door face, top and bottom, for ventilation.

E. Hinges: Two for doors under 42 inches high; three for doors over 42 inches high; weld securely to locker body and door.
   1. Hinge Thickness: 14 gauge, 0.0747 inch.

F. Clothes Rod: Stainless steel or zinc-plated steel.

G. Number Plates: Provide oval shaped plates. Form block font style with ADA designation and ADA-compliant, in contrasting color.

H. Fabricate accessible lockers with bottom shelf no lower than 15 inches above the floor. Place hooks, coat rods, and any additional shelves no higher than 48 inches above the floor.

I. Latching/Locking:
   1. Lift trigger of 14 gauge steel with padlock eye.
   2. Latch engage the frame at a minimum of three points on doors greater than 42 inches, two points at any door equal to or less than 42 inches. Locking device function "positive automatic type" where by the door may be locked when open and closed without unlocking.
J. Rubber Silencers: Manufacturer's recommended type for latch and door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared bases are in correct position and configuration.
B. Verify bases and embedded anchors are properly sized.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install lockers plumb and square.
C. Place and secure on prepared base.
D. Secure lockers with anchor devices to suit substrate materials. Minimum Pullout Force: 100 lb.
E. Bolt adjoining locker units together to provide rigid installation.
F. Install end panels and filler panels.
G. Install accessories.
H. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.
B. Dispose of all waste material in accordance with project's Waste Management Plan.

END OF SECTION
SECTION 11 30 12

APPLIANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Kitchen appliances.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before the start of work for this section.

1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.03 SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Data: Manufacturer's data indicating dimensions, rated power figures, capacity, and operating features of each piece of residential equipment specified.

C. Copies of Warranties: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Electric Appliances: Listed and labeled by CSA/UL and complying with NEMA standards.

C. Gas Appliances: Bearing design certification seal of AGA.

1.05 WARRANTY

A. Provide five (5) year manufacturer's warranty on refrigeration system of refrigerators.

B. Provide ten (10) year manufacturer's warranty on tub and door liner of dishwashers.

PART 2 PRODUCTS

2.01 DESCRIPTION

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Accessibility Requirements: For appliances required to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.03 KITCHEN APPLIANCES

A. Reference Appliance Schedule on drawings for products. Reference Drawing Sheet AI402 Enlarged Equipment Plans.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify utility rough-ins are present and correctly located.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Anchor built-in equipment in place.

3.03 ADJUSTING

A. Adjust operating equipment to efficient operation.

3.04 CLEANING

A. Dispose of all waste material in accordance with project's Waste Management Plan.

B. Remove packing materials from equipment.

C. Wash and clean equipment.

END OF SECTION
SECTION 12 36 00
COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Natural quartz and resin composite countertops.

1.02 RELATED REQUIREMENTS
A. 06 41 00 - Architectural Wood Casework: For casework supporting countertops.
B. 10 28 00 - Toilet and Shower Accessories: For counter mounted accessories.

1.03 SUBMITTALS
A. Qualification Data: For design engineer and fabricator.
B. Product Data: Provide product criteria, characteristics, accessories, jointing and seaming methods, and termination conditions.
C. Shop Drawings: Complete details of materials and installation.
D. Sample: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
   1. For sealant and accessories submit manufacturer's full range of available colors and patterns for selection.
E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
F. Manufacturer's Installation Instructions: Indicate special preparation of substrate, installation and attachment methods, and perimeter conditions requiring special attention.
G. Mockup Summary: Include summary of components, assemblies, and accessories to be reviewed. Include schedule and location where mockup will be available for review. Include approval or corrections summaries until mockup is approved.
H. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
I. Maintenance Data: For user operation and maintenance of system including:
   1. Methods for maintaining system's materials and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to components, finishes, and performance.

3. Recommendations on maintenance schedule.

1.04 QUALITY ASSURANCE

A. Fabricators Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience on projects of similar size and complexity.

1.05 MOCKUP

A. Visual and Constructability Mockup:
   1. Construct and participate mockup.

B. Construct mockup of single countertop, internal and external corners.

C. Locate where directed.

D. Mockup may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. As required by the manufacturer for a warrantable installation of the installed products to meet the Performance and Design Criteria.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Wall hung and casework supported countertops.

2.02 PERFORMANCE AND DESIGN CRITERIA

A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) Architectural Woodwork Standards.

2.03 NATURAL QUARTZ AND RESIN COMPOSITE COUNTERTOPS

A. (SS1, SS2) Natural Quartz Countertops: Sheet or slab of natural quartz and plastic resin.
   1. Basis of Design: Caesar Stone, Silestone, or comparable; substituted products will be judged based on the following performance criteria, features, warranty, and qualifications.
   2. Performance Criteria:
a. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA-2 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.

b. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with the MIA Dimension Stone Design Manual.

c. Surface Burning Characteristics: Flame spread 25, maximum; smoke developed 450, maximum; when tested in accordance with ASTM E84.

d. NSF approved for food contact.

3. Features:

   a. Flat Sheet Thickness: 3/4 inch, minimum.

   b. Other Components Thickness: 3/4 inch, minimum.

   c. Back and End Splashes: Same sheet material, square top; minimum 4 inches high and as indicated on drawings.

   d. Skirts: As indicated on drawings.

   e. Color: Refer to Drawing Sheet AF101 Finish Plan.

2.04 ACCESSORIES

A. All accessory materials required by the manufacturer for a warrantable installation of the installed products in a manner that meets the Performance and Design Criteria.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Joint Sealant: Mildew-resistant silicone sealant, as selected by Architect from manufacturer's full range.

2.05 FABRICATION

A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.

   1. Join lengths of tops using best method recommended by manufacturer.

   2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
   1. Secure to countertop with concealed fasteners and secure finish surfaces with contact surfaces with a waterproof glue.
   2. Height: As indicated on drawings.

C. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings, finished to match.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify existing conditions meet the manufacturer's requirements before starting work.

3.02 PREPARATION
   A. Prepare surfaces to receive work in accordance with manufacturer's instructions.

3.03 INSTALLATION
   A. General: Install all materials in accordance with manufacturer's instructions based on conditions present.
   B. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
   C. Seal joint between back/end splashes and vertical surfaces.
      1. Where indicated use rubber cove molding.
      2. Where applied cove molding is not indicated use specified sealant.
   D. Joints between adjacent pieces of surfacing.
      1. Securely join with manufacturer's approved adhesive.
      2. Fill joints level with surfacing.
      3. Clamp or brace surfacing in position until adhesive sets.
      4. Joints shall be flush, tight fitting, level, and neat.
3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

A. Clean countertop surfaces thoroughly.
B. Dispose of all waste material in accordance with project's Waste Management Plan.

3.06 PROTECTION

A. Protect installed work as required by the manufacturer to maintain product performance, design criteria, and warranty.

END OF SECTION
SECTION 22 00 10

GENERAL PLUMBING PROVISIONS

PART 1 - GENERAL

1.1 General-Plumbing Provisions are specified in Section 230010 "General HVAC Provisions." Project requirements as defined in Section 230010 shall be applicable to General Plumbing Provisions, and as such, shall be equally enforced.

PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION 22 00 10
SECTION 22 05 23
GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Bronze ball valves.
B. Related Sections:
   1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
   2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of valve indicated.

1.4 QUALITY ASSURANCE
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 B31.1 for power piping valves.
   3. ASME B31.9 for building services piping valves.
C. NSF Compliance: NSF 61 and NSF 372 for valve materials for potable-water service.
D. Safe Water Drinking Act: All materials in contact with potable-water shall meet the “lead-free” definition as required by the Safe Water Drinking Act and the Reduction of Lead in Drinking Water Act.
1.5 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.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following unless noted otherwise:

1. Apollo.
2. Crane.
3. Milwaukee.
4. NIBCO.
5. Powell.
7. Approved.

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. Handlever: For quarter-turn valves 6 inch and smaller.

E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. 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.

F. Valve-End Connections:

1. Solder Joint: With sockets according to ASME B16.18.
2. Threaded: With threads according to ASME B1.20.1.
2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves:

1. Description:
   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Two piece.
   e. Body Material: Lead free bronze.
   f. Ends: Threaded.
      1) Press ends can be provided in approved Press joint piping systems.
   g. Seats: PTFE or TFE.
   h. Stem: Lead free bronze.
   i. Ball: Chrome-plated lead free brass.
   j. Port: Full.

PART 3 - EXECUTION

3.1 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. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Locate valves for easy access and provide separate support where necessary.

B. Install valves in horizontal piping with stem at or above center of pipe.

3.3 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.

3.4 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe 2 inch and Smaller:
   1. Ball Valves: Two piece, full port, bronze with bronze trim.

B. Pipe 2-1/2 inch and Larger:
1. Ball Valves: Two piece, full port, brass with brass trim.

END OF SECTION 22 05 23
SECTION 22 05 29

HANGERS & SUPPORTS FOR PLUMBING PIPING & EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe stands.
7. Pipe positioning systems.
8. Equipment supports.

B. Related Sections:
1. Section 220549 "Seismic Controls for Plumbing."
2. Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7 and IBC.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 Hangers and Supports for Plumbing Piping and Equipment Products are specified in Section 230529 “Hangers and Supports for HVAC Piping and Equipment”. Specified requirements for hangers and supports for HVAC piping and equipment apply to this Section and shall be equally enforced.

2.2 PIPE POSITIONING SYSTEMS

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

PART 3 - EXECUTION

3.1 Installation Requirements for Hangers and Supports for Plumbing Piping and Equipment Products are specified in Section 230529 “Hangers and Supports for HVAC Piping and Equipment”.

3.2 HANGER AND SUPPORT INSTALLATION

A. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

3.3 HANGER AND SUPPORT SCHEDULE

A. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 22 05 29
SECTION 22 05 49

SEISMIC CONTROLS FOR PLUMBING

PART 1 - GENERAL

1.1 Seismic Controls for Plumbing is specified in Section 230548 "Vibration and Seismic Controls for HVAC." Specified requirements for Vibration and Seismic Controls for HVAC apply to this Section and shall be equally enforced.

PART 2 - PRODUCTS

2.1 Seismic Controls for Plumbing is specified in Section 230548 "Vibration and Seismic Controls for HVAC." Specified requirements for Vibration and Seismic Controls for HVAC apply to this Section and shall be equally enforced.

PART 3 - EXECUTION

3.1 Seismic Controls for Plumbing is specified in Section 230548 "Vibration and Seismic Controls for HVAC." Specified requirements for Vibration and Seismic Controls for HVAC apply to this Section and shall be equally enforced.

END OF SECTION 22 05 49
SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Equipment labels.
   2. Pipe labels.
   3. Valve tags.

B. Related Sections:
   1. Section 230553 "Identification for HVAC Piping and Equipment."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS
Identification for Plumbing Piping and Equipment is specified in Section 230553 "Identification for HVAC Piping and Equipment." Specified requirements for identification for HVAC piping and equipment apply to this Section and shall be equally enforced.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.

B. Pipe Label Color Schedule:

1. Domestic Water Piping:
   a. Background Color: Green.

2. Sanitary Waste Piping:
   a. Background Color: Black.
3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; shutoff valves; faucets; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:
   b. Hot Water: 2 inches, round.

2. Valve-Tag Color:
   b. Hot Water: Natural.

3. Letter Color:
   b. Hot Water: Black.

END OF SECTION 22 05 53
SECTION 22 05 93

TESTING, ADJUSTING AND BALANCING FOR PLUMBING

PART 1 - GENERAL

1.1 Testing, Adjusting, and Balancing for Plumbing is specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC." Specified requirements for Testing, Adjusting, and Balancing for HVAC apply to this Section and shall be equally enforced.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 Testing, Adjusting, and Balancing for Plumbing is specified in Section 230593 "Testing, Adjusting, and Balancing for HVAC." Specified requirements for Testing, Adjusting, and Balancing for HVAC apply to this Section and shall be equally enforced.

END OF SECTION 22 05 93
SECTION 22 07 19
PLUMBING PIPING INSULATION

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes insulating the following plumbing piping services:
      1. Domestic cold-water piping.
      2. Domestic hot-water piping.
      3. Domestic recirculating hot-water piping.
   B. Related Sections:
      1. Section 230700 "HVAC Insulation."

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets.

1.4 QUALITY ASSURANCE
   A. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1.5 COORDINATION
   A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
B. Coordinate clearance requirements with piping Installer for piping 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.

1.6 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

2.1 Plumbing Piping Insulation Products are specified in Section 230700 “HVAC Insulation”. Specified requirements for insulation for HVAC piping apply to this Section and shall be equally enforced.

2.2 INSULATION MATERIALS

A. Comply with requirements in Schedule articles for where insulating materials shall be applied.

2.3 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Truebro, Model Lav Guard 2 E-Z.
   b. ProFlow.
   c. Zurn.
   d. Approved.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION
3.1 Installation requirements for Plumbing Piping Insulation Products are specified in Section 230700 “HVAC Insulation”.

3.2 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:
   1. All Pipe Sizes: Insulation shall be the following:
      a. Fiberglass, Preformed Pipe: 1 inch thick.

B. Domestic Hot and Recirculated Hot Water:
   1. 1-1/4 inch and Smaller: Insulation shall be the following:
      a. Fiberglass, Preformed Pipe: 1 inches thick.
   2. 1-1/2 inch and Larger: Insulation shall be the following:

END OF SECTION 22 07 19
SECTION 22 08 00

COMMISSIONING OF PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. The OPR and BOD documentation are included by reference for information only.

1.2 SUMMARY

A. This section includes commissioning process requirements for Plumbing systems, assemblies, and equipment.

B. Related Sections:

   1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section “General Commissioning Requirements” for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section "General Commissioning Requirements" for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section "General Commissioning Requirements" for CxA’s role.

B. Refer to Division 01 Section “Submittals” for specific requirements. In addition, provide the following:

   C. Certificates of readiness

   D. Certificates of completion of installation, prestart, and startup activities.

   E. O&M manuals
F. Test reports

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the contractor for the equipment being tested. For example, the plumbing contractor of Division 22 shall ultimately be responsible for all standard testing equipment for the plumbing system in Division 22, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.
PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Construction Checklists for all commissioned components, equipment, and systems.

B. Red-lined Drawings:
   1. The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
   2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
   3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
   4. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. Operation and Maintenance Data:
   1. Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
   2. The CxA will review the O&M literature once for conformance to project requirements.
   3. The CxA will receive a copy of the final approved O&M literature once corrections have been mad by the contractor.

D. Demonstration and Training:
   1. Contractor will provide demonstration and training as required by the specifications.
   2. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training.
   3. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session.
   4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and Owner's representative. A copy of the test record shall be provided to the CxA, Owner, and Architect.
   5. Engage a Factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specific equipment.
   6. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
   7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.
B. Attend construction phase controls coordination meetings.

C. Attend domestic water balancing review and coordination meetings.

D. Participate in Plumbing systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

E. Provide information requested by the CxA for final commissioning documentation.

F. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

G. Prepare preliminary schedule for Plumbing system orientations and inspections, operation and maintenance manual submissions, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for owner. Distribute preliminary schedule to commissioning team members.

H. Update schedule as required throughout the construction period.

I. During the startup and initial checkout process, execute the related portions of the construction checklists for all commissioned equipment.

J. Assist the CxA in all verification and functional performance tests.

K. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

L. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA (45) days after submittal acceptance.

M. Coordinate with the CxA to provide (48) hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

N. Notify the CxA a minimum of (2) weeks in advance of the time for start of the balancing work. Attend the initial balancing meeting for review of the balancing procedures.

O. Participate in, and schedule vendors and contractors to participate in the training sessions.

P. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
   1. Plumbing equipment including domestic water heaters, pumps, plumbing fixtures, and all other equipment furnished under this Division.
   2. Gas piping, sanitary waste and vent piping, storm drainage piping, sump pumps and automatic sprinkler system.

Q. The equipment supplier shall document the performance of his equipment.

R. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

COMMISSIONING OF PLUMBING
S. Balance Contractor
   1. Attend initial commissioning coordination meeting scheduled by the CxA.
   2. Submit the site specific balancing plan to the CxA and Design Professional for review and acceptance.
   3. Attend the balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in balancing the Plumbing system.
   4. At the completion of the balancing work, and the submittal of the final balancing report, notify the Plumbing contractor and the CM/GC.
   5. At the completion of balancing work, and the submittal of the final balancing report, notify the Plumbing Contractor and the CM/GC.
   6. Participate in verification of the balancing report, which will consist of repeating measurements contained in the balancing reports. Assist in diagnostic purposes when directed.

T. Provide training of the Owner’s operating staff using expert qualified personnel, as specified.

U. Equipment Suppliers
   1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner, to keep warranties in force.
   2. Assist in equipment testing per agreements with contractors.
   3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

V. Refer to Division 01 Section “General Commissioning Requirements” for additional contractor responsibilities.

3.3 OWNER’S RESPONSIBILITIES
   A. Refer to Division 01 Section “General Commissioning Requirements” for Owner’s Responsibilities.

3.4 DESIGN PROFESSIONAL’S RESPONSIBILITIES
   A. Refer to Division 01 Section “General Commissioning Requirements” for Design Professional’s Responsibilities.

3.5 CxA’S RESPONSIBILITIES
   A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s Responsibilities.

3.6 TESTING PREPARATION
   A. Certify in writing to the CxA that Plumbing systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
   B. Certify in writing to the CxA that Plumbing instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
C. Certify in writing that balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 DOMESTIC WATER BALANCING VERIFICATION

A. Prior to performance of Domestic Water Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing work, and provide access for the CxA to witness balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of Plumbing systems at the direction of the CxA.
   1. The CxA will notify testing and balancing subcontractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.
   2. The balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.
   3. Failure of an item includes a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final balancing report.
   4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.8 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Plumbing testing shall include entire Plumbing installation. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Plumbing contractor, balancing subcontractor shall prepare detailed testing plans, procedures, and checklists for Plumbing systems, subsystems, and equipment.
E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Plumbing system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.9 PLUMBING SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 22 sections. Provide submittals, test data, inspector record, and certifications to the CxA.

B. Plumbing Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment: Test requirements are specified in Division 22 piping Sections. Plumbing Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. Plumbing Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air, fuel gas, sanitary waste and vent piping, storm drainage piping, sprinkler and domestic water distribution systems.
E. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

F. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

   1. Domestic Hot Water System

3.10 **DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT**

   A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.11 **APPROVAL**

   A. Refer to Division 01 Section “General Commissioning Requirements” for approval procedures.

3.12 **DEFERRED TESTING**

   A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deferred testing.

3.13 **OPERATION AND MAINTENANCE MANUALS**

   A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

   B. Refer to Division 01 Section “General Commissioning Requirements” for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.

3.14 **TRAINING OF OWNER PERSONNEL**

   A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to training.

   B. **Plumbing Contractor.** The mechanical contractor shall have the following training responsibilities:

      1. Provide the CxA with a training plan two weeks before the planned training.
      2. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of Plumbing equipment.
3. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

4. The appropriate trade or manufacturer’s representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.

5. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.

6. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.

7. The plumbing contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls.

8. Training shall occur after functional testing is complete, unless approved otherwise by the Owner.

END OF SECTION 22 08 00
SECTION 22 11 16
DOMESTIC WATER PIPING

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section Includes:
      1. Aboveground domestic water pipes, tubes, and fittings inside buildings.

1.3 ACTION SUBMITTALS
   A. Product Data: For piping materials, transition fittings and dielectric fittings.

1.4 QUALITY ASSURANCE
   A. Safe Water Drinking Act: All materials in contact with potable-water shall meet the “lead-free” definition as required by the Safe Water Drinking Act and the Reduction of Lead in Drinking Water Act.

PART 2 - PRODUCTS

2.1 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.
   B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."
   C. Galvanized pipe, fittings, couplings and appurtenances shall not be provided on domestic water systems.

2.2 COPPER TUBE AND FITTINGS
   A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
B. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L water tube, annealed temper.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.


E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

F. Copper Unions:
   1. MSS SP-123.
   4. Solder-joint or threaded ends.

G. Copper Pressure-Seal-Joint Fittings:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Merit Brass, Model CopperPress.
      b. NIBCO.
      c. Viega.
      d. Approved.
   2. Fittings for 2 inch and Smaller: Wrought-copper fitting with EPDM-rubber, O-ring seal in each end.
   3. Fittings for 2-1/2 inch to 4 inch: Cast-bronze or wrought-copper fitting with EPDM-rubber, O-ring seal in each end.

2.3 PIPING JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, lead-free alloys.

B. Flux: ASTM B 813, water flushable.

PART 3 - EXECUTION

3.1 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.

B. Install underground [copper tube] [and] [ductile-iron pipe] in PE encasement according to ASTM A 674 or AWWA C105/A21.5.

C. Install domestic water piping level without pitch and plumb.
D. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

E. 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.

F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

G. Install piping to permit valve servicing.

H. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

I. Install piping free of sags and bends.

J. Install fittings for changes in direction and branch connections.

K. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

L. Install escutcheons for exposed piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 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. Soldered Joints for Copper Tubing: 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."

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices in Section 220549 "Seismic Controls for Plumbing."

B. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
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.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

   1. 3/4 inch and Smaller: 60 inches with 3/8-inch rod.
   2. 1 inch and 1-1/4 inch: 72 inches with 3/8-inch rod.
   3. 1-1/2 inch and 2 inch: 96 inches with 3/8-inch rod.
   4. 2-1/2 inch: 108 inches with 1/2-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.4 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

   1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
   2. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection.

3.5 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Label pressure piping with system operating pressure.
3.6 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:
   a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
   b. 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:
      1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
      2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

2. Piping Tests:
   a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
   b. 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.
   c. 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.
   d. 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 it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
   e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

3.7 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. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
4. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.8 CLEANING

A. Clean and disinfect 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. Repeat procedures if biological examination shows contamination.
   e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Test potable water piping within 5 days prior to owner occupying facility. If tests show contamination, repeat cleaning and disinfecting procedures.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.9 PIPING SCHEDULE

A. Aboveground domestic water piping, 2 inch and smaller, shall be one of the following:
   1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
   2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

B. Aboveground domestic water (potable and non-potable) piping, 2-1/2 inch to 4 inch [Insert pipe size range], shall be[ one of] the following:
1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and brazed joints.
2. Hard copper tube, ASTM B 88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

END OF SECTION 22 11 16
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Pipe, tube, and fittings.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
PART 2 - PRODUCTS

2.1 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.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AB&I Foundry.
   b. Charlotte Pipe and Foundry.
   c. Tyler Pipe.

2. Standards: ASTM A 888 or CISPI 301.
3. Markings: Cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

B. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ANACO-Husky.
   b. Charlotte Pipe and Foundry.
   c. Mission.
   d. Tyler Pipe.
   e. MIFAB.
   f. Approved.

3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. ANACO-Husky, Model Husky SD 4000.
   b. Clamp-All Corp.
   c. Mission.
   d. MIFAB.
   e. Approved.

2. Standards: ASTM C 1540.
3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

C. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. 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.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. 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.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220549 "Seismic Controls for Plumbing Piping and Equipment."

K. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side.
with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

M. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping 3 inch and smaller; 2 percent downward in direction of flow for piping 4 inch and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

O. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. 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.

C. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:
   1. Install transition couplings at joints of piping with small differences in OD's.
   2. In Drainage Piping: Unshielded or Shielded, nonpressure transition couplings.

B. Dielectric Fittings:
   1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
   2. Dielectric Fittings for 2 inch and Smaller: Use dielectric unions.
   3. Dielectric Fittings for 2-1/2 inch to 4 inch: Use dielectric flanges.
   4. Dielectric Fittings for 5 inch and Larger: Use dielectric flange kits.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 22054 "Controls for Plumbing."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

   1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
   2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
   3. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
   4. Vertical Piping: MSS Type 8 or Type 42, clamps.
   5. Install 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.
   6. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
   7. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
1. 1-1/2 inch and 2 inch: Every other joint, unless over 48 inches then at each joint with 3/8-inch rod.
2. 3 inch: Every other joint, unless over 48 inches then at each joint with 1/2-inch rod.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. 1-1/4 inch: 72 inches with 3/8-inch rod.
2. 1-1/2 inch and 2 inch: 96 inches with 3/8-inch rod.
3. 2-1/2 inch: 108 inches with 1/2-inch rod.
4. 3 inch and 5 inch: 10 feet with 1/2-inch rod.

I. Install supports for vertical copper tubing every 10 feet.

J. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping 2 inch and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping 2-1/2 inch and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. 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 separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and un Concealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.
3.9 PIPING SCHEDULE

A. Aboveground, soil and waste piping 4 inch and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
3. Copper DWV tube, copper drainage fittings, and soldered joints.

B. Aboveground, soil and waste piping 5 inch and larger shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; [CISPI] [heavy-duty] hubless-piping couplings; and coupled joints.

C. Aboveground, vent piping 4 inch and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; [CISPI] [heavy-duty] hubless-piping couplings; and coupled joints.
3. Copper DWV tube, copper drainage fittings, and soldered joints.

D. Underground, soil, waste, and vent piping 4 inch and smaller shall be any of the following:

1. Service class, cast-iron soil piping, gaskets, and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

END OF SECTION 22 13 16
SECTION 22 40 00
PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Water closets.
   2. Toilet seats.
   3. Flushometer valves.
   5. Lavatories.
   7. Faucets.
   8. Drinking fountains.
  10. Sink/Lavatory Supply fittings.
  11. Sink/Lavatory Waste fittings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include rated flow rates and capacities, operating characteristics, electrical characteristics if applicable, and furnished specialties and accessories.

1.4 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. Flushometer-Valve Repair Kits: Two of each type.
   2. Faucet Washers and O-Rings: One of each type.
   3. Faucet Cartridges and O-Rings: One of each type.
1.5 QUALITY ASSURANCE

A. NSF Compliance: NSF 61 and NSF 372 for materials for potable-water service.

B. Safe Water Drinking Act: All materials in contact with potable-water shall meet the “lead-free” definition as required by the Safe Water Drinking Act and the Reduction of Lead in Drinking Water Act.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PLUMBING FIXTURES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following unless noted otherwise:

1. Water Closets:
   a. Refer to individual water closet specifications. No Substitutions.

2. Water Closet Seats:
   a. Bemis.
   b. Kohler.

3. Flush Valves:
   a. Sloan.
   b. Zurn.

4. Lavatories:
   a. Refer to individual lavatory specifications. No Substitutions.

5. Stainless Steel Sinks:
   a. Refer to individual sink specifications. No Substitutions.

6. Faucets:
   a. Refer to individual faucet specifications. No Substitutions.

7. Drinking Fountains:
   a. Refer to individual drinking fountain specifications. No Substitutions.

8. Fittings and Trim:
2.2 PLUMBING FIXTURES

A. P-1 Water Closet:
   1. Fixture: American Standard “Madera” Flowise, floor mount, 16-1/2” height, top spud, elongated bowl, vitreous china fixture less EverClean.
   2. Flushometer Valve: Sloan Royal Optima Model 111-SMO exposed, battery powered, side mount, sensor operated water closet flushometer for floor mounted or wall hung top spud bowls.

B. P-2 Wall-Mounted Lavatory:
   1. Fixture: Nameek’s Mona (CeraStyle 064200-U), vitreous china, single hole.
   2. Faucet: Provide P-7 faucet.
   4. Mounting: Refer to Arch.
   6. Trap Insulation: Provide with Truebro Lav Guard 2 P-Trap and Riser Insulation Kit.

C. P-3 Under Counter Wellness Room Lavatory:
1. **Fixture**: Kohler model K-8189 "Verticyl", vitreous china.
2. **Faucet**: Provide P-7 faucet.
3. **Mixing Valve**: Provide with Powers LFe480 thermostatic mixing valve.

**D. P-4 Drinking Fountain Hi/Lo With Bottle Filling Station:**
1. **Fixture**: Elkay model EZSTL8WSLK, wall mounted, barrier free, non-filtered and refrigerated dual height with integral bottle filling station. Do not provide with integral water filter. Provide with trap, service supply stop and support system.

**E. P-5 Sink – Two-Compartment:**
1. **Fixture**: Elkay ELU311810R Lustertone Classic, Equal Double Bowl, undermount with right drain, 18 gauge, type 304 stainless steel, 10" deep.
2. **Faucet**: Provide P-8 faucet.
3. **Provide with garbage disposal. Refer to Architectural plans and specifications.**

**F. P-6 Undercounter Handwash Room Lavatory:**
1. **Fixture**: American Standard 0614200.020 Reliant Rectangular, vitreous china.
2. **Faucet**: Provide P-7 faucet.
3. **Mixing Valve**: Provide with Powers LFe480 thermostatic mixing valve.

**G. P-7 Sensor Operated Faucet**
1. **Sloan ETF-880-4-BOX-BDT-CP-0.5-MLM-FCT**, infrared sensor type, single hole with 4” trim plate, 0.5 gpm, hard-wired with Power Option 3, SFP-35.

**H. P-8 Manual Sink Faucet:**
1. **Chicago 1100-GN8AE3-317AB**, deck-mounted with 8” centers, 8” gooseneck spout, 2.2 gpm, vandal proof 4” wrist blade handle.
I. FD Floor Drain:

J. TP Trap Primer:
   1. Fixture: Precision Plumbing Products, Inc. PR-500.

2.3 LAVATORY/SINK SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61 and NSF/ANSI 372, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-lead free brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

D. Supply Stops: Chrome-plated-lead free brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

E. Operation: Loose key.

F. Risers:
   1. 1/2 inch.
   2. Chrome-plated, soft-copper flexible tube riser.

2.4 LAVATORY/SINK WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Lavatory Drain: Grid type with 1-1/4 inch offset and straight tailpiece.
C. Sink Drain: Grid type with 1-1/2 inch offset and straight tailpiece. Material shall match trap material listed below.

D. Trap:
   2. Sanitary Waste System Material: Chrome-plated, two-piece, cast-brass trap and swivel elbow with 17 gauge-thick brass tube to wall; and chrome-plated, brass or steel wall flange.
   3. [Chemical-Waste System Material: PP, three-piece trap.]

2.5 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

3.1 Examination

A. Examine roughing-in of water-supply, sanitary waste, and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine counters, walls, and floors for suitable conditions where plumbing fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Installation

A. Water-Closet Installation:
   1. Install level and plumb according to roughing-in drawings.
   2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
   3. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Water Closet Support Installation:
   1. Install supports, affixed to building substrate, for floor-mounted, back-outlet water closets.
2. Use carrier supports with waste-fitting assembly and seal.
3. Install floor-mounted, back-outlet water closets attached to building floor substrate, onto waste-fitting seals; and attach to support.
4. Install wall-mounted, back-outlet water-closet supports with waste-fitting assembly and waste-fitting seals; and affix to building substrate.

C. Flushometer-Valve Installation:
1. Install flushometer-valve, water-supply fitting on each supply to each water closet and urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets and urinals with handle mounted on open side of water closet or urinal compartment.
4. Install actuators in locations that are easy for people with disabilities to reach.
5. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Install toilet seats on water closets.

E. Water Closet Wall Flange and Escutcheon Installation:
1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Water Closet Joint Sealing:
1. Seal joints between water closets and urinals, and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

G. Lavatory and Sink Installation:
1. Install lavatories and sinks level and plumb according to roughing-in drawings.
2. Install supports, affixed to building substrate, for wall-mounted lavatories and sinks.
3. Install accessible wall-mounted lavatories and sinks at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.
4. Set floor-mounted sinks in leveling bed of cement grout.
5. Install water-supply piping with stop on each supply to each sink faucet.
6. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings.
7. Seal joints between lavatories, sinks, and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color.
8. Set counter-mounted sink in bed of silicone sealant. Installing sealant after sink has been set is not acceptable.
9. Set deck mounted faucets in bed of silicone sealant. Installing sealant after faucet has been set is not acceptable.
3.3 CONNECTIONS

A. Connect plumbing fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match plumbing fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with traps and soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to plumbing fixtures, allow space for service and maintenance.

E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories and sinks.

3.4 FIELD QUALITY CONTROL

A. Mechanical-Component Testing: After plumbing connections have been made, test for compliance with requirements. Verify ability to achieve indicated capacities.

B. Tests and Inspections:
   1. Perform each visual and mechanical inspection.
   2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

A. Operate and adjust plumbing fixtures and controls. Replace damaged and malfunctioning plumbing fixtures, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.
3.6 CLEANING AND PROTECTION

A. After completing installation of plumbing fixtures inspect and repair damaged finishes.

B. Clean plumbing fixtures, faucets, and fittings with manufacturers’ recommended cleaning methods and materials.

C. Provide protective covering for installed plumbing fixtures and fittings.

D. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 22 40 00
SECTION 23 00 10
GENERAL HVAC PROVISIONS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes materials, equipment, labor, supervisions, tools and items necessary for the construction, installation, connection, testing and operation of a mechanical work for this project, as shown on the drawings and defined in Division 21, 22 and 23 of the specifications.

1.3 CERTIFICATIONS
   A. By submitting a bid for the mechanical Work, the Contractor certifies that they have carefully examined the Drawings, Specifications, and all subsequent Addenda, have visited the site, and are familiar with all conditions and requirements of the Work, agree to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of Work, according to the requirements of the Contract Documents.

1.4 DEFINITIONS
   A. Accessible: Arranged so that an average size man may complete any service required without disassembly, destruction, or damage to the surround installation of item being serviced.
   B. Codes: Codes, rules, and ordinances.
   C. Concealed: Hidden or out of site.
   D. Exposed: Open to view.
   E. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
   F. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
   G. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
   H. Furnish: Supply and deliver to the project site.
I. Install: Place in position for use.

J. Provide: Furnish and install.

K. Basis-of Design Product: The first product mentioned in the specification or the product indicated on the drawings for purposes of evaluating comparable products of additional manufacturers named in the specification.

L. Submittals: Written and graphic information that require Architect's and Engineer’s responsive action.

M. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

N. Work: Entire scope required by the contract documents.

1.5 ABBREVIATIONS

A/E    Architect/Engineer
AGA   American Gas Association
AHJ   Authority Having Jurisdiction
AMCA  Air Moving and Conditioning Association
ANSI  American National Standards Institute
ARI   Air-Conditioning and Refrigeration Institute
ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME  American Society of Engineers
ASTM  American Society of Testing and Materials
CISPI  Cast Iron Soil Pipe Institute
ETL   Environmental Technology Laboratory
F     Degrees, Fahrenheit
FM    Factory Mutual Engineering Corporation
HVAC  Heating, Ventilation, and Air Conditioning
IBC   International Building Code
IFC   International Fire Code
IMC   International Mechanical Code
MSS   Manufactures Standardization Society
NEMA  National Electrical Manufacturers Association
NEC   National Electrical Code
NFPA  National Fire Protection
psig  pounds Per Square Inch Gage Pressure
SMACNA Sheet Metal and Air Conditioning Contractor National Association
UL    Underwriters Laboratories, Inc
UPC   Uniform Plumbing Code
V     Volts
WP    Working Pressure
WG    Water Gage

1.6 CODES, PERMITS, STANDARDS, INSPECTIONS, FEES

A. Obtain permits and inspections and pay fees required by Federal, State and Local authorities having jurisdiction.
B. Work and materials shall be in accordance with requirements of all applicable codes, rules, and ordinances.

C. Conform to applicable industry standards, such as ANSI, UL, ETL and other standards as noted.

D. Nothing in the Drawings or Specifications shall be construed to permit work not in conformance with codes, rules and regulations.

E. Where Drawings or Specification call for material or construction of a better quality or larger sizes than required by the codes, rules and regulations, the provisions of the Drawings or Specifications shall take precedence over requires of the codes, rules and regulations.

F. Notify the Architect/Engineer of deviations in the Contract Documents to code requirements prior to installation of the Work. Include in the work changes due to the requirement of code enforcing agencies at no additional cost to the owner.

G. ASME code stamp is required on all Pressure Vessels and Relief Valves. Mount certificate adjacent to each Pressure Vessel and Relief Valve showing approval under this law.

H. Mechanical equipment, packaged systems, control panels, motor starters, motor controllers, variable frequency drives and similar equipment shall carry a Short Circuit Current Rating (SCCR) equal to or greater than available fault current delivered from electrical system. Include visible factory nameplate for such equipment indicating SCCR of equipment in accordance with UL 1995 and UL 508A.

1.7 SUBSTITUTIONS

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Where "Manufacturer" paragraphs include the word "Approved", approval of the proposed substitution is required. The Architect/Engineer is the sole judge of quality of proposed substitution.

C. Where "Manufacturer" paragraph does not include the word "Approved", substitution is not allowed.

D. Architect/Engineer will consider Contractor's request for substitution when the following conditions are satisfied. When the Architect/Engineer approves a substitution, the approval is given with the understanding that the following requirements are satisfied. If the following conditions are not satisfied, Architect/Engineer will return requests without action, except to record noncompliance with these requirements:

1. Substitution request is fully documented and properly submitted.
2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
3. Requested substitution provides sustainable design characteristics that specified product provided.
4. Substitution request is submitted prior to bid.
5. Requested substitution will not adversely affect Contractor's construction schedule.
6. Requested substitution will not increase cost to owner.
7. Requested substitution has received necessary approvals of authorities having jurisdiction.
8. Requested substitution is compatible with other portions of the Work.
9. Requested substitution has been coordinated with other portions of the Work.
10. Requested substitution provides specified warranty.
11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
12. “Manufacture paragraphs include the words “Approved”.

E. Substitution following bid will be allowed only when changes proposed by Contractor are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

F. Substitutions for convenience are not allowed.

1.8 SUBMITTALS

A. General Submittal Procedure Requirements: Comply with Division 01 and with additional requirements indicated in this article.

B. Contractor shall plan for a minimum of a 10 business day submittal review and commentary time period. Contractor shall schedule their submittal documents accordingly. Major equipment or long lead submittals shall include time for resubmittal in the event equipment as submitted is not in conformance with contract documents.

C. Partial submittals, or submittals not meeting formatting requirements will be returned unreviewed. The following are the acceptable submittal packages.

1. Underground Product Data for Early Site Work.
2. Long Lead Time Product Data (If Required).
3. All Fire Sprinkler Product Data.
4. All Plumbing Product Data.
5. All HVAC Product Data (Shall include control products unless submitted with the engineering/shop drawings).
6. Control Engineering/Shop Drawings.
7. Shop Drawings.
8. Delegated Design Submittals.
9. Coordination Drawings.

D. Product Data: Collect information into a single submittal for each division.

1. Submit prior to fabrication and delivery.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Submit as specified in individual specification sections.
4. Submit Product Data in the following format:

   a. PDF electronic file.
1) Separate file for Fire Suppression, Plumbing, and HVAC system. Bookmarks provided for each spec section and product. Bookmark names for each product shall be “Spec Section Para
graph Number Product Name.”

2) Include cover page with system, project, general contractor, mechanical contractor, architect, engineer and date of project final completion.

E. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

   a. Submit as specified in individual specification sections.
   b. Equipment clearances.
   c. Details and their locations.
   d. Coordination with other trades.
   e. Seal and signature of professional engineer if specified.
   f. AutoCAD floor plan backgrounds are available in electronic format if requested from the Architect/Engineer.


4. Submit Shop Drawings in the following format:

   a. PDF electronic file.

F. Delegated-Design Submittals: Contractor shall provide professional design/engineering services, and shall include respective fees in bid, where delegated-design submittals are indicated in the contract documents. Provide products and systems complying with specific performance and design criteria indicated. In addition to Shop Drawings, Product Data, and other required submittals, submit certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

G. Coordination Drawing Submittals: Comply with requirements specified in Division 01 and as specified in specific Division 21, 22, and 23 specification sections.

H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 with additional requirements as indicated.

1. Include separate costs for the following:

   a. Mobilization.
   b. Submittals.
   c. Fire Suppression Sprinkler Systems Material.
e. Plumbing Insulation Material.
f. Plumbing Insulation Labor.
g. Plumbing Equipment Material.
h. Plumbing Equipment Labor.
i. Domestic Water Material.
j. Domestic Water Labor.
l. Sanitary Waste and Vent Labor.
m. Plumbing Fixture Material.
n. Plumbing Fixture Labor.
o. HVAC Insulation Materials.
p. HVAC Insulation Labor.
q. Instrumentation and Controls Material.
r. Instrumentation and Control Engineering.
s. Instrumentation and Controls Labor.
t. HVAC Duct Material.
u. HVAC Duct Field Labor.
v. HVAC Duct Shop Labor.
aa. Testing Adjusting and Balancing.
bb. Operation and Maintenance Manuals.
c. Commissioning.
d. Closeout.

I. Maintenance Data: Comply with requirements specified in Division 01 and the Article “Operation and Maintenance Manuals” in this specification.

J. Balancing Reports: Comply with requirements specified in Division 01 and Section 230593 “Testing Adjusting and Balancing for HVAC.”

K. Project Record Documents: Comply with requirements specified in Division 01 and the Article “Project Record Documents” in this specification.

L. Qualifications Data, Certificates, and Test Reports: Comply with requirements specified in Division 01 and as specified in specific Division 21, 22, and 23 specification sections.

M. Approval: The acceptance of a manufacturers name or product by the Architect/Engineer does not relieve the Contractor of the responsibility for providing material and equipment which complies in all details with the requirements of the contract documents.

1.9 PRODUCT DELIVERY STORAGE AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
1. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

2. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

3. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

4. Protect stored products from damage and liquids from freezing.

5. Cover open ends of equipment and work during storage and construction.

D. Ductwork and equipment exposed to airflow shall be maintained clean and dry from fabrication through installation. Dirty and wet ductwork and equipment shall be removed from the site and replaced.

1.10 COORDINATION

A. Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.

B. Failure to coordinate work with other contractors is considered sufficient cause to alter the work, at no cost to the Owner.

C. Contractor is required to attend and participate in project coordination meetings.

D. Provide offsets and perform rerouting to fit Work in available space. Include provisions for such requirements in bid.

E. Ductwork and equipment access takes precedence over piping for available space.

F. [Existing Conditions:

1. Existing Work shown is based on existing drawings as available and on limited project site observations to the extent possible. Field verify existing conditions prior to commencement of work.

2. Installation of mechanical work will require openings, removal and replacement of existing general construction to match existing. Include provisions for such requirements in bid.

3. Installation of mechanical work will require removal, relocation and reinstallation of existing Fire Protection, Plumbing, HVAC and Controls work. Include provisions for such requirements in bid.

G. Beam penetrations to support mechanical scope of work shall not be allowed. However, where deemed required due to space constraints, contractor shall be responsible for beam penetration coordination as they relate to the mechanical work. Submit sizes and locations to the structural engineer for review and determination of structural details.
1.11 WORKMANSHIP

A. Work shall be in accordance with trade best practices. Failure to provide acceptable workmanship is sufficient cause to alter the work, at no cost to the owner.

1.12 DRAWINGS AND SPECIFICATIONS

A. Drawings are diagrammatic and show only approximate locations of mechanical piping, ducts, and equipment. Do not scale the drawings. Take measurements from building or site and verify with other Contract Documents.

B. Drawings are diagrammatic for document clarity and do not indicate all required offsets, fittings, and accessories that may be required. Carefully investigate the finish conditions that would affect the work to be performed and arrange such work accordingly, providing required offsets, fittings, and accessories to meet such conditions. Provide required offsets, fittings and accessories in bid. No additional costs shall be charged to Owner for additional offsets, fittings, and accessories required to install the mechanical systems shown on the drawings.

C. It is the responsibility of the Contractor to provide equipment that fits into the space allotted and allows adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance.

D. Field verify dimensions and existing conditions prior to performing work. Report any discrepancies to Architect/Engineer prior to proceeding with the work. Failure to follow this instruction is considered sufficient cause to alter the work, at no cost to the Owner, as directed by the Architect/Engineer.

1.13 MATERIALS

A. Products of any one classification which are used in quantity shall be of a single manufacturer.

B. Products shall be installed in accordance with the manufacturer’s recommendations.

C. Products shall be installed in strict accordance with governing codes and ordinances.

D. Where two or more manufactures are listed in the specification but not on the drawings, the first mentioned was used as the basis of design.

E. Where other than the basis of design product is selected, product shall be equal to or superior to the basis of design product in appearance, function, performance, quality, local support and shall meet requirements of the plans and specifications. It is the Contractor’s responsibility, in coordination with the supplying authorized manufacturer representative, to ensure contract document requirements are met. Listing of an approved equal manufacturer does not relieve
them of contractual responsibilities in the event they cannot meet the requirements of the contract documents.

F. Where other than the basis of design product is selected, Contractor is responsible for cost of resulting additional work, coordination with other trades, and redesign of associated building systems as required to accommodate selected product. This shall include, but is not limited to, structural upgrades, electrical system modifications, impacts to construction sequencing, shop drawing or BIM layout coordination, controls or other.

G. Equipment layout is based on basis of design product. Where other than the basis of design product is selected, Contractor is responsible for verifying equipment will fit within available space and meet code and manufacturer required clearances.

H. Materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

1.14 DEMOLITION

A. Provide demolition work required in existing building for removal of existing mechanical equipment, ductwork, controls, and piping and for installation of new equipment, ductwork, controls, and piping. Remove/replace or reinstall existing equipment, controls, piping, and ductwork as required by demolition to provide a complete and operational system.

B. Remove and dispose of existing materials indicated on the Drawings to be removed. Drawings are based on field observation and existing record drawings. Field verify information as shown on drawings. Report discrepancies to the Architect/Engineer before disturbing existing installation.

C. Remove refrigerant from existing refrigerant equipment. Furnish containers approved by AHJ and of sufficient size to hold entire charge. Deliver to owner as directed. Furnish signed certificate stating that the refrigerant has been removed, transferred to container and that the containers have been delivered.

D. Where existing ductwork, and piping is removed, remove back to main. Cap ductwork and piping behind surfaces so concealed. Remove unused ductwork and piping in walls to be demolished, and cap remaining ductwork and piping above ceiling or below finished floor so concealed.

E. Where mechanical equipment, ductwork, controls, and piping are removed and the surrounding surfaces and finishes are to remain, repair or replace surfaces with materials in conformance with other sections of this specification. Where not specified, repair or replace to match existing condition.

F. Where mechanical equipment, ductwork, controls, and piping are removed and the surrounding systems are to remain, repair or replace with materials in conformance with other sections of this specification. Where not specified, repair or replace to match existing condition.

G. Provide temporary connections to maintain existing systems in service during demolition.

H. Do not reuse existing products unless indicated on the Drawings.
I. The owner has the right to retain ownership of any materials being removed. Deliver items to the Owner's Representative as indicated in the Contract Documents. Notify owner in writing at least 7 days in advance of demolition.

1.15 EXISTING SYSTEM SHUTDOWN

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Perform work without shutdown of more than 4 hour duration of existing mechanical systems. Schedule each shutdown in writing with the Owner at least 7 days in advance of shutdown and obtain advance written approval.

1. Provide fire watch for shutdown of existing sprinkler systems as required by AHJ.

C. Perform work without shutdown of more than 4 hour duration of existing mechanical utilities. Schedule each shutdown in writing with the Owner at least 7 days in advance of shutdown and obtain advance written approval.

D. Perform work in the existing building with respect for the necessity of the Owner's building occupants. Coordinate shutdown time that meets with existing building occupancy and schedule requirements.

E. Plan installation of new work and connection to existing work to assure minimum interference with regular operation of existing facilities. Do not shutdown systems without prior review by the Owner to confirm that are needed to remain in operation are not affected.

1.16 START UP

A. Follow manufacturer start-up procedures for mechanical equipment. Complete manufacturer start up forms.

B. Replace air handling filters.

1.17 DEMONSTRATION

A. Subject system to operating tests as to demonstrate that systems will operate as indicated in the Contract Documents. If tests do not demonstrate satisfactory performance, correct deficiencies and retest systems.

B. Unless otherwise directed by the Architect/Engineer, perform in presence of the Architect/Engineer, Commissioning Authority, and Owners Representative. Give [1 week] notice prior to demonstration.

1.18 PROJECT RECORD DOCUMENTS

A. General Record Document Requirements: Comply with Division 01 and with additional requirements indicated in this article.

B. Record Drawings
1. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
   a. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally.
   b. Content: Types of items requiring marking include, but are not limited to, the following:
      1) Locations and depths of underground piping.
      2) Revisions to routing of piping.
      3) Valve locations.
      4) Actual equipment locations.
      5) Duct size and routing.
      7) Changes made following Architect/Engineer's written orders.
   c. Mark record sets with red-colored pen. Use other colors to distinguish between changes for different categories of the Work at same location.
   d. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
   e. Keep marked up drawings readily available at project site.

2. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect/Engineer.

   a.

C. Record Product Data

1. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   b. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   c. Note related Change Orders, and record Drawings where applicable.

2. Format: Submit record Product Data as annotated PDF electronic file.
   a. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

D. Recording and Maintenance

1. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

2. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect/Engineer's reference during normal working hours.
1.19    OPERATION AND MAINTENANCE MANUALS

A.  Comply with Division 01 and with additional requirements indicated in this article.

B.  Include operation and maintenance information for all equipment.

C.  Collect information into a single submittal for each division.

D.  Submit in PDF electronic file format. Bookmarks provided for each section. Bookmark names for each section shall be “Section Name_Product Name.” For example, “Start-Up Forms_Pump P-1.”

E.  Submit Product Data in the following format:

1.  PDF electronic file.

   a.  Separate file for Fire Suppression, Plumbing, and HVAC system. Bookmarks provided for each category and product. Bookmark names for each product shall be “Category_Product Name.”

   b.  Include cover page with system, project, general contractor, mechanical contractor, architect, engineer and date of project final completion.

F.  Include the following categories:

1.  Product data (compiled final submittal package).

2.  Start-up procedures and completed start-up forms. This includes but is not limited to the following:

   a.  Pump alignment reports.

3.  Operation data.

4.  Maintenance schedule and procedures.

5.  Repair procedures and sources.

6.  Troubleshooting guide.

7.  Service contracts.

8.  Field quality control test reports. This includes but is not limited to the following:

   a.  Domestic water piping systems cleaning and disinfection.

   b.  Refrigerant piping systems test and inspection.

   c.  Duct leakage test reports.


10. Warranties.

11. Filter list including sizes, quantities, and locations.

1.20    TRAINING

A.  Comply with Division 01 and with additional requirements indicated in this article.
B. Training shall not commence until the completion of the fire suppression, plumbing, HVAC, and control system installation and the Operation and Maintenance manual review and approval.

C. Conduct hands on training during the operation of fire suppression, plumbing, HVAC and control system operation.

D. Scheduling: Provide instruction at mutually agreed on times.

E. Instruction Program

1. General Agenda for Fire Suppression, Plumbing, HVAC, and Control Systems is as Follows:

   a. Introduction
   b. Description of Systems and Equipment
   c. Review of Operations and Maintenance Manuals, and Record Documents
   d. Tour of building
   e. Start-up procedures

       1) Seasonal considerations

   f. Operation procedures

       1) Occupancy considerations
       2) Weekday vs Weekend considerations
       3) Seasonal considerations
       4) Manual/Automatic

   g. Shutdown procedures
   h. Emergency procedures

       1) Alarms
       2) Shutdown

   i. Maintenance procedures

       1) Routine
       2) Preventative
       3) Service
       4) Lubrication
       5) Overhaul
       6) Factory
       7) Cleaning
       8) Access provisions

   j. Repair procedures

       1) Diagnosis
       2) Disassembly
       3) Component removal
       4) Repair
       5) Replacement
       6) Spare parts
k. Service agreements
   1) What they cover
   2) How to use them

l. Warranties
   1) What they cover
   2) How to use them

m. Tools

n. Hands on operation

o. Sequence of operations for controls

1.21 COMMISSIONING SUPPORT

A. Comply with requirements specified in Division 01 and Section 230800 “Commissioning of HVAC.”

1.22 CLOSEOUT

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Submit written certification that the work has been fully completed in strict accordance with plans and specifications.

C. Contractor shall be responsible for managing the response, troubleshooting and resolution of system operational concerns identified as part of commissioning and project closeout process. Types of activities shall include, but are not limited to, coordinating responsible parties for management tracking and resolution of the Cx Issues log, response to occupant temperature or system control complaints and/or equipment operational concerns. General Contractor shall appropriately respond to system operational concerns with relevant subcontractor stakeholders present for investigation at the job site and provide documented findings and response prior to requesting additional input and support of the A/E team.

1.23 WARRANTY

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Where not so prescribed or defined, the warranty period shall be 1 year. Warranty periods shall not start until substantial completion. Contractor shall extend warranties specified in other sections. Contractor shall review all spec sections for extended warranties and include on warranty letter.
PART 2 - PRODUCTS

2.1 Not used.

PART 3 - EXECUTION

3.1 Not used.

END OF SECTION 23 00 10
SECTION 23 05 17

SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

   A. Section Includes:

      1. Sleeves.
      2. Sleeve-seal systems.
      4. Firestopping.

1.3 ACTION SUBMITTALS

   A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVE-SEAL SYSTEMS

   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1. Pipeline Seal and Insulator, Model Link-Seal modular seals.
      3. Approved.

   B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve in poured wall construction and piping and wall in cored wall opening.

      1. Sealing Elements: Rubber interlocking links shaped to fill the annular space between the pipe and wall or sleeve opening. Include type and number required for pipe material and size of pipe.
      2. Pressure Plates: Glass reinforced nylon.
      3. Connecting Bolts and Nuts: Zinc plated steel of length required to secure pressure plates to sealing elements.
4. Sleeve: Molded non-metallic HDPE sleeve with integral hollow, molded water-stop ring four inches larger than the outside diameter of the sleeve itself.

2.2 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.

2.3 FIRESTOPPING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   2. Dow Corning.
   3. 3M Fire Protection Products.
   4. Approved.

B. Description: Material produced and installed as a system to resist spread of fire and passage of smoke and to maintain fire resistance of assembly. Material in accordance with ASTM E 814 and UL 1479.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide annular clear space between piping and concrete slabs and walls.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

   1. Sleeves are not required for core-drilled holes when all of the following apply:
      a. Piping through floor is not insulated.
      b. Penetration is not between adjacent noise sensitive areas. Area must be approved by Architect/Engineer.
      c. Sleeves are not installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.

   2. 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.

3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
4. Pack annular space between sleeve and piping or piping insulation with insulation.
5. Seal ends of annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 07.

D. Install sleeves for pipes passing through interior partitions.
   1. Cut sleeves to length for mounting flush with both surfaces.
   2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
   3. Pack annular space between sleeve and piping or piping insulation with insulation.
   4. Seal ends of annular space between sleeve and piping or piping insulation; use acoustical joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 07.

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping in Division 07.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION
A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade (where slabs are located at elevation below exterior grade) at service piping entries into building.
B. Install sleeve-seal fittings in new walls and slabs as they are constructed.
C. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
D. Secure nailing flanges to concrete forms.
E. Using grout, seal the space around outside of sleeve-seal fittings.
F. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE
A. Use sleeves and sleeve seals for the following piping-penetration applications:
   1. Exterior Concrete Walls above Grade:
      a. Galvanized-steel-pipe sleeves.
2. Exterior Concrete Walls below Grade:
   a. Sleeve-seal system.

3. Concrete Slabs-on-Grade:
   a. Galvanized-steel-pipe sleeves.
   b. Sanitary Waste and Vent Piping: Where penetrations are located within wall cavities, shafts or plumbing chases, Sill Seal wrap providing a minimum of 3/16 inch separation between piping and slab may be provided in lieu of galvanized sleeves where acceptable to the AHJ. Contractor shall verify acceptance from AHJ.

4. Interior Partitions:
   a. Piping Smaller Than 6 inch: Galvanized-steel-pipe sleeves.

END OF SECTION 23 05 17
SECTION 23 05 18
ESCUTCHEONS FOR HVAC PIPING

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section Includes:
      1. Escutcheons.
      2. Floor plates.

1.3 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS
   A. One-Piece, Cast-Brass Type: With polished, chrome-plated and rough-brass finish and setscrew fastener.
   B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
   C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.
   D. Split-Casting Brass Type: With polished, chrome-plated and rough-brass finish and with concealed hinge and setscrew.
   E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed and exposed-rivet hinge, and spring-clip fasteners.

2.2 FLOOR PLATES
   A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.
   B. Split-Casting Floor Plates: Cast brass with concealed hinge.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. Escutcheons for New Piping:
   a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
   b. Chrome-Plated Piping: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
   c. Insulated Piping: One-piece, stamped-steel type or split-plate, stamped-steel type with concealed hinge.
   d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
   e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass or split-casting brass type with polished, chrome-plated finish.
   f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.
   g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type or split-plate, stamped-steel type with exposed-rivet hinge.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 23 05 18
part 1 - general

1.1 related documents

a. drawings and general provisions of the contract, including general and supplementary conditions and division 01 specification sections, apply to this section.

1.2 summary

a. section includes:
   1. bronze ball valves.

b. related sections:
   1. section 230553 "identification for hvac piping and equipment" for valve tags and schedules.

1.3 definitions

a. cwp: cold working pressure.

b. epdm: ethylene propylene copolymer rubber.

c. swp: steam working pressure.

1.4 action submittals

a. product data: for each type of valve indicated.

1.5 quality assurance

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 b31.1 for power piping valves.
   3. asme b31.9 for building services piping valves.
1.6 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.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following unless noted otherwise:

1. Apollo.
2. Crane.
3. Milwaukee.
4. NIBCO.
5. Red-White.

B. Refer to HVAC valve schedule articles for applications of valves.

C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

D. Valve Sizes: Same as upstream piping unless otherwise indicated.

E. Valve Actuator Types:
1. Handlever: For quarter-turn valves 6 inch and smaller.

F. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. 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.

G. Valve Bypass and Drain Connections: MSS SP-45.
2.2  BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves:

1. Description:
   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Two piece.
   e. Body Material: Bronze.
   f. Ends: Threaded.
      1) Press ends can be provided in approved Press joint piping systems.
   g. Seats: PTFE or TFE.
   h. Stem: Bronze.
   i. Ball: Chrome-plated brass.
   j. Port: Full.

PART 3 - EXECUTION

3.1  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. Do not attempt to repair defective valves; replace with new valves.

3.2  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.

3.3  GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:
1. Shutoff Service: Ball 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 Copper Tubing, 2 inch and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

END OF SECTION 23 05 23
PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Metal pipe hangers and supports.
   2. Trapeze pipe hangers.
   3. Metal framing systems.
   4. Thermal-hanger shield inserts.
   5. Fastener systems.
   6. Pipe stands.
   7. Equipment supports.
B. Related Sections:
   1. Division 05.
   2. Section 230516 "Expansion Fittings and Loops for HVAC Piping" for pipe guides and anchors.
   3. Section 230548 "Vibration and Seismic Controls for HVAC" for vibration isolation devices.
   4. Section 233113 "Metal Ducts for duct hangers and supports.

1.3 DEFINITIONS
A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS
A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7 and IBC.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS
   A. Copper Pipe Hangers:
      1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.

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

2.3 METAL FRAMING SYSTEMS
   A. MFMA Manufacturer Metal Framing Systems:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.
   b. Cooper B-Line.
   c. Flex-Strut.
   d. GS Metals.
   e. Thomas & Betts.
   f. Unistrut.
   g. Wesanco.
   h. Approved.

2. Description: Shop- or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of [carbon steel] [stainless steel].
8. Pipe Clamps:
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   b. Description: Molded thermoplastic elastomer to separate the pipe from clamp the pipe and to protect the pipe from vibration, shock, surge, electrolysis, abrasion, expansion and contraction.

2.4 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Mechanical Pipe Shields.
   2. Value Engineered Products, Inc.
   3. Piping Technology & Products, Inc.
   4. Approved.
B. Insulation-Insert Material for Cold Piping: ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 360 degrees of pipe.

F. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

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.

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

2.6 EQUIPMENT SUPPORTS

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

2.7 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-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.

2. Design Mix: 5000-psi, 28-day compressive strength.
PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal 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 the building structure.

B. Metal 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 for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems. Provide with thermoplastic elastomer between pipe and clamp.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. 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.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

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, 2-1/2 inch 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 that 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 to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:
   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 allowed by ASME B31.9 for building services piping.
   2. Shield Dimensions for Pipe: Not less than the following:
      a. 1/4 inch to 3-1/2 inch: 12 inches long and 0.048 inch thick.
   3. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 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 bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS
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/D1.1M 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 so contours of welded surfaces match adjacent contours.

3.4 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.

3.5 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are 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 hangers and supports with galvanized metallic coatings for outdoor piping and equipment.

E. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

G. Use padded hangers for piping that is subject to scratching.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. 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 noninsulated or insulated, stationary pipes 1/2 inch to 30 inch.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes 4 inch to 24 inch, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes 3/4 inch to 36 inch, requiring clamp flexibility and up to 4 inches of insulation.
4. **Steel Pipe Clamps (MSS Type 4):** For suspension of cold and hot pipes 1/2 inch to 24 inch if little or no insulation is required.
5. **Pipe Hangers (MSS Type 5):** For suspension of pipes 1/2 inch to 4 inch, 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 noninsulated, stationary pipes 3/4 inch to 8 inch.
7. **Adjustable, Steel Band Hangers (MSS Type 7):** For suspension of noninsulated, stationary pipes 1/2 inch to 8 inch.
8. **Adjustable Band Hangers (MSS Type 9):** For suspension of noninsulated, stationary pipes 1/2 inch to 8 inch.
9. **Adjustable, Swivel-Ring Band Hangers (MSS Type 10):** For suspension of noninsulated, stationary pipes 3/4 inch to 8 inch.
10. **Adjustable Band Hangers (MSS Type 11):** For suspension of noninsulated, stationary pipes 3/8 inch to 8 inch.
11. **Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 12):** For suspension of noninsulated, stationary pipes 3/8 inch to 8 inch.
12. **Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 13):** For suspension of insulated pipes not subject to expansion or contraction.
13. **U-Bolts (MSS Type 24):** For support of heavy pipes 1/2 inch to 30 inch.
14. **Pipe Saddle Supports (MSS Type 26):** For support of pipes 4 inch to 36 inch, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. **Pipe Stanchion Saddles (MSS Type 37):** For support of pipes 4 inch to 36 inch, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. **Adjustable Pipe Saddle Supports (MSS Type 38):** For stanchion-type support for pipes 2-1/2 inch to 36 inch 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 1 inch to 30 inch, from two rods if longitudinal movement caused by expansion and contraction might occur.
18. **Adjustable Roller Hangers (MSS Type 43):** For suspension of pipes 2-1/2 inch to 24 inch, from single rod if horizontal movement caused by expansion and contraction might occur.
19. **Complete Pipe Rolls (MSS Type 44):** For support of pipes 2 inch to 42 inch 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 2 inch to 24 inch 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 2 inch to 30 inch if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

**J. 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 3/4 inch to 24 inch.
2. **Carbon- or Alloy-Steel Riser Clamps (MSS Type 42):** For support of pipe risers 3/4 inch to 24 inch if longer ends are required for riser clamps.

**K. 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.

L. 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-joist 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.

M. 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.

N. 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 allow 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 allow 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 allow 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.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 23 05 29
SECTION 23 05 48
VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Elastomeric isolation pads.
   2. Elastomeric isolation mounts.
   3. Restrained elastomeric isolation mounts.
   4. Open-spring isolators.
   5. Housed-spring isolators.
   6. Restrained-spring isolators.
   8. Pipe-riser resilient supports.
   9. Resilient pipe guides.
  10. Elastomeric hangers.
  11. Spring hangers.
  12. Snubbers.
  13. Restraint channel bracings.
  15. Seismic-restraint accessories.
  16. Mechanical anchor bolts.
  17. Vibration isolation equipment bases.
  18. Restrained isolation roof-curb rails.

B. Related Requirements:
   1. Section 220549 "Seismic Controls for Plumbing" for devices for plumbing equipment and systems.

1.3 DEFINITIONS


C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).
1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   
   1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
   2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
      
      a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
      b. Annotate to indicate application of each product submitted and compliance with requirements.
   
   3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

1.5 QUALITY ASSURANCE

A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.

B. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads:
   
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      
      a. Mason, Model Super W.
      b. Vibro-Acoustics.
      c. Kinetics.
      d. Approved.
   
   2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
   3. Size: Factory or field cut to match requirements of supported equipment.
   4. Pad Material: Oil and water resistant with elastomeric properties.
   5. Surface Pattern: Waffle pattern.
B. Double-Deflection, Elastomeric Isolation Mounts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mason, Model ND.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.

2. Mounting Plates:
   a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
   b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.

3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.2 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

A. Restrained Elastomeric Isolation Mounts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mason, Model BR.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.

2. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
   a. Housing: Cast-ductile iron or welded steel.
   b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

2.3 OPEN-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mason, Model SLF.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.

3. Minimum Additional Travel: 50 percent of the required deflection at rated load.

4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.


7. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

2.4 HOUSED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing:

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. Mason, Model C.
      b. Vibro-Acoustics.
      c. Kinetics.
      d. Approved.

   2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.

   3. Minimum Additional Travel: 50 percent of the required deflection at rated load.

   4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

   5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

   6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.

      a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
      b. Top housing with threaded mounting holes and internal leveling device.

2.5 RESTRAINED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint:

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. Mason, Model SLR.
      b. Vibro-Acoustics.
      c. Kinetics.
      d. Approved.

   2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.
a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
b. Top plate with threaded mounting holes.
c. Internal leveling bolt that acts as blocking during installation.

3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.6 HOUSED-RESTRAINED-SPRING ISOLATORS

A. Freestanding, Steel, Open-Spring Isolators with Vertical-Limit Stop Restraint in Two-Part Telescoping Housing:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Mason, Model SSLFH.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.

2. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with adjustable snubbers to limit vertical movement.
   a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
   b. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.

3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.7 PIPE-RISER RESILIENT SUPPORT

A. Description: All-directional, acoustical pipe anchor consisting of two steel tubes separated by a minimum 1/2-inch thick neoprene.

1. Vertical-Limit Stops: Steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions.
2. Maximum Load Per Support: 500 psig on isolation material providing equal isolation in all directions.
2.8 RESILIENT PIPE GUIDES

A. Description: Telescopic arrangement of two steel tubes or post and sleeve arrangement separated by a minimum 1/2-inch- thick neoprene.

1. Factory-Set Height Guide with Shear Pin: Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

2.9 ELASTOMERIC HANGERS

A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Mason, Model HD.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.

2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.

3. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

2.10 SPRING HANGERS

A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Mason, Model 30N.
   b. Vibro-Acoustics.
   c. Kinetics.
   d. Approved.

2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.

3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.

4. Minimum Additional Travel: 50 percent of the required deflection at rated load.

5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.

6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

2.11 SNUBBERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason.
4. Approved.

B. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.

1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
3. Maximum 1/4-inch air gap, and minimum 1/4-inch-thick resilient cushion.

2.12 RESTRAINT CHANNEL BRACINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason.
4. Approved.

B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.13 RESTRAINT CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason, Model SCB.
4. Approved.
B. Restraint Cables: ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.14 SEISMIC-RESTRAINT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason, Inc.
4. Approved.

B. Hanger-Rod Stiffener: Reinforcing steel angle clamped to hanger rod.

C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.

D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.15 MECHANICAL ANCHOR BOLTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason.
4. Approved.

B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.16 VIBRATION ISOLATION EQUIPMENT BASES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mason, Model WF and K.
4. Approved.

B. Steel Bases: Factory-fabricated, welded, structural-steel bases and rails.
   1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
      a. Include supports for suction and discharge elbows for pumps.
   2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
   3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

C. Concrete Inertia Base: Factory-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete.
   1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
      a. Include supports for suction and discharge elbows for pumps.
   2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
   3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
   4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

2.17 RESTRAINED ISOLATION ROOF-CURB RAILS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Mason, Model SRSC.
   4. Approved.

B. Description: Factory-assembled, fully enclosed, insulated, air- and watertight curb rail designed to resiliently support equipment and to withstand seismic[ and wind] forces.

C. Upper Frame: The upper frame shall provide continuous support for equipment and shall be captive to resiliently resist seismic[ and wind] forces.
D. Lower Support Assembly: The lower support assembly shall be formed sheet metal section containing adjustable and removable steel springs that support the upper frame. The lower support assembly shall have a means for attaching to building structure and a wood nailer for attaching roof materials, and shall be insulated with a minimum of 2 inches of rigid, glass-fiber insulation on inside of assembly. Adjustable, restrained-spring isolators shall be mounted on elastomeric vibration isolation pads and shall have access ports, for level adjustment, with removable waterproof covers at all isolator locations. Isolators shall be located so they are accessible for adjustment at any time during the life of the installation without interfering with the integrity of the roof.

E. Snubber Bushings: All-directional, elastomeric snubber bushings at least 1/4 inch thick.

F. Water Seal: Galvanized sheet metal with EPDM seals at corners, attached to upper support frame, extending down past wood nailer of lower support assembly, and counterflashed over roof materials.

**PART 3 - EXECUTION**

3.1 EXAMINATION

A. Examine areas and equipment to receive vibration isolation and seismic-[and wind]-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS

A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.

B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Division 03.

B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.

C. Equipment Restraints:
1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

D. Piping Restraints:
1. Comply with requirements in MSS SP-127.

E. Install cables so they do not bend across edges of adjacent equipment or building structure.

F. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.

G. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

H. Drilled-in Anchors:
1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Section 230516 "Expansion Fittings and Loops for HVAC Piping" for piping flexible connections.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections when required by authority having jurisdiction.

B. Remove and replace malfunctioning units and retest as specified above.
C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after piping system is at operating weight.

B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

3.7 VIBRATION ISOLATION EQUIPMENT BASES INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Division 03.

3.8 VIBRATION ISOLATION SCHEDULE

A. Isolators for Air Handling Units: Housed spring vibration isolators.


C. Isolators for Hung Exhaust Fans: Elastomeric hangers.

END OF SECTION 23 05 48
SECTION 23 05 53
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Equipment labels.
   2. Pipe labels.
   3. Valve tags.
   4. Accessible ceiling labels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

C. Valve numbering scheme.

D. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.
PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:
   1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
   4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
   5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
   6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   7. Fasteners: Stainless-steel rivets or self-tapping screws.
   8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's unique equipment number.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, [pipe size,] and an arrow indicating flow direction.
   1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
   2. Lettering Size: At least 1-1/2 inches high.

2.3 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass beaded chain.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.4 [WARNING TAGS]

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: Approximately 4 by 7 inches.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."

2.5 ACCESSIBLE CEILING LABELS

A. Material: Matte paper.
B. Size: Round, 1/2 inch.
C. Adhesive: Permanent.
D. Color: Per schedule.

A. Plastic Labels for Ceiling Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick.
3. Background Color: Green.
4. Minimum Label Size: Length varies for required label content, but not less than 2-1/2 inch. Width not less than the greater of 3/4 inch or that required to fit on grid.
6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content:

1. Include equipment's unique equipment number or item designation.
2. Include arrow to point to the designated removable ceiling tile.
PART 3 - EXECUTION

3.1 PREPARATION
   A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION
   A. Install or permanently fasten labels on each major item of mechanical equipment.
   B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION
   A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
      1. Near each valve and control device.
      2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
      3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
      4. At access doors, manholes, and similar access points that permit view of concealed piping.
      5. Near major equipment items and other points of origination and termination.
      6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   B. Pipe Label Color Schedule:
      1. Refrigerant Piping:
         a. Background Color: Orange.
         b. Letter Color: Black.

3.4 VALVE-TAG INSTALLATION
   A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
   B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
      1. Valve-Tag Size and Shape:
a. Refrigerant: 2 inches, round.

2. Valve-Tag Color:
   a. Refrigerant: Natural.

3. Letter Color:
   a. Refrigerant: Black.

3.5 ACCESSIBLE CEILING LABEL INSTALLATION

A. Install plastic label indicating equipment identification number or product designation at each ceiling tile. Locate label at grid of ceiling tile and provide an arrow pointing to tile to be removed to access equipment. If equipment is installed within a hard lid ceiling, provide label at access door.

B. Install labels for the following equipment:
   1. Fan Coil Units.
   2. All other ceiling mounted equipment that has an equipment tag.

C. Identification number and product designations shall be as follows:
   1. Isolation Valves:
      a. Domestic Cold Water and Hot Water Isolation Valves: DCW-VALVE, DHW-VALVE, or DCW/HW-VALVE.
      b. Domestic Hot Water Recirc Balancing Valve: DHWC-BAL-VALVE.
      c. If equipment isolation valve is located directly adjacent to the ceiling mounted equipment and valve access location match’s equipment access location, a dedicated valve tag is not required.
   2. Fan Coil Units: Label shall match equipment tag designation. FCU-01, etc.
   3. Ceiling Mounted Equipment: Label shall match equipment tag designation.

D. Install color coded “dot” to accessible ceiling grid wherever equipment is located above concealed. Colors shall be as follows:
   1. Fan Coil Units: Green.

END OF SECTION 23 05 53
SECTION 23 05 93
TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Balancing Air Systems:
      a. Constant-volume air systems.
      b. Variable-air-volume systems.
   2. Balancing Domestic Water Piping Systems:
      a. Domestic Hot water systems.

1.3 DEFINITIONS
C. TAB: Testing, adjusting, and balancing.
D. TABB: Testing, Adjusting, and Balancing Bureau.
E. TAB Specialist: An entity engaged to perform TAB Work.

1.4 INFORMATIONAL SUBMITTALS
A. Certified TAB reports.

1.5 QUALITY ASSURANCE
A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC or NEBB.
   1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC or NEBB.
2. TAB Technician: Employee of the TAB contractor and who is certified by AABC or NEBB as a TAB technician.

B. Certify TAB field data reports and perform the following:
   1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
   2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.


D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 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.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 TAB SPECIALISTS

A. Subject to compliance with requirements, engage one of the following:
   2. National Indoor Air Care.
   4. Hardin and Sons.
5. Airtest Co.
6. GB Systems.
7. TAC Systems LLC.
8. United Test and Balance.

3.2 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.

B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. 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.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Section 233113 “Metal Ducts” and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

   1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

   2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, “Fans and Systems,” or in SMACNA’s “HVAC Systems - Duct Design.” Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine operating safety interlocks and controls on HVAC equipment.

L. 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.
3.3 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system-readiness checks and prepare reports. Verify the following:
   1. Permanent electrical-power wiring is complete.
   2. Automatic temperature-control systems are operational.
   3. Equipment and duct access doors are securely closed.
   4. Balance, smoke, and fire dampers are open.
   5. Isolating and balancing valves are open and control valves are operational.
   6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
   7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.4 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 Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
   1. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
   2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230700 "HVAC Insulation."

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.5 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

C. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
D. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

E. Verify that motor starters are equipped with properly sized thermal protection.

F. Check dampers for proper position to achieve desired airflow path.

G. Check for airflow blockages.

H. Check condensate drains for proper connections and functioning.

I. Check for proper sealing of air-handling-unit components.

J. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.6 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

   a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.

2. Measure fan static pressures as follows to determine actual static pressure:

   a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
   b. Measure static pressure directly at the fan outlet or through the flexible connection.
   c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
   d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.

   a. Report the cleanliness status of filters and the time static pressures are measured.

4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.

5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.

6. Obtain approval from Architect/Engineer for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
   1. Measure airflow of submain and branch ducts.
      a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
   2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
   3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.
   1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
   1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
   2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.7 PROCEDURES FOR MULTIZONE SYSTEMS
A. Set unit at maximum airflow through the cooling coil.
B. Adjust each zone’s balancing damper to achieve indicated airflow within the zone.

3.8 PROCEDURES FOR DOMESTIC WATER SYSTEMS
A. Balance domestic hot water circulation loops for equal flow.
B. Throttle domestic hot water circulation pumps for scheduled flow.
3.9 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Heating-Water Flow Rate: Plus or minus 10 percent.
4. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.10 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Field test reports prepared by system and equipment installers.
2. Other information relative to equipment performance.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:
   
   a. Indicated versus final performance.
   b. Notable characteristics of systems.
   c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:

   a. Settings for outdoor-, return-, and exhaust-air dampers.
   b. Conditions of filters.
c. Cooling coil, wet- and dry-bulb conditions.
d. Face and bypass damper settings at coils.
e. Fan drive settings including settings and percentage of maximum pitch diameter.
f. Inlet vane settings for variable-air-volume systems.
g. Settings for supply-air, static-pressure controller.
h. Other system operating conditions that affect performance.

D. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:
   a. Unit identification.
   b. Location.
   c. Make and type.
   d. Model number and unit size.
   e. Manufacturer's serial number.
   f. Unit arrangement and class.
   g. Discharge arrangement.
   h. Sheave make, size in inches, and bore.
   i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
   j. Number, make, and size of belts.
   k. Number, type, and size of filters.

2. Motor Data:
   a. Motor make, and frame type and size.
   b. Horsepower and rpm.
   c. Volts, phase, and hertz.
   d. Full-load amperage and service factor.
   e. Sheave make, size in inches, and bore.
   f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):
   a. Total air flow rate in cfm.
   b. Total system static pressure in inches wg.
   c. Fan rpm.
   d. Discharge static pressure in inches wg.
   e. Filter static-pressure differential in inches wg.
   f. Preheat-coil static-pressure differential in inches wg.
   g. Cooling-coil static-pressure differential in inches wg.
   h. Heating-coil static-pressure differential in inches wg.
   i. Outdoor airflow in cfm.
   j. Return airflow in cfm.
   k. Outdoor-air damper position.
   l. Return-air damper position.
   m. Vortex damper position.

E. Apparatus-Coil Test Reports:

1. Coil Data:
   a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch o.c.
f. Make and model number.
g. Face area in sq. ft..
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

a. Air flow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
e. Return-air, wet- and dry-bulb temperatures in deg F.
f. Entering-air, wet- and dry-bulb temperatures in deg F.
g. Leaving-air, wet- and dry-bulb temperatures in deg F.
h. Water flow rate in gpm.
i. Water pressure differential in feet of head or psig.
j. Entering-water temperature in deg F.
k. Leaving-water temperature in deg F.
l. Refrigerant expansion valve and refrigerant types.
m. Refrigerant suction pressure in psig.
n. Refrigerant suction temperature in deg F.
o. Inlet steam pressure in psig.

F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):
G. Air-Terminal-Device Reports:

1. Unit Data:
   a. System and air-handling unit identification.
   b. Location and zone.
   c. Apparatus used for test.
   d. Area served.
   e. Make.
   f. Number from system diagram.
   g. Type and model number.
   h. Size.
   i. Effective area in sq. ft.

2. Test Data (Indicated and Actual Values):
   a. Air flow rate in cfm.
   b. Air velocity in fpm.
   c. Preliminary air flow rate as needed in cfm.
   d. Preliminary velocity as needed in fpm.
   e. Final air flow rate in cfm.
   f. Final velocity in fpm.
   g. Space temperature in deg F.

H. Instrument Calibration Reports:

1. Report Data:
   a. Instrument type and make.
   b. Serial number.
   c. Application.
   d. Dates of use.
   e. Dates of calibration.

END OF SECTION 23 05 93
SECTION 23 07 00
HVAC INSULATION

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section includes insulating the following HVAC systems:
   1. Condensate drain piping.
   2. Refrigerant suction and hot-gas piping, indoors and outdoors.
   3. Indoor, concealed supply and outdoor air.
   4. Indoor, exposed supply and outdoor air.
   5. Indoor, concealed heat recovery exhaust air.
   6. Indoor, exposed heat recovery exhaust air.
   7. Indoor, concealed outdoor air between isolation damper and penetration of building
      exterior.
   8. Indoor, exposed outdoor air between isolation damper and penetration of building
      exterior.
   9. Indoor, concealed exhaust and relief between isolation damper and penetration of
      building exterior.
   10. Indoor, exposed exhaust and relief between isolation damper and penetration of building
       exterior.

B. Related Sections:
   1. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor
   permeance thickness, and jackets (both factory and field applied if any).

1.4 COORDINATION
A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in
   Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with equipment Installer for equipment insulation
   application.
1.5 SCHEDULING

A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

1.6 DEFINITIONS

A. Conditioned Space: An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicated through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling.

B. Unconditioned Space: Everything that is not a conditioned space.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS


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. Surface-Burning Characteristics:

1. Insulation and Related Materials Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2. Insulation and Related Materials Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

3.

G. Flexible Elastomeric Pipe Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials. K-value not greater than 0.27 at 75°F mean temperature.

1. Products: Subject to compliance with requirements, provide one of the following:
a. AeroflexUSA, Model Aerocel.
b. Armacell.
c. K-Flex USA.
d. Approved.

H. Fiberglass, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:
   b. Knauf Insulation.
   c. Manson.
   d. Owens Corning.
   e. Approved.

2. Type I, 850 F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
3. K-value not greater than 0.23 at 75°F mean temperature.

2.2 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. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

C. Fiberglass Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

D. ASJ Adhesive, and FSK Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

E. PVC Jacket Adhesive: Compatible with PVC jacket.

2.3 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.

1. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 F.
3. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.

C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
1. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
2. Service Temperature Range: Minus 50 to plus 220 F.
3. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.

D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
   1. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
   2. Service Temperature Range: Minus 20 to plus 180 F.
   3. Solids Content: 60 percent by volume and 66 percent by weight.

2.4 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:
   1. Materials shall be compatible with insulation materials, jackets, and substrates.
   2. Fire- and water-resistant, flexible, elastomeric sealant.
   3. Service Temperature Range: Minus 40 to plus 250 F.

B. ASJ Flashing Sealants, and Vinyl, and PVC Jacket Flashing Sealants:
   1. Materials shall be compatible with insulation materials, jackets, and substrates.
   2. Fire- and water-resistant, flexible, elastomeric sealant.
   3. Service Temperature Range: Minus 40 to plus 250 F.

2.5 FACTORY-APPLIED JACKETS

A. When factory-applied jackets are indicated, comply with the following:
   1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
   2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
   3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
   4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

2.6 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
   1. Adhesive: As recommended by jacket material manufacturer.
2. Color: [White] [Color-code jackets based on system. Color as selected by Architect].
3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
   a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

C. Metal Jacket:
      a. Sheet and roll stock ready for shop or field sizing
      b. Finish and thickness are indicated in field-applied jacket schedules.
      d. Moisture Barrier for Outdoor Applications: 3-mil thick, heat-bonded polyethylene and kraft paper.
      e. Factory-Fabricated Fitting Covers:
         1) Same material, finish, and thickness as jacket.
         2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
         3) Tee covers.
         4) Flange and union covers.
         5) End caps.
         6) Beveled collars.
         7) Valve covers.
         8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

D. Underground Direct-Buried Jacket: 125-mil thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.

2.7 TAPE

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

2.8 SECUREMENTS

A. Bands:
1. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304; 0.015 inch thick, 1/2 inch wide with wing seal.

2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal.

**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. 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.

3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
   
   a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   
   b. Spindle: Copper- or zinc-coated, low-carbon steel, fully annealed, 0.106-inch-diameter shank, length to suit depth of insulation indicated.

   c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, stainless-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. 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:** 0.062-inch soft-annealed, stainless steel.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.

2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. [Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.]

C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties and length of ducts and fittings.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe and duct systems, and item of equipment 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. Install insulation with least number of joints practical.

J. 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.
K. Apply adhesives, mastics, and sealants at manufacturer’s recommended coverage rate and wet and dry film thicknesses.

L. 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 2 inches o.c.
      a. For below-ambient services, apply vapor-barrier mastic over staples.
   4. Cover joints and seams with tape, according to insulation material manufacturer’s written instructions, 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, duct flanges, and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. 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.

P. 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.
   5. Handholes.
   6. Cleanouts.

3.4 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 roof flashing at least 2 inches below top of roof flashing. Install jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
   4. Seal jacket to wall or 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 piping insulation continuously through penetrations of fire-rated walls and partitions. Terminate duct insulation at fire damper sleeves for fire rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
   1. Comply with requirements in Division 07 for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:
   1. Pipe: Install insulation continuously through floor penetrations.
   2. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
   3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07.

3.5 GENERAL PIPE INSULATION 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, install fitted PVC cover over elbows, tees, strainers, valves, flanges, unions, and grooved couplings. 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. 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 insulation covers from fiberglass blanket as same thickness as that on adjoining pipe. Enclose fiberglass blanket in silicone impregnated fiberglass cloth cover secured at all ends. Include 1” straps and stainless steel d-rings to secure insulation covers. For below-ambient services, provide a design that maintains vapor barrier.

2. Extend insulation covers at least 2 inches over adjacent pipe insulation on each side.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.

2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install mitered sections of pipe insulation.
   2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF FIBERGLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:
   1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
   2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
   3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
   4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
   5. Seal the butt end of every fourth pipe insulation section and the ends or raw edges of insulation terminations at equipment connections, fittings and fire stop systems.

B. Insulation Installation on Pipe Flanges:
   1. Install preformed pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with fiberglass blanket insulation.
   4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install preformed sections of same material as straight segments of pipe insulation when available.
   2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:
   1. Install preformed sections of same material as straight segments of pipe insulation when available.
   2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

E. Blanket and Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply manufacturer's recommended adhesives according to manufacturer's recommended coverage rates per unit area.
2. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.
   e. Impale insulation over pins and attach speed washers.
   f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
3. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
4. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturer's recommended adhesive.
   1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.9 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
   1. Drainage piping located in crawl spaces.
   2. Underground piping.
   3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Condensate Drain:
   1. 1-1/4 inch and Smaller: Insulation shall be the following:
      a. Fiberglass, Preformed Pipe: 1 inch thick.

B. Refrigerant Suction and Hot-Gas Piping:
   1. All Pipe Sizes: Insulation shall be the following:
      a. Flexible Elastomeric Pipe: Multiple layers of insulation 1 inch or smaller to equal total thickness of 1-1/2 inch thick.

C. Refrigerant Suction and Hot-Gas Flexible Tubing:
   1. All Pipe Sizes: Insulation shall be the following:
      a. Flexible Elastomeric Pipe: Multiple layers of insulation 1 inch or smaller to equal total thickness of 1-1/2 inch thick.

3.11 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping:
1. All Pipe Sizes: Insulation shall be the following:
   a. [Flexible Elastomeric Pipe: Multiple layers of insulation 1 inch or smaller to equal
total thickness of 1-1/2 inch thick.]

B. Refrigerant Suction and Hot-Gas Flexible Tubing:

1. All Pipe Sizes: Insulation shall be the following:
   a. [Flexible Elastomeric Pipe Insulation: Multiple layers of insulation 1 inch or smaller
to equal total thickness of 1-1/2 inch thick]

3.12 OUTDOOR, UNDERGROUND PIPING INSULATION SCHEDULE

A. Dual-Service Heating and Cooling, All Sizes, 40 to 200 F: Cellular glass, 3 inches thick.

3.13 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed outdoor air between isolation damper and penetration of building exterior.
4. Indoor, exposed outdoor air between isolation damper and penetration of building exterior.
5. Indoor, concealed exhaust and relief air between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust and relief air between isolation damper and penetration of building exterior.

B. Items Not Insulated:

1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and
ASHRAE/IESNA 90.1.
3. Double wall ducts with insulation of sufficient thickness to comply with energy code and
ASHRAE/IESNA 90.1.
5. Factory-insulated plenums and casings.
6. Flexible connectors.
8. Factory-insulated access panels and doors.
9. Exposed supply, return, exhaust and relief metal ducts located in finished spaces.
   Finished spaces do not include mechanical and electrical equipment rooms.
10. Return air ductwork in conditioned space.
11. Dedicated outside air handling systems “DOAS” supply air ductwork in conditioned space
    that does not serve systems that include sensible only cooling terminal units which
    include active and passive chilled beams, sensible only fan coils, etc.
3.14 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, supply-air duct and plenum insulation shall be the following:
   1. Fiberglass Blanket: 1-1/2 inch thick and 0.75-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-3.3.

B. Concealed, supply-air, and return-air duct and plenum insulation in unconditioned space shall be the following:
   1. Fiberglass Blanket: 3 inches thick and 0.75-lb/cu. ft. nominal density or 2 inches thick and 1.5 to 3.0lb/cu. ft. nominal density. Total installed thermal resistance of at least R-6.

C. Concealed, outdoor-air duct and plenum insulation between isolation damper and equipment shall be the following:
   1. Fiberglass Blanket: 3 inches thick and 0.75-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-8.
   2. If automatic isolation damper does not exist prior to equipment connection, insulate between penetration of building exterior and equipment as follows:
      a. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

D. Concealed, outdoor-air duct and plenum insulation between isolation damper and penetration of building exterior shall be one of the following:
   1. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.
   2. If automatic isolation damper does not exist prior to equipment connection, insulate between penetration of building exterior and equipment as follows:
      a. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

E. Concealed, exhaust-air and relief-air duct and plenum insulation between isolation damper and penetration of building exterior shall be one of the following:
   1. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

F. Concealed, heat recovery exhaust-air duct and plenum insulation between isolation damper and equipment shall be the following:
   1. Fiberglass Blanket: 3 inches thick and 0.75-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-8.
   2. If automatic isolation damper does not exist prior to equipment connection, insulate between penetration of building exterior and equipment as follows:
      a. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

G. Exposed, supply-air duct and plenum insulation shall be the following:
1. Fiberglass Blanket: 1-1/2 inch thick and 0.75-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-3.3.

2. Fiberglass Board: 1-1/2 inch thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-3.3.

H. Exposed, outdoor-air duct and plenum insulation between isolation damper and equipment shall be the following:

1. Fiberglass Blanket: 3 inches thick and 0.75-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-8.

2. Fiberglass Board: 2 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-8.

3. If automatic isolation damper does not exist prior to equipment connection, insulate between penetration of building exterior and equipment as follows:
   a. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

I. Exposed, outdoor-air duct and plenum insulation between isolation damper and penetration of building exterior shall be one of the following:

1. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

2. If automatic isolation damper does not exist prior to equipment connection, insulate between penetration of building exterior and equipment as follows:
   a. Fiberglass Board: 4 inches thick and 1.5-lb/cu. ft. nominal density. Total installed thermal resistance of at least R-16.

3.15 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Piping, Exposed:
   1. Aluminum, Smooth: 0.032 inch thick.

3.16 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.
SECTION 23 08 00

COMMISSIONING OF HVAC SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. The OPR and BOD documentation are included by reference for information only.

1.2 SUMMARY

A. This section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section “General Commissioning Requirements” for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section “General Commissioning Requirements” for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s role.

B. Refer to Division 01 Section “Submittals” for specific requirements.

C. In addition, provide the following:
   1. Certificates of readiness
   2. Certificates of completion of installation, prestart, and startup activities.
   3. O&M manuals
   4. Test reports

D. Control Drawings Submittal
1. The control drawings shall have a key to all abbreviations.
2. The control drawings shall contain graphic schematic depictions of the systems and each component.
3. The schematics will include the system and component layout of any equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
4. Provide a full points list with at least the following included for each point:
   a. Controlled system
   b. Point abbreviation
   c. Point description
   d. Display unit
   e. Control point or set point (Yes / No)
   f. Monitoring point (Yes / No)
   g. Intermediate point (Yes / No)
   h. Calculated point (Yes / No)

1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC&R system and controls system in Division 23, except for equipment specific to and used by TAB in their commissioning responsibilities. A sufficient quantity of two-way radios shall be provided by each subcontractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.
D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Construction Checklists for all commissioned components, equipment, and systems.

B. Red-lined Drawings:
   1. The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
   2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
   3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
   4. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. Operation and Maintenance Data:
   1. Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
   2. The CxA will review the O&M literature once for conformance to project requirements.
   3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. Demonstration and Training:
   1. Contractor will provide demonstration and training as required by the specifications.
   2. A complete training plan and schedule must be submitted by the contractor to the CxA four weeks (4) prior to any training.
   3. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session.
   4. The CxA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CxA and Owner's representative. A copy of the test record shall be provided to the CxA, Owner, and Architect.
5. Engage a Factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specific equipment.

6. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment.

7. Review data in O&M Manuals.

### 3.2 CONTRACTOR'S RESPONSIBILITIES

A. Mechanical, Controls and TAB Contractors. The commissioning responsibilities applicable to each of the mechanical, controls and TAB contractors of Division 23 are as follows (all references apply to commissioned equipment only):

B. Perform commissioning tests at the direction of the CxA.

C. Attend construction phase controls coordination meetings.

D. Attend testing, adjusting, and balancing review and coordination meetings.

E. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

F. Provide information requested by the CxA for final commissioning documentation.

G. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

H. Prepare preliminary schedule for Mechanical system orientations and inspections, operation and maintenance manual submissions, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for owner. Distribute preliminary schedule to commissioning team members.

I. Update schedule as required throughout the construction period.

J. During the startup and initial checkout process, execute the related portions of the construction checklists for all commissioned equipment.

K. Assist the CxA in all verification and functional performance tests.

L. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

M. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA (45) days after submittal acceptance.

N. Coordinate with the CxA to provide (48) hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
O. Notify the CxA a minimum of (2) weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

P. Participate in, and schedule vendors and contractors to participate in the training sessions.

Q. Provide written notification to the CM/GC and CxA Authority that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.
   1. HVAC&R equipment including all fans, air handling units, ductwork, dampers, terminals, and all other equipment furnished under this Division.

R. The equipment supplier shall document the performance of his equipment.

S. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

T. Test, Adjust and Balance Contractor
   1. Attend initial commissioning coordination meeting scheduled by the Commissioning Authority.
   2. Submit the site specific testing and balancing plan to the CxA and AE for review and acceptance.
   3. Attend the testing and balancing review meeting scheduled by the CxA. Be prepared to discuss the procedures that shall be followed in testing, adjusting, and balancing the HVAC&R system.
   4. At the completion of the testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R contractor and the CM/GC.
   5. At the completion of testing and balancing work, and the submittal of the final testing and balancing report, notify the HVAC&R Contractor and the CM/GC.
   6. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.

U. Provide training of the Owner’s operating staff using expert qualified personnel, as specified.

V. Equipment Suppliers
   1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner, to keep warranties in force.
   2. Assist in equipment testing per agreements with contractors.
   3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

W. Refer to Division 01 Section “General Commissioning Requirements” for additional contractor responsibilities.

3.3 OWNER’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for Owner’s Responsibilities.
3.4 DESIGN PROFESSIONAL’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for Design Professional’s Responsibilities.

3.5 CxA’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.7 TESTING, ADJUSTING AND BALANCING VERIFICATION

A. Prior to performance of Testing, Adjusting and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the CxA.

B. Notify the CxA at least ten (10) days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.

C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.

1. The CxA will notify testing and balancing subcontractor ten (10) days in advance of the date of field verification. Notice will not include data points to be verified.

2. The testing and balancing subcontractor shall use the same instruments (by model and serial number) that were used when original data were collected.

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3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

3.8 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the HVAC&R contractor, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.9 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 23 sections. Provide submittals, test data, inspector record, and certifications to the CxA.
B. **HVAC&R Instrumentation and Control System Testing:** Field testing plans and testing requirements are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

C. **Pipe system cleaning, flushing, hydrostatic tests, and chemical treatment:** Test requirements are specified in Division 23 piping Sections. HVAC&R Contractor shall prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the CxA. Plan shall include the following:

1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers shall be keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Drawings keyed to pipe zones or sectors shall be formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
2. Description of equipment for flushing operations.
4. Tracking checklist for managing and ensuring that all pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.

D. **Refrigeration System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of chillers, cooling towers, refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. **HVAC&R Distribution System Testing:** Provide technicians, instrumentation, tools, and equipment to test performance of air, steam, and hydronic distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

F. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Building Automation System
2. Ductwork
3. Energy Recovery Ventilators
4. Exhaust Fans
5. Variable Refrigerant Flow Fan Coils

3.10 **DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT**

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.
3.11 APPROVAL
   A. Refer to Division 01 Section “General Commissioning Requirements” for approval procedures.

3.12 DEFERRED TESTING
   A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deferred testing.

3.13 OPERATION AND MAINTENANCE MANUALS
   A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.
   B. Refer to Division 01 Section “General Commissioning Requirements” for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.
   C. An updated as-built version of the control drawings and sequences of operation shall be included in the final controls O&M manual submittal.

3.14 TRAINING OF OWNER PERSONNEL
   A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to training.
   B. Mechanical Contractor. The mechanical contractor shall have the following training responsibilities:
      1. Provide the CxA with a training plan two weeks before the planned training.
      2. Provide designated Owner personnel with comprehensive orientation and training in the understanding of the systems and the operation and maintenance of each piece of HVAC equipment including, but not limited to, all HVAC equipment (ex. pumps, heat exchangers, chillers, heat rejection equipment, air conditioning units, air handling units, fans, terminal units, controls and water treatment systems, etc.)
      3. Training shall normally start with classroom sessions followed by hands-on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
      4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
      5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer’s representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.
6. The controls contractor shall attend sessions other than the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

7. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.

8. Training shall include:
   a. Use of the printed installation, operation and maintenance instruction material included in the O&M manuals.
   b. A review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.
   c. Discussion of relevant health and safety issues and concerns.
   d. Discussion of warranties and guarantees.
   e. Common troubleshooting problems and solutions.
   f. Explanatory information included in the O&M manuals and the location of all plans and manuals in the facility.
   g. Discussion of any peculiarities of equipment installation or operation.
   h. The format and training agenda in The HVAC Commissioning Process, ASHRAE Guideline 1-2007, is recommended.

9. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance for all pieces of equipment.

10. The mechanical contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.

11. Training shall occur after functional testing is complete, unless approved otherwise by the Owner.

C. Controls Contractor. The controls contractor shall have the following training responsibilities:

1. Provide the CxA and AE with a training plan four weeks before the planned training.

2. The controls contractor shall provide designated Owner personnel training on the control system in this facility. The intent is to clearly and completely instruct the Owner on all the capabilities of the control system.

3. Training manuals. The standard operating manual for the system and any special training manuals will be provided for each trainee, with three extra copies left for the O&M manuals. In addition, copies of the system technical manual will be demonstrated during training and three copies submitted with the O&M manuals. Manuals shall include detailed description of the subject matter for each session. The manuals will cover all control sequences and have a definitions section that fully describes all relevant words used in the manuals and in all software displays. Manuals will be approved by the CxA and AE. Copies of audiovisuals shall be delivered to the Owner.
4. The trainings will be tailored to the needs and skill-level of the trainees.

5. The trainers will be knowledgeable on the system and its use in buildings. For the on-site sessions, the most qualified trainer(s) will be used. The Owner shall approve the instructor prior to scheduling the training.

6. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

7. The controls contractor shall attend sessions other than the controls training, as requested, to discuss the interaction of the controls system as it relates to the equipment being discussed.

8. There shall be three (3) training sessions:

   a. Training I. Control System. The first training shall consist of 8 hours of actual training. This training may be held on-site or in the supplier’s facility. If held off-site, the training may occur prior to final completion of the system installation. Upon completion, each student, using appropriate documentation, should be able to perform elementary operations and describe general hardware architecture and functionality of the system.

   b. Training II. Building Systems. The second session shall be held on-site for a period of 8 hours of actual hands-on training after the completion of system commissioning. The session shall include instruction on:

      1) Specific hardware configuration of installed systems in this building and specific instruction for operating the installed system, including HVAC systems, lighting controls and any interface with security and communication systems.

      2) Security levels, alarms, system start-up, shut-down, power outage and restart routines, changing set points and alarms and other typical changed parameters, overrides, freeze protection, manual operation of equipment, optional control strategies that can be considered, energy savings strategies and set points that if changed will adversely affect energy consumption, energy accounting, procedures for obtaining vendor assistance, etc.

      3) All trending and monitoring features (values, change of state, totalization, etc.), including setting up, executing, downloading, viewing both tabular and graphically and printing trends. Trainees will actually set-up trends in the presence of the trainer.

      4) Every screen shall be completely discussed, allowing time for questions.

      5) Use of keypad or plug-in laptop computer at the zone level.

      6) Use of remote access to the system via phone lines or networks.

      7) Setting up and changing an air terminal unit controller.

      8) Graphics generation

      9) Point database entry and modifications

      10) Understanding DDC field panel operating programming (when applicable)

COMMISSIONING OF HVAC SYSTEMS
c. Training III. The third training will be conducted on-site six months after occupancy and consist of 8 hours of training. The session will be structured to address specific topics that trainees need to discuss and to answer questions concerning operation of the system.

D. **TAB.** The TAB contractor shall have the following training responsibilities:

1. TAB shall meet for 4 hours with facility staff after completion of TAB and instruct them on the following:

   a. Go over the final TAB report, explaining the layout and meanings of each data type.
   b. Discuss any outstanding deficient items in control, ducting or design that may affect the proper delivery of air or water.
   c. Identify and discuss any terminal units, duct runs, diffusers, coils, fans and pumps that are close to or are not meeting their design capacity.
   d. Discuss any temporary settings and steps to finalize them for any areas that are not finished.
   e. Other salient information that may be useful for facility operations, relative to TAB.

END OF SECTION 23 08 00
SECTION 23 23 00
REFRIGERANT PIPING

PART 1 - GENERAL

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

1.2 SUMMARY
   A. This Section includes refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS
   A. Line Test Pressure for Refrigerant R-410A:

1.4 ACTION SUBMITTALS
   A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
      1. Copper tube and fittings.

1.5 INFORMATIONAL SUBMITTALS
   A. Field quality-control test reports.

1.6 QUALITY ASSURANCE
   A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
   C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."
1.7 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 280, Type ACR.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Brazing Filler Metals: AWS A5.8. BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480.

E. Flexible Connectors:
   2. End Connections: Socket ends.
   3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch-long assembly.
   5. Maximum Operating Temperature: 250 deg F.

2.2 REFRIGERANTS

A. 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:
   1. Atofina.
   2. DuPont.
   3. Honeywell.
   4. INEOS Fluor Americas.

B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

2.3 HANGERS AND SUPPORTS

A. Insulated Pipe Support System:
   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:
      a. NRP, Model Insulclamp.
2. General: Sizes range to fit ¼ inch to 4-1/8 inch OD pipes. Plastic inserts shall insulate against heat loss and reduce vibration. Metal parts shall be zinc plated and color passivated to resist corrosion. Attaches to standard unistrut.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-134a

A. Suction Lines 1-1/2 inch and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

B. Suction Lines 2 inch to 4 inch for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

C. Hot-Gas and Liquid Lines[, and Suction Lines for Heat-Pump Applications]:
   1. 1-1/2 inch and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.
   2. 2 inch to 3 inch: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.
   3. 4 inch: Copper, Type K, drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines 1-1/2 inch and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.

B. Suction Lines 2 inch to 3-1/2 inch for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

C. Suction Lines 4 inch and smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

D. Hot-Gas and Liquid Lines[, and Suction Lines for Heat-Pump Applications]:
   1. 5/8 inch and Smaller: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.
   2. 3/4 inch to 1 inch and Smaller: Copper, Type K, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.
   3. 1-1/4 inch and smaller: Copper, Type K, drawn-temper tubing and wrought-copper fittings with brazed joints.
   4. 1-1/2 inch to 2 inch: Copper, Type K, drawn-temper tubing and wrought-copper fittings with brazed joints.
3.3 PIPING INSTALLATION

A. 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 Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

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 adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 “Access Doors and Frames” if valves or equipment requiring maintenance is concealed behind finished surfaces.

L. Install refrigerant piping in protective conduit where installed belowground.

M. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

N. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

O. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
P. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."

R. [Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."]

S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

3.4 PIPE 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 pipe and fittings before assembly.

C. Fill pipe and fittings with nitrogen during brazing to prevent scale formation.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
   2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.5 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:
   1. [Insulated pipe support system for individual horizontal runs less than 20 feet long.]
   2. [Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.]
   3. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
   4. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
   5. Spring hangers to support vertical runs.
   6. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
   1. 1/2 inch: Maximum span, 60 inches; minimum rod size, 1/4 inch.
   2. 5/8 inch: Maximum span, 60 inches; minimum rod size, 1/4 inch.
   3. 1 inch: Maximum span, 72 inches; minimum rod size, 1/4 inch.
   4. 1-1/4 inch: Maximum span, 96 inches; minimum rod size, 3/8 inch.
5. 1-1/2 inch: Maximum span, 96 inches; minimum rod size, 3/8 inch.
6. 2 inch: Maximum span, 96 inches; minimum rod size, 3/8 inch.
7. 2-1/2 inch: Maximum span, 108 inches; minimum rod size, 3/8 inch.
8. 3 inch: Maximum span, 10 feet; minimum rod size, 3/8 inch.
9. 4 inch: Maximum span, 12 feet; minimum rod size, 1/2 inch.

D. Support multifloor vertical runs at least at each floor.

3.6 SYSTEM CHARGING

A. Charge system using the following procedures:
   1. Install new filter-dryer core in replaceable core filter-dryers after leak test but before evacuation.
   2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
   3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
   4. Perform evacuation in the presence of the Owner. Notify Owner at least 72 hours in advance.
   5. Fully charge system after testing. Charge system with a new filter-dryer core in charging line.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
   1. Comply with ASME B31.5, Chapter VI.
   2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of test.
      c. Test joints and fittings to no leakage with electronic leak detector.
      d. If leakage occurs, remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.8 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
   1. Open shutoff valves in condenser water circuit.
   2. Verify that compressor oil level is correct.
   3. Open compressor suction and discharge valves.
   4. Open refrigerant valves except bypass valves that are used for other purposes.
   5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 00
SECTION 23 31 13
METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Single-wall rectangular ducts and fittings.
   2. Single-wall round ducts and fittings.
   4. Duct liner.
   5. Sealants and gaskets.
   6. Hangers and supports.

B. Related Sections:
   1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
   2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 [DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Approved.

B. Rectangular Ducts: Fabricate ducts with indicated dimensions for the inner duct.

C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

D. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
F. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fiberglass Duct Liner Standard."

1. Maximum Thermal Conductivity: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
2. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
3. Coat insulation with antimicrobial coating.
4. Cover insulation with polyester film complying with UL 181, Class 1.

G. Inner Duct: Minimum 0.028-inch [perforated galvanized sheet steel having 3/32-inch- diameter perforations, with overall open area of 23 percent] [solid sheet].

H. Formed-on Transverse Joints (Flanges): Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Traverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

I. Longitudinal Seams: Select seam types and fabricate according to SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Traverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2.4 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   2. Finishes for Surfaces Exposed to View: Mill phosphatized.
   3. Gauge: Minimum 26 gauge unless noted otherwise.

C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
   1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.5 DUCT LINER

A. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Armacell, Model AP/Armaflex.
      b. Aeroflex.
      c. Rubatex.
      d. Approved.
   2. Maximum Thermal Conductivity: 0.25 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
   3. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
   4. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
   5. Thickness: Multiple layer to achieve scheduled thickness.

B. Insulation Pins and Washers:
   1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
   2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick stainless steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
C. Shop Application of Duct Liner: Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints in the liner, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
7. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.6 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

2. Type: S.
3. Grade: NS.
5. Use: O.

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.7 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
D. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
F. Trapeze and Riser Supports:
   3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
C. Install round[ and flat-oval] ducts in maximum practical lengths.
D. Install ducts with fewest possible joints.
E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

K. [Where ducts pass through fire-rated interior partitions and exterior walls, install rated dampers as required by code. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.]

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.[ Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."]

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Where practical, install concrete inserts before placing concrete.
2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual" with the rate of air leakage (CL) less than or equal to 6.0 as determined by the following equation:

   a. \[ CL = \frac{F}{P^{0.65}} \]
   
   b. Where \( F \) = The measured leakage rate in CFM per 100 square feet of duct surface and \( P \) = The static pressure of the test.

2. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing.

3. Test for leaks before applying external insulation.

4. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
Section 23 31 13
Metal Ducts

3.6 START UP

A. Air Balance: Comply with requirements in Section 230593 “Testing, Adjusting, and Balancing for HVAC.”

3.7 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated [on drawings] and as follows:
   1. Underground Ducts: Concrete-encased, [galvanized sheet steel] [PVC-coated, galvanized sheet steel with thicker coating on duct exterior] [stainless steel].

B. [Supply Ducts:]
   1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
      a. Pressure Class: Positive 2-inch wg.
   2. Ducts Connected to Constant-Volume Air-Handling Units:
      a. Pressure Class: Positive 2-inch wg.

C. Return Ducts:
   1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
      a. Pressure Class: Positive or negative 2-inch wg.
   2. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive or negative 2-inch wg.

D. Exhaust Ducts:
   1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
      a. Pressure Class: Negative 2-inch wg.
   2. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive or negative 2-inch wg.
   3. Ducts Connected to Locker Room Heat Recovery Air Handling Units or Exhaust Fans:
      a. Alloy 3003, aluminum sheets.
      b. Gauge: 24 minimum.
      c. Pressure Class: Positive or negative 2-inch wg.

E. Outdoor-Air Heated or Cooled Ducts:
   1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
Section 23 31 13
Metal Ducts

a. Pressure Class: Positive or negative 2-inch wg.

2. Ducts Connected to Air-Handling Units:
   a. Pressure Class: Positive or negative [2-inch wg] [3-inch wg].

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
   a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
   b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
   c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      1) Radius-to Diameter Ratio: 1.5.
   b. Round Elbows, 12 inches and Smaller in Diameter: Stamped or pleated.
   c. Round Elbows, 14 inches and Larger in Diameter: Standing seam or welded.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
   a. Rectangular Main to Rectangular Branch: 45-degree entry.
   b. Rectangular Main to Round Branch: Spin in.
      1) Velocity 1000 fpm or Lower: 90-degree tap.
      2) Velocity 1000 to 1500 fpm: Conical tap.
      3) Velocity 1500 fpm or Higher: 45-degree lateral.

2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
   a. Velocity 1000 fpm or Lower: 90-degree tap.
   b. Velocity 1000 to 1500 fpm: Conical tap.
   c. Velocity 1500 fpm or Higher: 45-degree lateral.
3.8 DUCT LINER SCHEDULE

A. General: Duct liner shall be installed at the lengths as indicated for the duct types noted below. Lengths as indicated include all branch connections to main ducts as measured from connection to fans or diffusers/registers/grilles.

B. Supply-air ducts, 10 feet downstream of an air handler supply fan, duct liner shall be the following:
   1. Flexible elastomeric, 1 inch thick.

C. Supply-air ducts, 5 feet downstream of single-duct air terminal units, duct liner shall be the following:
   1. Flexible elastomeric, 1 inch thick.

D. Exhaust air ducts, feet upstream of an air handler fan, duct liner shall be the following:
   1. Flexible elastomeric, 1 inch thick.

E. Transfer-air ducts, duct liner shall be the following:
   1. Flexible elastomeric 1 inch thick.

END OF SECTION 23 31 13
SECTION 23 33 00
AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

   A. Section Includes:
      1. Backdraft and pressure relief dampers.
      3. Control dampers.
      4. Flange connectors.
      5. Turning vanes.
      6. Remote damper operators.
      7. Duct-mounted access doors.
      8. Flexible connectors.
     10. Duct accessory hardware.

1.3 ACTION SUBMITTALS

   A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

   A. Source quality-control reports.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION


   B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Low Velocity, Backdraft and Pressure Relief Dampers.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ruskin, Model CBD2.
      b. American Warming and Ventilating.
      c. Greenheck.
      d. Nailor.
      e. Approved.
   2. Description: Counter balanced gravity backdraft damper. Counterbalance weigh can be set to relieve air at pressure differentials less than 0.01 inch wg.
   4. Maximum System Pressure: 4-inch wg.
   5. Frame: 0.090-inch- thick extruded aluminum, with mounting flange.
   6. Blades: Multiple single-piece blades, center pivoted, maximum 7-inch width, 0.025-inch- thick, roll-formed aluminum with sealed edges.
   11. Accessories:
      a. Adjustment device to permit setting for varying differential static pressure.
      b. Counterweights for vertical airflow installations.

A. High Velocity, Backdraft and Pressure Relief Dampers.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      b. American Warming and Ventilating.
      c. Greenheck.
      d. Nailor.
      e. Approved.
2. Description: Heavy duty counterbalanced.
4. Maximum System Pressure: 4-inch wg.
5. Frame: 14 gage, galvanized sheet steel and mounting flange.
6. Blades: Multiple single-piece blades, end pivoted, maximum 7-inch width, 16 gage galvanized steel.
8. Blade Axles:
   b. Diameter: 0.50 inch.
11. Accessories:
   a. Adjustment device to permit setting for varying differential static pressure.
   b. Counterweights and spring-assist kits for vertical airflow installations.

2.4 MANUAL VOLUME DAMPERS
A. General: Fabricate in accordance with SMACNA, same material as for duct construction.
B. Standard, Steel, Manual Volume Dampers:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ruskin, Model MD and MDR
      b. American Warming and Ventilating.
      c. Greenheck.
      d. Nailor.
      e. Approved.
   2. Standard leakage rating, with linkage outside airstream.
   3. Suitable for horizontal or vertical applications.
   4. Maximum Temperature: 250°F.
   5. Maximum Air Velocity: 1500 fpm.
   6. Maximum System Pressure: 2 inch wg.
   7. Frames:
      a. Frame: 20 gage channel frame, galvanized sheet steel.
      b. Mitered and welded corners.
      c. Flangeless frames for installing in ducts.
   8. Blades:
      a. Multiple or single blade.
      b. Parallel- or opposed-blade design.
      c. Stiffen damper blades for stability.
      d. Galvanized-steel, 20 gage.

10. Bearings:
   a. Molded synthetic.
   b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

11. Tie Bars and Brackets: Galvanized steel.

C. Damper Hardware:

1. Regulator: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut. "Jiffy" style regulator sets are not allowed and shall be removed and replaced with specified product at the contractor's expense.

2. Include hand quadrant for ducts 20” or greater.

3. Include center hole to suit damper operating-rod size.

4. Include elevated platform for insulated duct mounting.

2.5 MOTORIZED CONTROL DAMPERS

1. Manufacturers:
   a. Ruskin, Model CD50.
   b. Nailor.
   c. Approved.

2. Description: AMCA Class 1A leakage rated, airfoil shaped, parallel blade for two-position control, opposed blade for modulating control; 0.125-inch- minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall be extruded aluminum with maximum blade width of 6 inches and length of 60 inches.

   a. Secure blades to 1/2-inch- diameter, plated steel hex, with molded synthetic blade bearings, blade-linkage hardware of zinc-plated steel and brass.
   b. Operating Temperature Range: From minus 40 to plus 200 deg F.
   d. Edge Seals: Extruded TPR or stainless-steel, rated for leakage at less than 4 cfm per sq. ft. of damper area, at differential pressure of 1-inch wg when damper is held by torque of 50 in. x lb; when tested according to AMCA 500D.
   e. Duct Mounting: Duct flange mounting type to maintain duct free area.

B. Dampers, Round:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Ruskin, Model CDRS25.
   b. Approved.
2. Description: AMCA-rated butterfly type; 20 gage minimum galvanized steel frame; 14 gage minimum galvanized damper blades with maximum damper size of 24 inches and sleeve length of 6 inches.
   a. Secure blades to 1/2-inch- diameter axle, with stainless steel sleeve bearings.
   b. Operating Temperature Range: From minus 40 to plus 200 deg F.
   c. Control Shaft: 1/2-inch- diameter, plated steel.
   d. Edge Seals: Neoprene seal, rated for leakage at less than 0.15 cfm per inch of damper perimeter, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

2.6 FLANGE CONNECTORS
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. Ductmate.
      2. Approved.
   B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
   C. Material: Galvanized steel.
   D. Gage and Shape: Match connecting ductwork.

2.7 TURNING VANES
   A. General Requirements: Comply with SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows." Same material as adjacent duct.
   B. Vane Construction: Double wall.

2.8 REMOTE DAMPER OPERATORS
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. Young Regulator.
      2. Approved.
   B. Description: Cable system designed for remote manual damper adjustment.
   C. Control Wire: Stainless steel.
   D. Sheath: Galvanized steel.
   E. Wall-Box Mounting: Recessed.
F. Wall-Box Cover-Plate Material: Primer cover plate for painting to match surrounding surfaces.

2.9 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate, Model PROFlex.
2. Duro Dyne.
3. Approved.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3 inches wide minimum attached to two strips of minimum 3-inch wide, 24 gage, galvanized sheet steel, 0.032-inch thick aluminum sheets or stainless steel. Provide metal compatible with connected ducts.


1. Minimum Weight: 26 oz./sq. yd.
2. Tensile Strength: 475 lbf/inch in the warp and 375 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

2.10 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Thermaflex, Model M-KE
2. Flexmaster.
3. Approved.

B. Insulated, Flexible Duct: UL 181, Class 1, max flame spread rating 25, max smoke-development rating 50, CPE duct liner film supported by helically wound, spring-steel wire; fibrous-glass insulation; metallized vapor-barrier film.

1. Pressure Rating: 4-inch wg positive and 1-inch wg negative.
3. Temperature Range: Minus 20 to plus 250 deg F.
4. Insulation R-Value: 4.2.

C. Flexible Duct Connectors:

1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
2.11 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA’s "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts [and] [ stainless-steel accessories in stainless-steel ducts], [and aluminum accessories in aluminum ducts].

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install control dampers at exterior louvers. Dampers may not be shown on the drawings.

E. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
2. Volume dampers may not be shown on the drawings. Install volume damper in duct to each supply, return, and exhaust diffuser, register or grille.
3. Install volume damper in accessible locations as far from diffuser, register or grill as possible.
4. Install ½ inch wide orange colored surveyors tape on quadrant of volume dampers located above ceilings.
5. Provide remote damper operators where dampers are not accessible.

F. Set dampers to fully open position before testing, adjusting, and balancing.

G. Install test holes at fan inlets and outlets and elsewhere as indicated.

H. Install flexible connectors to connect ducts to equipment.

I. Connect terminal units to supply ducts with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

J. Connect diffusers to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
K. Connect flexible ducts to metal ducts with draw bands.
L. Install duct test holes where required for testing and balancing purposes.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Operate dampers to verify full range of movement.
   2. Inspect locations of access doors and verify that purpose of access door can be performed.
   3. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 23 33 00
SECTION 23 37 13
DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Diffusers, registers, and grilles.
   2. Flexible diffusion outlets.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated, include the following:
   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
   2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.

1.4 INFORMATIONAL SUBMITTALS
A. Source quality-control reports.

PART 2 - PRODUCTS

2.1 DIFFUSERS, REGISTERS AND GRILLES
A. Diffusers, Registers, and Grilles:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
      a. Anemostat.
      b. Krueger.
c. METALAIRE.
d. Nailor.
e. Price.
f. Titus.
g. Tuttle & Bailey.
h. Approved.

2. Mounting: Furnish with border type compatible with adjacent ceiling, wall or floor type. Refer to architectural drawings and specifications for ceiling, wall or floor systems.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713
SECTION 23 72 00
ENERGY RECOVERY VENTILATORS

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Energy recovery ventilators (ERV's) for indoor applications.

1.3 SUBMITTALS
A. Product Data: For each air-handling unit indicated.
   1. Submit product data for specified products with the following information:
      a. General layout drawing with plan and elevation views including are relevant dimensions.
      b. Performance schedule including airflow, heating and cooling capacities, electrical data, unit weight.
      c. Full fan curve.
      d. Motor Electrical schematics including field wiring connection.
      e. Control point schematic and complete written sequence of operation.

1.4 QUALITY ASSURANCE
A. Entire unit shall be UL 1812 certified and bear certification label by ETL, UL or CSA.
B. Unit shall meet ASHRAE Standard 90.1 performance requirements.
C. Unit sound data will be tested in accordance to AHRI 260.

1.5 DELIVERY, STORAGE AND HANDLING
A. Store equipment away from construction areas where it may be damage and protected from harmful weather conditions.
B. Keep factory shipping packaging in place until unit is ready to be installed.
C. Follow manufacturer's instructions for placement of equipment.

1.6 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate sizes and locations of structural-steel support members, if any, with actual equipment provided.

C. Coordinate all system connections and building penetrations including electrical, and duct connections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. Approved.

2.2 ENERGY RECOVERY UNITS

A. Energy Recovery units shall be factory assembled and tested. Units shall include insulated steel cabinet, total plate heat exchanger, fan and motor assembly, filter rack, and integral controls. Unit shall have single point power connections.

2.3 CABINET

A. Cabinet shall be nominal ¾-inch single wall panel with Styrofoam thermal insulation. Cabinet exterior shall be 22-gauge pre-painted steel.

B. Doors shall be nominal ¾-inch single wall panel with the same construction as cabinet. Doors shall be fitted with hinges and door latch.

C. The unit will be designed for service and maintenance on one side only to allow for a compact installation.

2.4 FILTERS

A. Unit shall include 1” filter for the supply air and return air paths upstream of energy recovery exchanger. Filters shall be accessed through hinged access door. Supply one set of MERV4 pleated filters for the Outdoor air stream and one set of MERV4 for the Return air stream. All filters must be UL approved.
2.5  FANS
A. Fans shall be mixed flow plenum type with direct drive motor. Fan and motor assembly shall be factory mounted and balanced. The fans will be capable of operating in ambient temperatures of up to 104°F.
B. Fan motors shall be Electronically Commutated type.
C. Provide means to easily remove fan-motor assembly for service through standard doors.
D. Fan motor drives shall be 120/60/1 and be UL approved.

2.6  ENERGY RECOVERY DEVICE
A. Where indicated, units shall include plate type cross flow heat exchanger fabricated from polymer membrane.
B. The energy recovery efficiency must be a minimum of 50% enthalpy recovery effectiveness to meet the 2018 Washington State Energy Code.
C. The energy recovery device must have an ISO Hygiene rating of 0.
D. Energy recovery device shall be AHRI 1060 certified.

2.7  CONTROLS
A. Unit shall include an integrated microprocessor-based unit controller. The controls shall be in the integral control’s cabinet. All internal controls and sensors shall be factory prewired and tested.
B. The control system shall regulate airflows and other functions as required. Unit controller shall be pre-programmed with factory tested software.
C. Controller shall come complete with furnace interlock.
D. Recirculation Defrost Option – Frost protection shall be initiated when the temperature on the supply air is 40°F, the supply air fan shall cycle to high and the recirculation damper shall open. The exhaust fan shall turn off and the supply fan shall recirculate air from the return through the core and back through the supply side of the core and back into the space. Depending on the outdoor air temperature, the defrost timing shall vary to ensure a full melt of the accumulated frost on the core.
E. Controller must be capable of operating at hi/low set points.

2.8  PLASTIC COMPONENTS
A. All plastic components that are in the airstream, must be of a UL94 rated material.
B. If gasketing is used to join unit sections together, gasketing must be a UL94 approved compound.
PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of Air Handling Units.

B. Examine casing insulation materials and filter media before air-handling unit installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for Air Handling Units to verify actual locations of piping and duct connections before equipment installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install equipment in accordance with manufacturer instructions, these specifications, best practices.

1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

2. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

B. Arrange installation of units to provide access space for service and maintenance.

C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing, with new, clean filters.

3.3 CONNECTIONS

A. Comply with requirements for piping specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to air-handling unit to allow service and maintenance.

C. Connect piping to air-handling units mounted on vibration isolators with flexible connectors.

D. Connect condensate drain pans using 1-1/4 inch, ASTM B 88, Type M copper tubing. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

E. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping." Install shutoff valve and union or flange at each supply and return connection.

F. Duct installation requirements are specified in other HVAC Sections. Drawings indicate the general arrangement of ducts.
3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Submit start up report:

3.5 ADJUSTING

A. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.

3.6 CLEANING

A. After completing system installation and testing, adjusting, and balancing air-handling unit and air-distribution systems and after completing startup service, clean air-handling units internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

END OF SECTION 23 73 13
SECTION 23 81 29
VARIABLE REFRIGERANT FLOW SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes variable refrigerant flow (VRF) systems consisting of outdoor heat pump units, connected to refrigerant distribution branch circuit controllers and indoor fan coil units. System is capable of simultaneous heating and cooling of individual zones.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Factory-authorized sales representative shall design refrigeration piping and control wiring using manufacturer certified design software.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings:

1. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: Include design for routing and sizing of the refrigerant piping and control wiring, complying with the performance requirements, design criteria, and analysis data using the manufacturer certified design software.

1. Include system schematic drawing with power wire, signal wire, control wire and refrigeration routing and sizing requirements.

D. Samples for Initial Selection: For units with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.
B. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

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. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."

C. Components shall be manufactured in production facilities maintaining ISO 9001 and ISO 14001 certifications.

1.7 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.8 TOOLS

A. Provide any proprietary manufacturer tools including but not limited to hardware, maintenance software, and torque wrenches as required for the owner to operate and maintain the system.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

   a. For Compressor: Seven year(s) from date of [Substantial] [Final] Completion. Parts only.
   b. For Parts: Two year(s) from date of [Substantial] [Final] Completion.

PART 2 - PRODUCTS

2.1 VARIABLE REFRIGERANT FLOW SYSTEMS

A. Manufacturers:

   1. Daikin.
   2. Approved.

B. General:
1. VRF system shall maintain normal heating and/or cooling operation at all indoor units while any one indoor unit is powered down for service. When power is restored to the indoor unit served normal operation shall be restored with no system shutdown, interruption, reset or power cycling of the outdoor unit.

2. 

3. Outdoor units, indoor units and branch circuit controller unit assembly shall be shipped from the factory assembled and pressure tested including internal refrigerant piping, compressor, contacts, relay(s), control components, power and communications wiring.

4. Outdoor units shall be capable of maintain continuous compressor operation under the following operating ambient conditions:

   a. All indoor units cooling: 14 degrees F DB to 122 degrees F DB.
   b. All indoor units heating: -4 degrees F WB to 61 degrees F WB.
   c. Cooling based synchronous: 14 degrees F DB to 81 degrees F DB.
   d. Heating based synchronous: 14 degrees F DB to 61 F DB.

2.2 OUTDOOR UNITS

A. General: Each system shall have an outdoor unit. System shall be designed to accept connections for up to sixty-four indoor units.

B. Cabinet:

1. 20 gauge galvanized steel with enamel finish with heavy gauge coating wire coil guard, tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1000 hours.
2. Internal serviceable components shall be accessible by removing the front panel of unit.
3. Cabinet designed with pre-punched pipe and electrical knockouts.

C. Fan:

1. One or two direct drive variable speed propeller fans with independent Brushless Digitally Controlled motors mounted in a vertical top air discharge configuration.
2. Fan blades shall be made of non-metallic light weight Acrylonitrile Butadiene Styrene (ABS) material, with quiet, deep-V designed to minimize air turbulence. Fan shroud shall be designed in conjunction with fan blade to minimize air turbulence along the edge of blades to minimize noise generation.
3. Outdoor unit fan motors shall be powered using a DC inverter drive capable of operating the fans at a maximum speed of 1100 RPM. Inverter drive shall be provided with DIP switch that reprograms the drive to allow outdoor unit fan assemblies to operate under high discharge static conditions (up to 0.32° ESP).
4. Fan/motor assembly shall be protected with raised ferrous wire metal guard with baked enamel finish, color matching unit cabinet.

D. Coil:

1. Factory built coil with aluminum fins mechanically bonded on copper tubing with inner grooves for efficient heat transfer. Variable path design.
2. Fins shall be treated with factory applied anti-corrosion coating, and shall be tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1000 hours.
3. Minimum three row coil, up to twenty-two fins per inch.
4. Factory pressure tested at a minimum of 551 psig.
E. Compressors:

1. Hermetically sealed, inverter driven scroll compressors, capable of operating in a frequency range from 15 to 150 Hz with control in 0.5 Hz increments. Non-inverter driven compressors are not acceptable.
2. Compressor shall be provided from factory with full charge of Polyvinyl Ether oil, and bearing shall have Teflon coating.
3. Compressors shall be equipped with minimum 60 Watt crankcase heater.
4. Compressors shall have a mid-stage, medium pressure vapor economizer apparatus to maximize refrigerant compression efficiency.
5. Compressors shall be protected with the following:
6. High pressure switch
   a. Over-current/under-current protection
   b. Phase failure
   c. Phase reversal

F. Refrigerant Piping:

1. Refrigerant circuit shall be constructed using field provided copper piped together with manufacturer supplied branch selector units and Y-branches or header fittings connected to multiple indoor units to effectively and efficiently control the simultaneous heating and cooling operation of the VRF system.
2. Each outdoor refrigeration circuit shall have the following components:
   a. Inverter variable speed compressor
   b. Outdoor unit heat exchanger
   c. Refrigerant strainer(s)
   d. Check valve(s)
   e. Oil separator
   f. Accumulator
   g. Heat exchanger circuiting control
   h. Electronic expansion valve(s)
   i. Four-Zay reversing valve
   j. Sub-cooler circuit with controls
   k. High and low side Schrader valve service ports with caps
   l. Service valves
3. Multi-frame configurations shall be field piped together using manufacturer’s designed and supplied Y-branch kit and field provided interconnecting pipe to form a common refrigerant circuit.

G. Defrost Operation:

1. The outdoor unit(s) shall be capable of intelligent defrost operation to melt accumulated frost, snow and ice that may have accumulated on the outdoor unit heat exchanger. The defrost cycle length and sequence shall be based on outdoor ambient temperatures, outdoor unit heat exchanger temperature, and various differential pressure variables.
2. Defrost Mode Selection: The outdoor unit shall be provided with three field-selectable defrost operation modes; Normal, Fast, or Forced.
   a. Normal Defrost operation intended for use in areas of the country with mild winter temperatures and light to moderate humidity levels. The strategy minimizes defrost cycle frequency allowing frozen precipitation to build longer in between cycles.
Minimum time between defrost cycles shall be 20 minutes. Intelligent Defrost shall choose between split coil/frame and full system methods to minimize energy consumption and cycle time.

b. Fast Defrost operation intended for use in areas of the country that experience adverse winter weather with periods of heavy winter precipitation and extremely low temperatures. This strategy shall maximize the systems heating performance and maintain operational efficiency. When the ambient temperature is above 32°F, Intelligent Defrost shall continue to heat until the discharge temperature declines. At temperatures below 32°F, the time between defrost cycles shall be a minimum of 90 minutes. At temperatures below 4°F, a defrost cycle shall occur every two hours to optimize system heating efficiency.

c. Forced Defrost operation shall be available for the service provider to test defrost operations at any weather condition and to manually clear frozen water from the outdoor coil surfaces.

3. Indoor Unit Fan Operation During Defrost

a. During partial defrost operation indoor units operating in cooling or dry mode shall continue normal operation.

b. During partial defrost operation, indoor units that are commissioned with fans set for continuous operation shall maintain normal fan speed unless the leaving air temperature drops, then the fan speed will be reduced to low speed for the remainder of the defrost cycle.

c. During full system defrost operation, indoor unit fans will cycle off and remain off during the remainder of the defrost cycle.

H. Sound Levels: Outdoor unit sound levels shall not exceed 64 dBA.

I. Controls:

1. Factory installed microprocessor controller capable of performing functions necessary to operate the system. Controller shall be able to communicate with other outdoor and indoor units.

2. Each outdoor cabinet shall have the following factory installed sensors:

   a. Suction temperature sensor
   b. Discharge temperature sensor
   c. High pressure sensor
   d. Low pressure sensor
   e. Outdoor temperature sensor
   f. Outdoor unit heat exchanger temperature sensor

2.3 REFRIGERANT DISTRIBUTION DEVICES (BRANCH circuit controller UNIT)

A. General

1. Refrigerant distribution devices shall be designed and manufactured by the same manufacturer of VRF indoor and outdoor units.

2. Refrigerant distribution devices be an intermediate refrigerant control device between the air source outdoor unit and the indoor units to control the systems simultaneous cooling and heating operation.
3. Each port shall be capable of operating in cooling or heating independently regardless of the operating mode of any other port on the Refrigerant distribution devices unit or in the system.

B. Cabinet:

1. Unit casing shall be made with galvanized steel and have a galvanized steel finish.
2. Refrigerant distribution device shall be designed to be piped in a series or parallel pipe configuration relative to each other.
3. Refrigerant distribution device shall be a multi-port design capable of serving several indoor units.
4. Refrigerant distribution device shall be internally piped, wired, assembled, leak and run tested at the factory.
5. Refrigerant distribution device shall be designed for installation in a conditioned environment and provided with factory applied insulation on all cold surfaces.

C. Refrigerant Piping:

1. Refrigerant distribution device shall have a liquid bypass circuit between the high pressure vapor and the low pressure vapor pipes.
2. Each indoor unit port shall have a pair of two-position solenoid valves.
3. Refrigerant distribution device shall have a balancing valve to control the pressure between the high pressure and low pressure pipe during mode switching.
4. Refrigerant distribution device cold surface pipes shall be factory insulated to prevent condensation.
5. Factory supplied high impact polystyrene resin condensate drain pan below the coil, with wired condensate drain pump capable of minimum 27.5° lift. Pump shall have safety switch to shut off unit if condensate rises too high in the drain pan.

D. Controls:

1. Factory installed unit mounted control boards and integral microprocessor to communicate with indoor units and outdoor units over a single stranded, shielded, twisted wire pair.
2. Manufacturer shall provide screw terminal connections at the refrigerant distribution device to terminate power wiring and communications cables.

2.4 DUCTED MEDIUM AND HIGH STATIC FAN COIL UNITS

A. Cabinet:

1. Galvanized steel plate with cold surfaces insulated with a coated polystyrene materials. External insulation shall be plenum rated and conform to ASTM D-1418. Provide with hanger brackets. Designed to mount fully concealed above finished ceiling with flanged duct connection for field installed ductwork.
2. Horizontal supply air discharge and return air inlet.
3. Factory assembled, piped and wired electronic expansion valve for refrigerant control.

B. Fan:

1. One or two direct drive fans, mounted on a common shaft, with impeller statically and dynamically balanced.
2. Brushless Digitally Controlled (BLDC) motor with permanently lubricated and sealed wall bearings. Motor shall include thermal, overcurrent and low RPM protection.
3. Fan/motor mounted on vibration attenuating rubber grommets.
4. Speed controlled by microprocessor based direct digitally controlled algorithm.
5. Field adjustable cooling mode setting: Low, Med, High, Power Cool and Auto.
7. Capable of 0.98" static pressure for high speed air volume in high static fan coil units.
8. Capable of 0.6" static pressure for high speed air volume in medium static fan coil units.

C. Filter: Factory supplied removable, washable filter with antifungal treatment at return air inlet. Filter access at rear end of unit.

D. Coil:
   1. Factory built coil with aluminum fins mechanically bonded on copper tubing with inner grooves for efficient heat transfer.
   2. Minimum two row coil, nineteen to twenty-one fins per inch.
   3. Factory supplied high impact polystyrene resin condensate drain pan below the coil, with wired condensate drain pump capable of minimum 27.5" lift. Pump shall have safety switch to shut off unit if condensate rises too high in the drain pan.
   4. Factory pressure tested at a minimum of 551 psig.

E. Controls:
   1. Factory installed microprocessor controller capable of performing functions necessary to operate the system. Controller shall be able to communicate with other indoor and outdoor units.
   2. Factory installed temperature thermistors for return air, refrigerant entering coil and refrigerant leaving coil.
   4. Unit shall have the following functions:
      a. Self-diagnostic function
      b. Auto restart function
      c. Auto changeover function
      d. Auto operation function
      e. Child lock function
      f. Forced operation
      g. Dual thermistor control
      h. Sleep mode
      i. External static pressure control
      j. Dual setpoint control
      k. Multiple aux heater applications
      l. Filter life and power consumption display

2.5 CEILING CASSETTE FAN COIL UNITS

A. Cabinet:
   1. Galvanized steel plate with cold surfaces insulated with a coated polystyrene materials. External insulation shall be plenum rated and conform to ASTM D-1418. Provide with hanger brackets. Designed to mount into lay-in ceiling with all components fully concealed above finished ceiling.
2. Horizontal outside air inlet.
3. Factory assembled, piped and wired electronic expansion valve for refrigerant control.

B. Fan:
1. One or two direct drive fans, mounted on a common shaft, with impeller statically and dynamically balanced.
2. Brushless Digitally Controlled (BLDC) motor with permanently lubricated and sealed wall bearings. Motor shall include thermal, overcurrent and low RPM protection.
3. Fan/motor mounted on vibration attenuating rubber grommets.
4. Speed controlled by microprocessor based direct digitally controlled algorithm.
5. Field adjustable cooling mode setting: Low, Med, High, Power Cool and Auto.

C. Filter: Factory supplied removable, washable filter with antifungal treatment at return air inlet. Filter access at rear end of unit.

D. Coil:
1. Factory built coil with aluminum fins mechanically bonded on copper tubing with inner grooves for efficient heat transfer.
2. Minimum two row coil, nineteen to twenty-one fins per inch.
3. Factory supplied high impact polystyrene resin condensate drain pan below the coil, with wired condensate drain pump capable of minimum 27.5" lift. Pump shall have safety switch to shut off unit if condensate rises too high in the drain pan.
4. Factory pressure tested at a minimum of 551 psig.

E. Controls:
1. Factory installed microprocessor controller capable of performing functions necessary to operate the system. Controller shall be able to communicate with other indoor and outdoor units.
2. Factory installed temperature thermistors for return air, refrigerant entering coil and refrigerant leaving coil.
4. Unit shall have the following functions:
   a. Self-diagnostic function
   b. Auto restart function
   c. Auto changeover function
   d. Auto operation function
   e. Child lock function
   f. Forced operation
   g. Dual thermistor control
   h. Sleep mode
   i. External static pressure control
   j. Dual setpoint control
   k. Multiple aux heater applications
   l. Filter life and power consumption display
2.6 ACCESSORIES

A. Centralized Controller: Monitors annual and weekly scheduling, sending error email, online maintenance tool, interlock control and data monitoring.

1. Manage up to 200 indoor units (may require expansion controllers).
2. Supports dual set point functionality.
3. Displays:
   a. Compressor speed and hi/low pressure
   b. Indoor unit free contact input/output status
   c. Space temperature and humidity
   d. Error code
   e. Unoccupied setback up temperature range
4. Functions: Hold function, initial setting, operation data back up.
5. Permits or prohibits remote controller functions: On/off, change operation mode, change set point temperature, filter status, change fan speed, change air direction.
6. External input/output signals can be used for batch operations.
7. Temperature set point range limits for local controllers.
8. User defined indoor unit functions: On/off, monitoring and operation, operation mode, temperature setting, fan speed, airflow direction.
9. Monitoring and Control of indoor and outdoor units.
10. Scheduling: Daily, annually, five pattern weekly seasonal schedule.
11. Twenty four scheduled events per day: On/off, mode, temperature setting, vane direction, fan, speed, operation prohibits.
12. Trend Data: Fan operation time, thermost-on time, set temperature, room temperature, AI controller temperature and humidity.
13. High resolution LCD color, tough panel, display.
14. Memory back up via USB port.

B. Remote Controller (Room Thermostat): One for each fan coil unit.

C. Refrigerant Service Valves:

1. General: Fully factory assembled, full port design, R-410A compatible and with schrader valve for refrigerant service.
2. Body: Forged brass with brass cap.
5. Temperature Range: -40°F to 325°F.

D. Wiring: Provide per VRF manufacturer requirements.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Equipment Mounting:
   1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

D. [Install refrigerant service valves at each piping branch downstream of refrigerant distribution devices and upstream of fan coils. Pressure drops shall be included in pipe length calculation and limitations.]

E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

F. Insulation: Insulation requirements for refrigerant and condensate piping are specified in Section 230700 "HVAC Insulation."

G. Control Wiring and Connection:
   1. General:
      a. Include wire and cable as required for complete and operable control system.
      b. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
      c. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
      d. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
      e. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
      f. Install wiring parallel or perpendicular to walls. Use right angle turns.
      g. Do not install wiring in power circuit raceways.
      h. Provide junction boxes. Do not use magnetic motor starters and disconnects as junction boxes.
      i. Do not run wiring longer than 75% percent of maximum length or power consumption for wire size and application.
      j. Number wires at each connection, termination, and junction box.
      k. Arrange wiring within control panels in a neat and professional manner.
      l. Install expansion joints where raceway crosses building expansion joints.
   2. Power for Controls:
      a. Coordinate power source with Division 26.
      b. Provide power from electrical panel circuit breakers to control devices requiring line voltage power.
c. Provide power from electrical panel circuit breakers to control devices requiring low voltage power. Provide transformers.
d. Do not provide power from electrical circuits serving other equipment. Controls shall be fed by dedicated control circuits only.
e. Provide power from emergency power panel if available.

3. Raceway:
   a. Conceal wiring, except in mechanical spaces and areas where other conduit and piping are exposed.
   b. Install exposed wiring in electrical metallic tubing (EMT) raceway.
   c. Install exposed wiring located in mechanical spaces (mechanical rooms, mechanical attics, mechanical mezzanines, boiler rooms) in electrical metallic tubing (EMT) raceway.
   d. Install wiring above inaccessible ceilings in electrical metallic tubing (EMT) raceway.
   e. [Install wiring located in walls in electrical metallic tubing (EMT) raceway.]
   f. Install wiring above accessible ceiling without electrical metallic tubing (EMT) raceway. Route in straight line supported by cable rings or support by mechanically fastening to piping or ductwork. Do not lay on top of ceiling tiles.
   g. Do not fill raceway above 70 percent of maximum capacity.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.

C. Refrigerant Piping Connections: Piping installation requirements are specified in Section 232300 "Refrigerant Piping". Connect piping to VRF units with flexible connectors.

D. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to VRF units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

3.3 FIELD QUALITY CONTROL

A. Manufacturer’s Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.
   1. Manufacturer’s Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:
1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

E. Prepare test and inspection reports.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 23 81 29
SECTION 26 00 10
ELECTRICAL PROVISIONS

PART 1 GENERAL

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

1.2 SUMMARY
   A. Section includes furnishing materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of electrical work for this project, as shown on the Drawings and defined of Division 26 of the Specifications.

1.3 CERTIFICATIONS
   A. By submitting a bid for the electrical Work, the Contractor certifies that they have carefully examined the Drawings, Specifications, and all subsequent Addenda, have visited the site, and are familiar with all conditions and requirements of the Work, agree to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of Work, according to the requirements of the Contract Documents.

1.4 DEFINITIONS
   A. Accessible: Arranged so that an average size man may complete any service required without disassembly, destruction, or damage to the surround installation of item being serviced.
   B. Codes: Codes, rules, and ordinances.
   C. Concealed: Spaces out of sight. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.
   D. Contractor: As used of Division 26 sections, means the electrical subcontractor.
   E. Direct Buried: Installed underground without encasement in concrete or other protective material.
   F. Enclosure: The case or housing of an apparatus, or the fence or wall(s) surrounding an installation, to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage.
   G. Emergency Systems: Those systems legally required and classed as emergency by municipal, state, federal, or other codes, or by any governmental agency having jurisdiction that are
design to ensure continuity of lighting, electrical power, or both, to designated areas and equipment in the event of failure of the normal supply for safety to human life.

H. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

I. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

J. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

K. Furnish: Supply and deliver to the project site.

L. Install: To place in position for service or use.

M. Jacket: A continuous nonmetallic outer covering for conductors or cables.

N. Luminaire: A complete lighting unit consisting of a light source such as a lamp, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light.

O. Provide: Furnish and install for a complete, finished, and operable system and ready for intended use.

P. Shop Drawings: Document which fully details equipment and intended installation relative to this specific Project.

Q. Sheath: A continuous metallic covering for conductors or cables.

R. Submittals: Written and graphic information and physical samples that require Engineers responsive action.

S. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

T. Work: Entire scope required by the contract documents.

1.5 ABBREVIATIONS

AC Armored cable.
AHJ Authorities Having Jurisdiction
ANSI American National Standards Institute
ASTM American Society for Testing and Materials
CATV Coaxial general-purpose cable.
CM Communications general-purpose cable.
CMG Communications general-purpose cable.
CMP Communications plenum cable.
CMR Communications riser cable.
CMUC Under-carpet communications wire and cable.
CMX  Communications cable, limited use.
EMT  Electrical metallic tubing.
ENT  Electrical nonmetallic tubing.
ETL  Environmental Technology Laboratory
FM   Factory Mutual Engineering Corporation
FMC  Flexible metal conduit.
FMT  Steel flexible metallic tubing.
FNMC Flexible nonmetallic conduit.
IBC  International Building Code
IMC  Steel electrical intermediate metal conduit.
LFMC Liquidtight flexible metal conduit.
LFNC Liquidtight flexible nonmetallic conduit.
MC   Metal-clad cable.
MV   Medium-voltage cable.
NEC  National Electrical Code, NFPA 70
NECA National Electrical Contractor’s Association
NEMA National Electrical Manufacturer’s Association
NFPA National Fire Protection Association
OFC  Conductive optical fiber general-purpose cable.
OFCG Conductive optical fiber general-purpose cable.
OFCP Conductive optical fiber plenum cable.
OFCR Conductive optical fiber riser cable.
OSHA Occupational Safety and Health Administration
PV   Photovoltaic cable.
PVC  Rigid PVC conduit.
PVC-40 Schedule 40 rigid PVC conduit.
PVC-80 Schedule 80 rigid PVC conduit.
RGS  Rigid Galvanized Steel conduit.
RMC  Rigid Metal conduit.
SE   Service-entrance cable.
THHN Thermoplastic, heat-resistant cable with nylon jacket outer sheath.
THHW Thermoplastic, heat- and moisture-resistant cable.
THWN Thermoplastic, moisture- and heat-resistant cable with nylon jacket outer sheath.
UL   Underwriters Laboratories Inc.
USE  Underground service-entrance cable.
XHHW Cross-linked polyethylene, heat- and moisture-resistant cable.

1.6 CODES, PERMITS, STANDARDS, INSPECTIONS, FEES

A. Obtain permits and inspections and pay fees required by Federal, State and Local authorities having jurisdiction.

B. Work and materials shall be in accordance with requirements of all applicable codes, rules, and ordinances.

C. Conform to applicable industry standards, such as ANSI, UL, ETL and other standards as noted.

D. Nothing in the Drawings or Specifications shall be construed to permit work not in conformance with codes, rules and regulations.
E. Where Drawings or Specification call for material or construction of a better quality or larger sizes than required by the codes, rules and regulations, the provisions of the Drawings or Specifications shall take precedence over requires of the codes, rules and regulations.

F. Notify the Architect/Engineer of deviations in the Contract Documents to code requirements prior to installation of the Work. Include in the work changes due to the requirement of code enforcing agencies at no additional cost to the owner.

1.7 ALTERNATES

A. See Bid Form and Alternates described in Division 01 for possible effects on work of Division 26.

1.8 SUBSTITUTIONS

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Where “Manufacturer” paragraphs include the word “Approved”, approval of the proposed substitution is required. The Architect/Engineer is the sole judge of quality of proposed substitution.

C. Where “Manufacturer” paragraph does not include the word “Approved”, substitution is not allowed.

D. Architect/Engineer will consider Contractor's request for substitution when the following conditions are satisfied. When the Architect/Engineer approves a substitution, the approval is given with the understanding that the following requirements are satisfied. If the following conditions are not satisfied, Architect/Engineer will return requests without action, except to record noncompliance with these requirements:

1. Substitution request is fully documented and properly submitted.
2. Requested substitution is consistent with the Contract Documents and will produce indicated results.
3. Requested substitution provides sustainable design characteristics that specified product provided.
4. Substitution request is submitted prior to bid.
5. Requested substitution will not adversely affect Contractor's construction schedule.
6. Requested substitution will not increase cost to owner.
7. Requested substitution has received necessary approvals of authorities having jurisdiction.
8. Requested substitution is compatible with other portions of the Work.
9. Requested substitution has been coordinated with other portions of the Work.
10. Requested substitution provides specified warranty.
11. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
12. “Manufacture paragraphs include the words “Approved”.

E. Substitution following bid will be allowed only when changes proposed by Contractor are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
F. Substitutions for convenience are not allowed.

1.9 SUBMITTALS

A. General Submittal Procedure Requirements: Comply with Division 01 and with additional requirements indicated in this article.

B. Contractor shall plan for a minimum of a 10-business day submittal review and commentary time period. Contractor shall schedule their submittal documents accordingly. Major equipment or long lead submittals shall include time for resubmittal in the event equipment as submitted is not in conformance with contract documents.

C. Partial submittals, or submittals not meeting formatting requirements will be returned unreviewed. The following are the acceptable submittal packages.

1. Underground Product Data for Early Site Work.
2. Long Lead Time Product Data (If Required).
3. All Division 26 Product Data.
4. All Division 27 Product Data.
5. All Division 28 Product Data.
6. Control Engineering/Shop Drawings.
7. Shop Drawings.
8. Delegated Design Submittals.
9. Coordination Drawings.

D. Product Data: Collect information into a single submittal for each division.

1. Submit prior to fabrication and delivery.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Submit as specified in individual specification sections.
4. Submit Product Data in the following format:
   a. PDF electronic file.
      1) Separate file for Division 26, 27, and 28 system. Bookmarks provided for each spec section and product. Bookmark names for each product shall be “Spec Section_Paragraph Number_Product Name.”
      2) Include cover page with system, project, general contractor, mechanical contractor, architect, engineer and date of project final completion.

E. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
   a. Submit as specified in individual specification sections.
   b. Equipment clearances.
   c. Details and their locations.
   d. Coordination with other trades.
   e. Seal and signature of professional engineer if specified.
f. AutoCAD floor plan backgrounds are available in electronic format if requested from the Architect/Engineer.

4. Submit Shop Drawings in the following format:
   a. PDF electronic file.

F. Delegated-Design Submittals: Contractor shall provide professional design/engineering services, and shall include respective fees in bid, where delegated-design submittals are indicated in the contract documents. Provide products and systems complying with specific performance and design criteria indicated. In addition to Shop Drawings, Product Data, and other required submittals, submit certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

G. Coordination Drawing Submittals: Comply with requirements specified in Division 01 and as specified in specific Division 26 specification sections.

H. Maintenance Data: Comply with requirements specified in Division 01 and the Article "Operation and Maintenance Manuals " in this specification.

I. Project Record Documents: Comply with requirements specified in Division 01 and the Article “Project Record Documents” in this specification.

J. Qualifications Data, Certificates, and Test Reports: Comply with requirements specified in Division 01 and as specified in specific Division 26 specification sections.

K. Approval: The acceptance of a manufacturer's name or product by the Architect/Engineer does not relieve the Contractor of the responsibility for providing material and equipment which complies in all details with the requirements of the contract documents.

1.10 PRODUCT DELIVERY STORAGE AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:
   1. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
   2. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:
   1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
3. Comply with product manufacturer’s written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
4. Protect stored products from damage and liquids from freezing.
5. Cover open ends of equipment and work during storage and construction.

1.11 COORDINATION

A. Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.

B. Failure to coordinate work with other contractors is considered sufficient cause to alter the work, at no cost to the Owner.

C. Contractor is required to attend and participate in project coordination meetings.

D. Provide offsets and perform rerouting to fit Work in available space. Include provisions for such requirements in bid.

E. Existing Conditions:

1. Existing Work shown is based on existing drawings as available and on limited project site observations to the extent possible. Field verify existing conditions prior to commencement of work.
2. Installation of electrical work will require openings, removal and replacement of existing general construction to match existing. Include provisions for such requirements in bid.

F. Beam penetrations to support electrical scope of work shall not be allowed. However, where deemed required due to space constraints, contractor shall be responsible for beam penetration coordination as they relate to the electrical work. Submit sizes and locations to the structural engineer for review and determination of structural details.

1.12 WORKMANSHIP

A. Work shall be in accordance with trade best practices. Failure to provide acceptable workmanship is sufficient cause to alter the work, at no cost to the owner.

1.13 DRAWINGS AND SPECIFICATIONS

A. Drawings are diagrammatic and show only approximate locations of electrical equipment. Do not scale the drawings. Take measurements from building or site and verify with other Contract Documents.

B. Drawings are diagrammatic for document clarity and do not indicate all required accessories that may be required. Carefully investigate the finish conditions that would affect the work to be performed and arrange such work accordingly, providing required accessories to meet such conditions. Provide required accessories in bid. No additional costs shall be charged to Owner for additional accessories required to install the electrical systems shown on the drawings.
C. It is the responsibility of the Contractor to provide equipment that fits into the space allotted and allows adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance.

1.14 MATERIALS

A. Products of any one classification which are used in quantity shall be of a single manufacturer.

B. Products shall be installed in accordance with the manufacturer’s recommendations.

C. Products shall be installed in strict accordance with governing codes and ordinances.

D. Where two or more manufactures are listed in the specification but not on the drawings, the first mentioned was used as the basis of design.

E. Where other than the basis of design product is selected, product shall be equal to or superior to the basis of design product in appearance, function, performance, quality, local support and shall meet requirements of the plans and specifications. It is the Contractor’s responsibility, in coordination with the supplying authorized manufacturer representative, to ensure contract document requirements are met. Listing of an approved equal manufacturer does not relieve them of contractual responsibilities in the event they cannot meet the requirements of the contract documents.

F. Where other than the basis of design product is selected, Contractor is responsible for cost of resulting additional work, coordination with other trades, and redesign of associated building systems as required to accommodate selected product. This shall include, but is not limited to, structural upgrades, mechanical system modifications, impacts to construction sequencing, shop drawing or BIM layout coordination, controls or other.

G. Equipment layout is based on basis of design product. Where other than the basis of design product is selected, Contractor is responsible for verifying equipment will fit within available space and meet code and manufacturer required clearances.

H. Materials within plenums shall be noncombustible or shall have a flame spread index of not more than 25 and a smoke-developed index of not more than 50 when tested in accordance with ASTM E 84 or UL 723.

I. Whenever UL listed standards exist for equipment with electrical components, provide UL listed equipment. Otherwise provide equipment certified by the manufacturer as complying with UL standards for similar items.

1.15 DEMOLITION

A. Provide demolition work required in existing building for removal of existing electrical equipment, conduit, and wiring and for installation of new equipment, conduit, and wiring. Remove/replace or reinstall existing equipment, conduit, and wiring as required by demolition to provide a complete and operational system.

B. Remove and dispose of existing materials indicated on the Drawings to be removed. Drawings are based on field observation and existing record drawings. Field verify information is as
shown on drawings. Report discrepancies to the Architect/Engineer before disturbing existing installation.

C. Where existing conduit is removed, remove back to source. Cap conduit behind surfaces so concealed. Remove unused conduit in walls to be demolished, and cap remaining conduit above ceiling or below finished floor so concealed.

D. Where electrical equipment and conduit are removed and the surrounding surfaces and finishes are to remain, repair or replace surfaces with materials in conformance with other sections of this specification. Where not specified, repair or replace to match existing condition.

E. Provide temporary connections to maintain existing systems in service during demolition.

F. Do not reuse existing products unless indicated on the Drawings.

G. The owner has the right to retain ownership of any materials being removed. Deliver items to the Owner’s Representative as indicated in the Contract Documents. Notify owner in writing at least 7 days in advance of demolition.

1.16 EXISTING CONDITIONS

A. Where permitted or required in the Instructions to Bidders, visit the site prior to bidding to become familiar with existing conditions and other factors which may affect the execution of the Work.

B. Demolition work required is noted on the Drawings. Specific scope of demolition work and operating conditions to be encountered shall be verified from on-site review and coordination with the Owner. Maintain service to existing equipment and devices to be retained in area adjacent to the existing areas scheduled for renovation.

C. Be aware of restricted space for installation of electrical systems. Include offsets and perform rerouting and coordination to fit elements in available space. Include provisions for such requirements in bid.

D. Coordinate attachments to structure to verify that attachment points on equipment and structure can accept seismic, weight, and other loads imposed.

E. Special Protection: Exercise maximum precaution to provide positive protection for the existing building and equipment from damage of any kind. Mark and protect equipment and systems from the activities of other trades.

F. Cutting and Patching: Conform to the requirements of Division 01. Keep cutting and patching to a minimum. Finish materials to match existing work.

G. Measurements: Verify field measurements for equipment space requirements prior to submitting Shop Drawings for approval.

H. Roughing-In Dimensions: Obtain roughing-in dimensions for equipment from approved Shop Drawings or actual equipment measurements.
I. Manufacturer's Installation Instructions: Follow manufacturer's written instructions where furnished. If the details are in conflict with the Drawings, notify Engineer for resolution.

J. Accessibility: Install products which require periodic maintenance readily accessible location.

K. Rejected Materials: Remove damaged or rejected materials from the site.

1.17 DEMONSTRATION

A. Subject system to operating tests as to demonstrate that systems will operate as indicated in the Contract Documents. If tests do not demonstrate satisfactory performance, correct deficiencies and retest systems.

B. Unless otherwise directed by the Architect/Engineer, perform in presence of the Architect/Engineer and Owners Representative. Give 1 week notice prior to demonstration.

1.18 PROJECT RECORD DOCUMENTS

A. General Record Document Requirements: Comply with Division 01 and with additional requirements indicated in this article.

B. Record Drawings

1. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

   a. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally.
   b. Content: Types of items requiring marking include, but are not limited to, the following:

      1) Locations and depths of underground conduit.
      2) Revisions to routing of conduit.
      3) Actual equipment locations.
      4) Homerun locations.
      6) Changes made following Architect/Engineer’s written orders.

   c. Mark record sets with red-colored pen. Use other colors to distinguish between changes for different categories of the Work at same location.
   d. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
   e. Keep marked up drawings readily available at project site.

2. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect/Engineer.

C. Record Specifications
1. Record Prints: Maintain one set of marked-up paper copies of the Contract specifications as modifications are issued.
   a. Preparation: Mark record prints to show the proprietary name and model number of products, materials and equipment furnished, including substitutions and products selected.
   b. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect/Engineer.

D. Record Product Data

1. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
   a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
   b. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
   c. Note related Change Orders, and record Drawings where applicable.

2. Format: Submit record Product Data as annotated PDF electronic file.
   a. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

E. Recording and Maintenance

1. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
2. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect/Engineer's reference during normal working hours.

1.19 OPERATION AND MAINTENANCE MANUALS

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Include operation and maintenance information for all equipment.

C. Collect information into a single submittal for each division.

D. Submit in PDF electronic file format. Bookmarks provided for each section. Bookmark names for each section shall be “Section Name_Product Name.”
E. Submit Product Data in the following format:

1. PDF electronic file.
   a. Separate file for Division 26, 27, and 28. Bookmarks provided for each category and product. Bookmark names for each product shall be “Category_Product Name.”
   b. Include cover page with system, project, general contractor, electrical contractor, architect, engineer and date of project final completion.

F. Include the following categories:

1. Product data (compiled final submittal package).
2. Parts list: Include local source of parts.
3. Start-up procedures and completed start-up forms.
4. Operation data.
5. Maintenance schedule and procedures.
6. Repair procedures and sources.
7. Troubleshooting guide.
8. Service contracts.
9. Field quality control test reports.
10. Warranties.

1.20 TRAINING

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Training shall not commence until the completion of the Division 26, 27, and 28 installation and the Operation and Maintenance manual review and approval.

C. Conduct hands on training during the operation of Division 26, 27, and 28 systems operation.

D. Video record demonstration and training sessions.

E. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with Owner with at least seven days' advance notice.

1.21 COMMISSIONING SUPPORT

A. Comply with requirements specified in Division 01.

1.22 CLOSEOUT

A. Comply with Division 01 and with additional requirements indicated in this article.

B. Submit written certification that the work has been fully completed in strict accordance with plans and specifications.
C. Fee for electrical punch list work includes two final construction reviews. The first after the contractor’s written certification. The second after written certification from the Contractor that the deficiencies noted during the first review have been corrected. If additional reviews are required due to the Contractor’s failure to correct the deficiency, the Engineer will be compensated on a time and material basis. Compensation for additional reviews will be deducted from final payment to the Contractor.

D. Contractor shall be responsible for managing the response, troubleshooting and resolution of system operational concerns identified as part of commissioning and project closeout process. Types of activities shall include, but are not limited to, coordinating responsible parties for management tracking and resolution of the Cx Issues log and response to occupant light level complaints and/or equipment operational concerns. General Contractor shall appropriately respond to system operational concerns with relevant subcontractor stakeholders present for investigation at the job site and provide documented findings and response prior to requesting additional input and support of the A/E team.

1.23 WARRANTY

A. Conform to the requirements of Division 01.

B. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

C. Two-year Warranty to commence after final acceptance. Extend all warranties from initial start-up to final completion while the project is under construction, but in use by the occupant.

D. Contractor to comply with additional warranty requirements of Division 26.

PART 2 PRODUCTS

2.1 NOT USED

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION 260010
SECTION 26 00 50
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

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

1.2 SUMMARY
   A. Section Includes: anchors, fasteners, nameplates, labels, sealing, and firestopping.

1.3 ACTION SUBMITTALS
   A. Product Data:
      1. Submit anchors and fasteners. Include rated load and pull-out strengths.
      2. Submit nameplates, labels, and marker types for equipment, devices, and wiring. Group the list by type of equipment, device, and wiring. Include material type and thickness, font type, size, vertical and horizontal spacing (tracking), number of rows, colors, and other specified features.
      3. Submit firestopping. Include manufacturer’s instructions showing approved and prohibited installation methods.

1.4 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum 3 years documented experience and with service facilities within 100 miles of project.

PART 2 PRODUCTS

2.1 ANCHORS AND FASTENERS
   A. Anchor Bolts:
      1. Anchor Bolts (Expansion Type): Type 304 stainless steel construction; with impact section on the end of the bolt.
      3. Comply with the VOC limit requirements of the Puget Sound Pollution Control Agency.
      4. Pound-in lead anchors not allowed.
2.2 NAMEPLATES

A. Provide phenolic plastic nameplates for each item specified in the technical Sections or shown on the drawings. Items requiring nameplates include but are not limited to the following.

1. Switchgear and switchboards.
2. Panelboards.
3. Equipment enclosures.
4. Relays.
5. Switches.
6. Devices.

B. Colors:

1. Matte black background with white letters for normal power.
2. Matte red background with white letters for emergency power.

C. Letter Size: 1/4 inch minimum.

D. Legend: Provide nameplates with identification and other information as shown on the Drawings.

E. Identify electrical components as follows.

1. Nameplate for each electrical distribution and control equipment enclosure.
2. Nameplate for disconnect switches and motor starters shall identify source panel, voltage, load served, and fuse sizes.
3. Nameplate for circuit breakers in the main service switchboard and distribution panelboards shall identify the load served.
4. Nameplate for panelboards shall identify the voltage and source panel.
5. Nameplate for transformer shall identify the source panel, voltage, rating, and the panel being served.

2.3 LABELS

A. Description: Embossed adhesive tape, with 3/8 inch letters on white background.

B. Colors: Black letters for normal power circuits. Red letters for emergency power circuits.

C. Identify electrical components as follows.

1. Label for receptacles and control device stations with panel and circuit number.
2. Wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes and each load connection.
3. Label outlet and junction boxes with panel and circuit number.
4. Raceway marker for each raceway longer than 6 feet.

D. Color and Legend Requirements:

1. Raceways and Cables Carrying Circuits at 600 V or Less:
   a. Black letters on a white field.
   b. Legend: Indicate voltage.
2. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded conductors.
   a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
   b. Colors for 208/120-V Circuits:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
   c. Colors for 480/277-V Circuits:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
   d. Color for Neutral: White for 120V, Gray for 277V.
   e. Color for Equipment Grounds: Bare copper or Green.
   f. Colors for Isolated Grounds: Green with two or more yellow stripes.

3. Warning Label Colors:
   a. Identify system voltage with black letters on an orange background.

4. Warning labels and signs shall include, but are not limited to, the following legends:
   a. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
   b. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

5. Equipment Identification Labels:
   a. Black letters on a white field.

2.4 SEALING AND FIRESTOPPING

A. General:
   1. Furnish UL 1479 products and systems listed for the application.
   2. Select products with rating not less than rating of wall or floor being penetrated.

B. Fire and Smoke Rated Surfaces:
   1. Fire barrier wrap strips, composite sheet, and intumescent sealant.

C. Non-Rated Surfaces:
   1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.
2. For exterior wall openings below grade, furnish modular mechanical type seal consisting of interlocking synthetic rubber links shaped to continuously fill annular space between conduit and cored opening or water-stop type wall sleeve.

D. For interior wall or floor openings, furnish caulkling and sealant to effect seal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify installation conditions as satisfactory to receive work of the various sections. Do not install until unsatisfactory conditions are corrected.

B. Demolition Drawings are based on field observation and existing record documents. Report discrepancies to Engineer before performing the Work.

C. Contractor accepts existing conditions upon beginning the Work.

D. Maintain access to existing installations which remain active. Maintain NEC required working space around and above electrical equipment.

3.2 INSPECTIONS

A. Confirm that installations have been inspected before enclosure within building features, buried, or otherwise hidden from view. Pay costs associated with uncovering or exposing installations and features not previously inspected and for repair to exposed surfaces.

3.3 PREPARATION

A. Protect surrounding areas and surfaces to prevent damage throughout the project.

B. Obtain equipment roughing-in dimensions from approved Shop Drawings or actual measurements.

C. Review Architectural, Mechanical and other applicable drawings and applicable Shop Drawings to become familiar with the location of other trade's equipment. Eliminate conflicts. Check door swings before installing equipment. Relocate electrical devices and connections as directed by the A/E at no additional cost to the Owner if the work is not properly coordinated.

D. Layout electrical work in advance of construction to eliminate unnecessary cutting, drilling, channeling, and similar activities.

3.4 EXISTING WORK

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Remove, relocate, and extend existing installations to accommodate new construction.
C. Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finishes. Cut embedded support elements flush with walls and floors. Patch surfaces damaged by removal of existing components.

D. Provide temporary connections to maintain existing systems in service during construction. When work must be performed on energized equipment, use personnel experienced in such operations and perform the work in accordance with laws, rules, and regulations.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

3.5 INSTALLATION
A. Install Work as specified and in accordance with the Drawings and manufacturer's instructions. Where these conflict, manufacturer's instructions govern.

B. Provide block-outs, sleeves, demolition work, and similar items required for installation of Work specified in this division.

C. Repair damage to building and equipment at no additional cost to the Owner.

3.6 WORKMANSHIP
A. Work and materials will be subject to observation at any time by the Engineer and Owner.

B. Install material and equipment in accordance with manufacturer's instructions. Provide all necessary equipment required.

C. Cutting and Patching: Do not weld to, cut, or notch structural members. Restore surfaces neatly to original condition after cutting, channeling, chasing, and drilling of walls, partitions, ceilings, paving, and anchorage of conduit, raceways, and other electrical equipment.

3.7 CLEANING
A. Clean equipment, conduit, and fittings and remove packing cartons and other debris created by Division 26 Work.

B. Before Substantial Completion, carefully clean equipment, fixtures, exposed raceways and similar items. Remove construction labels, dirt, cuttings, paint, plaster, mortar, concrete, and similar items.

3.8 PROTECTION
A. Protect equipment during and after electrical hookup, painting, and final testing.

END OF SECTION 260050
SECTION 26 05 19
WIRE AND CABLE (600V AND LESS)

PART 1 GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Building wire.
   2. Metal-clad cable, Type MC.
   3. Connectors and splices.
B. Related Requirements:

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Product Schedule: Indicate type, use, location, and termination locations.

PART 2 PRODUCTS

2.1 BUILDING WIRE
A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
B. Conductors: Copper, stranded.
C. Conductor Insulation:
   1. Type THHN and Type THWN-2: Comply with UL 83.
   2. Type XHHW-2: Comply with UL 44.

2.2 METAL-CLAD CABLE, TYPE MC
A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Ground Conductor: Insulated.

E. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

F. Armor: Steel, interlocked.

G. Jacket: PVC applied over armor.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper or Bronze.
2. Type: Two hole with standard barrels.
3. Termination: Compression.

PART 3 EXECUTION

3.1 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Conductors: Type XHHW-2, single conductors in raceway.

C. Conductors Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway smaller than No. 2 AWG; Type XHHW-2, single conductors No. 2 AWG and larger.
D. Conductors Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

E. Conductors Installed below Raised Flooring: Type THHN/THWN-2, single conductors in raceway smaller than No. 2 AWG; Type XHHW-2, single conductors No. 2 AWG and larger.

F. Conductors in Cable Tray: Type THHN/THWN-2, single conductors in raceway smaller than No. 2 AWG; Type XHHW-2, single conductors No. 2 AWG and larger.

G. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.2 INSTALLATION, GENERAL

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

3.3 CONNECTIONS

A. 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-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch (150 mm) of slack.

3.4 IDENTIFICATION

A. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.5 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.
3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
   2. After installing conductors and cables and before electrical circuitry has been energized, test conductors feeding the following critical equipment and services for compliance with requirements:
   3. Perform each of the following visual and electrical tests:
      a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
      b. Test bolted connections for high resistance using one of the following:
         1) A low-resistance ohmmeter.
         2) Calibrated torque wrench.
         3) Thermographic survey.
      c. Inspect compression-applied connectors for correct cable match and indentation.
      d. Inspect for correct identification.
      e. Inspect cable jacket and condition.
      f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
      g. Continuity test on each conductor and cable.
      h. Uniform resistance of parallel conductors.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:
   1. Procedures used.
   2. Results that comply with requirements.
   3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

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

1.2 SUMMARY
A. Section includes grounding and bonding systems and equipment.
B. Section includes grounding and bonding systems and equipment, plus the following special applications:

1.3 ACTION SUBMITTALS
A. Product Data: For each type of product indicated.
B. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
   1. Ground rods.
C. Field quality-control reports.

PART 2 PRODUCTS

2.1 CONDUCTORS
A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
   4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
   5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
   6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

C. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

PART 3 EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, minimum.

C. Grounding Conductors: Green-colored insulation with continuous yellow stripe.

D. Isolated Grounding Conductors: Green-colored insulation with more than one continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

E. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
   2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
   3. Connections to Ground Rods at Test Wells: Bolted connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
   1. Feeders and branch circuits.
   2. Lighting circuits.
   3. Receptacle circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

E. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

F. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
D. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

E. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
2. Make connections with clean, bare metal at points of contact.
5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.

   a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
   b. Perform tests by fall-of-potential method according to IEEE 81.
4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Excessive Ground Resistance: If resistance to ground exceeds recommended values, notify Engineer promptly and include recommendations to reduce ground resistance.
SECTION 26 05 33
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Electrical Metallic Tubing (Type EMT) raceways and elbows.
   2. Electrical Non-Metallic Tubing (Type ENT) raceways and fittings.
   3. Electrical Rigid Metal Conduit (Type ERMC) raceways, elbows, couplings, and nipples.
   4. Flexible Metal Conduit (Type FMC) raceways.
   5. Liquid-tight Flexible Metal Conduit (Type LFMC) raceways.
   6. Fittings for conduit, tubing, and cable.
   7. Threaded metal joint compound.
   8. Solvent cements.
   9. Surface metal raceways and fittings.
   11. Cover plates for device boxes.

1.3 ACTION SUBMITTALS
A. Product Data: For the following:
   1. Wireways and auxiliary gutters.
   2. Surface metal raceways.
   3. Surface nonmetallic raceways.
   4. Floor boxes.
   5. Cabinets, cutout boxes, and miscellaneous enclosures.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details. Show that floor boxes are located to avoid interferences and are structurally allowable. Indicate floor thickness where boxes are embedded in concrete floors and underfloor clearances where boxes are installed in raised floors.
PART 2 PRODUCTS

2.1 ELECTRICAL METALLIC TUBING (TYPE EMT) RACEWAYS AND ELBOWS

A. General Characteristics: UL 797.
B. Material: Galvanized steel.
C. Minimum Trade Size: 3/4 inch, 1 inch for homeruns, unless noted otherwise.
D. Conduit Straps: Two-hole only.
E. Raceways and Fittings:
   1. General Characteristics: UL 514B.
   2. Options:
      a. Material: Galvanized Steel.
      b. Insulated throat.
      c. Coupling Method: Raintight compression coupling for 1-1/4 inch and smaller, setscrew coupling for 1-1/2 inch and larger. Setscrew couplings with only single screw per conduit are not acceptable.
      d. Drive-on type and cast fittings are not acceptable.

2.2 ELECTRICAL NON-METALLIC TUBING (TYPE ENT) RACEWAYS AND FITTINGS

A. General Characteristics: UL 1653 and UL Category Control Number FKHU.
B. Minimum Trade Size: 3/4 inch.

2.3 ELECTRICAL RIGID METAL CONDUIT (TYPE ERMC) RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. General Characteristics: UL 6 and UL Category Control Number DYIX.
B. Material: Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples.
C. Minimum Trade Size: 3/4 inch.

2.4 FLEXIBLE METAL CONDUIT (TYPE FMC) RACEWAYS

A. General Characteristics: UL 1.
B. Material: Interlocked steel.
C. Minimum Trade Size: 3/4 inch.
2.5 LIQUID-TIGHT FLEXIBLE METAL CONDUIT (TYPE LFMC) RACEWAYS

A. General Characteristics: UL 360 and UL Category Control Number DXHR.

B. Material: Steel.

C. Minimum Trade Size: 3/4 inch.
2.6 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Fittings for Type ERMC:
   1. General Characteristics: UL 514B and UL Category Control Number DWTT.
   2. Options:
      a. Material: Steel.
      b. Coupling Method: Compression coupling for conduit 1-1/2" and smaller, setscrew coupling for conduit larger than 1-1/2". Setscrew couplings with only single screw per conduit are unacceptable.
      c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
      d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

B. Fittings for Type EMT Raceways:
   1. General Characteristics: UL 514B and UL Category Control Number FKAV.
   2. Options:
      a. Material: Steel.
      b. Coupling Method: Compression coupling for conduit 1-1/2" and smaller, setscrew coupling for conduit larger than 1-1/2". Setscrew couplings with only single screw per conduit are unacceptable.
      c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
      d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type FMC Raceways:
   1. General Characteristics: UL 514B and UL Category Control Number ILNR.

D. Fittings for Type LFMC Raceways:
   1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.7 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

2.8 SOLVENT CEMENTS

A. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.

2.9 SURFACE METAL RACEWAYS AND FITTINGS

A. General Characteristics: UL 5 and UL Category Control Number RJBT.

B. Surface Metal Raceways and Fittings with Metal Covers:
1. **Options:**
   a. Aluminum base with snap-on covers.
   b. Manufacturer’s standard enamel finish in color selected by Architect.
   c. Wiring Channels: Single. Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

2.10 **JUNCTION AND PULL BOXES**

   A. Indoor Sheet Metal Junction and Pull Boxes:
      1. Description: Sheet metal box with a blank cover that serves the purpose of joining different runs of raceway or cable.
      2. NEMA OS 1 and UL 50.

   B. Outdoor Sheet Metal Cabinets:
      1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.

   C. Outdoor Sheet Metal Cutout Boxes:
      1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.

   D. Outdoor Sheet Metal Junction and Pull Boxes:
      1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.

2.11 **COVER PLATES FOR DEVICES BOXES**

   A. General Characteristics:
      1. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
      2. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

   B. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.

   C. As indicated on architectural Drawings.
PART 3 EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers’ written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.

B. Outdoors:

1. Exposed: Type ERMC.
2. Concealed Aboveground: ERMC, EMT.
6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Hazardous Classified Locations: ERMC.
2. Exposed: ERMC, EMT.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Damp or Wet Locations: ERMC.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC, FMC.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC and IMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers’ written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:
   a. Type 3R unless otherwise indicated.

2. Indoors:
   a. Type 1 unless otherwise indicated.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:
1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with NECA NEIS 101 for installation of steel raceways.
4. Comply with NECA NEIS 102 for installation of aluminum raceways.
5. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
6. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
7. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts.
8. Raceway Terminations at Locations Subject to Moisture or Vibration:
   a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft (0.6 m) above finished floor.
3. Install no more than equivalent of three 90-degree bends in conduit run. Support within 12 inch (300 mm) of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch (300 mm) of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:
   a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   b. Where an underground service raceway enters a building or structure.
   c. Conduit extending from interior to exterior of building.
   d. Conduit extending into pressurized duct and equipment.
   e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
   f. Where otherwise required by NFPA 70.
9. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
10. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
11. Keep raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

12. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.

13. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERMC and IMC:
   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

2. Types FMC, LFMC, and LFNC:
   a. Comply with NEMA RV 3. Provide a maximum of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

3. Types PVC and EPEC:
   a. Do not install Type PVC or Type EPEC conduit where ambient temperature exceeds 122 deg F (50 deg C). Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
   b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Stub-ups to Above Recessed Ceilings:

1. Provide EMT or ERMC for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

E. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERMC-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.

2. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

F. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.
3.4 INSTALLATION OF SURFACE RACEWAYS

A. Install surface raceways only where indicated on Drawings.

B. Install surface raceway with a minimum 2 inch (50 mm) radius control at bend points.

C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch (1200 mm) and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.5 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

C. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.

D. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

E. Locate boxes so that cover or plate will not span different building finishes.

F. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.

G. Support boxes of three gangs or more from than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

H. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

I. Set metal floor boxes level and flush with finished floor surface.

J. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

K. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.

L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

M. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:

1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
2. Provide gaskets for wallplates and covers.
3.6 FIRESTOPPING
   A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

3.7 PROTECTION
   A. Protect coatings, finishes, and cabinets from damage and deterioration.
      1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
      2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.8 CLEANING
   A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION 260533
SECTION 26 08 00

COMMISSIONING OF ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. The OPR and BOD documentation are included by reference for information only.

1.2 SUMMARY

A. This section includes commissioning process requirements for Electrical systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DESCRIPTION

A. Refer to Division 01 Section “General Commissioning Requirements” for the description of commissioning.

1.4 DEFINITIONS

A. Refer to Division 01 Section “General Commissioning Requirements” for definitions.

1.5 SUBMITTALS

A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s role.

B. Refer to Division 01 Section “Submittals” for specific requirements. In addition, provide the following:

C. In addition, provide the following:

1. Certificates of readiness
2. Certificates of completion of installation, prestart, and startup activities.
3. O&M manuals
4. Test reports
1.6 QUALITY ASSURANCE

A. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer’s calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to CxA upon request.

1.7 COORDINATION

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to coordination during the commissioning process.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup, initial checkout and functional performance testing shall be provided by the Contractor for the equipment being tested. For example, the electrical contractor of Division 26 shall ultimately be responsible for all standard testing equipment for the electrical systems and controls systems in Division 26. A sufficient quantity of two-way radios shall be provided by each contractor.

B. Special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing shall be included in the base bid price to the Owner and left on site, except for stand-alone data logging equipment that may be used by the CxA.

C. Proprietary test equipment and software required by any equipment manufacturer for programming and/or start-up, whether specified or not, shall be provided by the manufacturer of the equipment. Manufacturer shall provide the test equipment, demonstrate its use, and assist in the commissioning process as needed. Proprietary test equipment (and software) shall become the property of the Owner upon completion of the commissioning process.

D. Data logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

E. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5°F and a resolution of + or - 0.1°F. Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year.
PART 3 - EXECUTION

3.1 GENERAL DOCUMENTATION REQUIREMENTS

A. With assistance from the installing contractors, the CxA will prepare Construction Checklists for all commissioned components, equipment, and systems.

B. Red-lined Drawings:
   1. The contractor will verify all equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
   2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
   3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
   4. The contracted party, as defined in the Contract Documents will create the as-built drawings.

C. Operation and Maintenance Data:
   1. Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for all commissioned equipment and systems.
   2. The CxA will review the O&M literature once for conformance to project requirements.
   3. The CxA will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.

D. Demonstration and Training:
   1. Contractor will provide demonstration and training as required by the specifications.
   2. A complete training plan and schedule must be submitted by the Contractor to the CxA four weeks (4) prior to any training.
   3. A training agenda for each training session must be submitted to the CxA one (1) week prior the training session.
   4. The CA shall be notified at least 72 hours in advance of scheduled tests so that testing may be observed by the CA and Owner's representative. A copy of the test record shall be provided to the CA, Owner, and Architect.
   5. Engage a Factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specific equipment.
   6. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
   7. Review data in O&M Manuals.

3.2 CONTRACTOR'S RESPONSIBILITIES

A. Perform commissioning tests at the direction of the CxA.
B. Attend construction phase controls coordination meetings.

C. Participate in Electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.

D. Provide information requested by the CxA for final commissioning documentation.

E. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or sub-contract written.

F. Prepare preliminary schedule for Electrical system orientations and inspections, operation and maintenance manual submissions, training sessions, equipment start-up and task completion for owner. Distribute preliminary schedule to commissioning team members.

G. Update schedule as required throughout the construction period.

H. During the startup and initial checkout process, execute the related portions of the construction checklists for all commissioned equipment.

I. Assist the CxA in all verification and functional performance tests.

J. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

K. Gather operation and maintenance literature on all equipment, and assemble in binders as required by the specifications. Submit to CxA 45 days after submittal acceptance.

L. Coordinate with the CxA to provide 48-hour advance notice so that the witnessing of equipment and system start-up and testing can begin.

M. Notify the CxA a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.

N. Participate in, and schedule vendors and contractors to participate in the training sessions.

O. Provide written notification to the CM/GC and CxA that the following work has been completed in accordance with the contract documents, and that the equipment, systems, and sub-system are operating as required.

1. Electrical equipment including switchgear, panel boards, motor control centers, lighting, receptacles, dimmers and all other equipment furnished under this Division.

P. The equipment supplier shall document the performance of his equipment.

Q. Provide a complete set of red-lined drawings to the CxA prior to the start of Functional Performance Testing.

R. Provide training of the Owner’s operating staff using expert qualified personnel, as specified.

S. Equipment Suppliers
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner, to keep warranties in force.
2. Assist in equipment testing per agreements with contractors.
3. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.

T. Refer to Division 01 Section “General Commissioning Requirements” for additional Contractor responsibilities.

3.3 OWNER’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for Owner's Responsibilities.

3.4 DESIGN PROFESSIONAL’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for Design Professional’s Responsibilities.

3.5 CxA’S RESPONSIBILITIES

A. Refer to Division 01 Section “General Commissioning Requirements” for CxA’s Responsibilities.

3.6 TESTING PREPARATION

A. Certify in writing to the CxA that Electrical systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.

B. Certify in writing to the CxA that Electrical instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.

C. Certify in writing that testing procedures have been completed and that testing reports have been submitted, discrepancies corrected, and corrective work approved.

D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).

E. Inspect and verify the position of each device and interlock identified on checklists.

F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.

G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.
3.7 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.

B. Scope of Electrical testing shall include the entire Electrical installation, from the incoming power equipment throughout the distribution system. Testing shall include measuring, but not limited to resistance, voltage, and amperage of system(s) and devices.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. The CxA along with the Electrical contractor and other contracted subcontractors, including the fire alarm Subcontractor shall prepare detailed testing plans, procedures, and checklists for Electrical systems, subsystems, and equipment.

E. Tests will be performed using design conditions whenever possible.

F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

G. The CxA may direct that set points be altered when simulating conditions is not practical.

H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

I. If tests cannot be completed because of a deficiency outside the scope of the Electrical system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 ELECTRICAL SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 26 sections. Provide submittals, test data, inspector record, infrared camera and certifications to the CA.

B. Electrical Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 26 Sections "Instrumentation and Control" and "Sequence of Operations" Assist the CxA with preparation of testing plans.

C. Emergency Generator Testing and Acceptance Procedures: Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the...
sequence of testing and testing procedures for each equipment item and pipe section to be tested.

D. **Fire Detection and Alarm System Testing:** Provide technicians, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

E. **Electrical Distribution System Testing:** Provide technicians, load banks, infrared cameras, instrumentation, tools and equipment to test performance of designated systems and devices at the direction of the CxA. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.

F. **Vibration and Sound Tests:** Provide technicians, instrumentation, tools, and equipment to test performance of vibration isolation and seismic controls.

G. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of all components, systems and sub-systems. The following equipment and systems shall be evaluated:

1. Automatic temperature controls integrated with the electrical systems
2. Coordination and functionality with the Building Automation System/Building Management Controls System
3. Lighting Controls

3.9 **DEFICIENCIES/NON-CONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT**

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deficiencies/non-conformance, cost of retesting, or failure due to manufacturer defect.

3.10 **APPROVAL**

A. Refer to Division 01 Section “General Commissioning Requirements” for approval procedures.

3.11 **DEFERRED TESTING**

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to deferred testing.

3.12 **OPERATION AND MAINTENANCE MANUALS**

A. The Operation and Maintenance Manuals shall conform to Contract Documents requirements as stated in Division 01.

B. Refer to Division 01 Section “General Commissioning Requirements” for the AE and CxA roles in the Operation and Maintenance Manual contribution, review and approval process.
3.13 TRAINING OF OWNER PERSONNEL

A. Refer to Division 01 Section “General Commissioning Requirements” for requirements pertaining to training.

B. **Electrical Contractor.** The electrical contractor shall have the following training responsibilities:

1. Provide the CA with a training plan two weeks before the planned training.
2. Provide designated Owner personnel with comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of commissioned electrical equipment or system.
3. Training shall start with classroom sessions, if necessary, followed by hands on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.
4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
5. The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer's representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.
6. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
7. Training shall include:
   a. Use the printed installation, operation and maintenance instruction material included in the O&M manuals.
   b. Include a review of the written O&M instructions emphasizing safe and proper operating requirements, preventative maintenance, special tools needed and spare parts inventory suggestions. The training shall include start-up, operation in all modes possible, shut-down, seasonal changeover and any emergency procedures.
   c. Discuss relevant health and safety issues and concerns.
   d. Discuss warranties and guarantees.
   e. Cover common troubleshooting problems and solutions.
   f. Explain information included in the O&M manuals and the location of all plans and manuals in the facility.
   g. Discuss any peculiarities of equipment installation or operation.
8. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and preventative maintenance of all pieces of equipment.

COMMISSIONING OF ELECTRICAL
9. The electrical contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.

10. Training shall occur after functional testing is complete, unless approved otherwise by the Owner's.

END OF SECTION 26 08 00
SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. General-use switches.
   2. Indoor occupancy and vacancy sensors.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. For each type of product.

B. Shop Drawings:
   1. Show installation details for the following:
      a. Occupancy sensors.
      b. Vacancy sensors.
   2. Interconnection diagrams showing field-installed wiring.
   3. Include diagrams for power, signal, and control wiring.

C. Field quality-control reports.

PART 2 PRODUCTS

2.1 GENERAL-USE SWITCHES

A. Toggle Switch:
   2. Device Color: As indicated on architectural Drawings.
   3. Heavy-duty, 120-277 V, 20 A.

2.2 CEILING-MOUNTED INDOOR OCCUPANCY AND VACANCY SENSORS

A. General Requirements for Sensors:
   1. Integrated power pack.
2. Hardwired connection to switch.
3. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
4. Operation:
   a. Combination Sensor: Unless otherwise indicated, sensor must be programmed to turn lights on when coverage area is occupied and turn them off when unoccupied, or to turn off lights that have been manually turned on; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
6. Power Pack: Dry contacts rated for 20 A LED load at 120 and 277 V(ac), for 13 A tungsten at 120 V(ac), and for 1 hp at 120 V(ac). Sensor has 24 V(dc), 150 mA, Class 2 power source.
7. Mounting:
   a. Sensor: Suitable for mounting in any position in a standard device box or outlet box.
   b. Relay: Externally mounted through a 1/2 inch (13 mm) knockout in a standard electrical enclosure.
   c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
8. Indicator: LED light to show when motion is detected during testing and normal operation of sensor.

B. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.
   1. Sensitivity Adjustment: Separate for each sensing technology.
   2. Detector Sensitivity: Detect occurrences of 6 inch (150 mm) minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch (23 200 sq. mm), and detect a person of average size and weight moving not less than 12 inch (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inch/s (305 mm/s).
   3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96 inch (2440 mm) high ceiling.

2.3 SWITCHBOX-MOUNTED OCCUPANCY SENSORS

A. General Requirements for Sensors: Automatic-wall-switch occupancy sensor with manual on-off switch, suitable for mounting in a single gang switchbox.
   1. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
   2. Occupancy Sensor Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn lights off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
   3. Operating Ambient Conditions: Dry interior conditions, 32 to 120 deg F (0 to 49 deg C).
   4. Switch Rating: Not less than 800 VA LED load at 120 V, 1200 VA LED load at 277 V.
5. Standard Range: 180-degree field of view, field adjustable from 180 to 40 degrees; with a minimum coverage area of 900 sq. ft. (84 sq. m).
7. Voltage: Dual voltage - 120 and 277 V.
8. Ambient-Light Override: Concealed, field-adjustable, light-level sensor from 10 to 150 fc (108 to 1600 lx). The switch prevents the lights from turning on when the light level is higher than the set point of the sensor.
9. Concealed, field-adjustable, "off" time-delay selector at up to 30 minutes.
10. Adaptive Technology: Self-adjusting circuitry detects and memorizes usage patterns of the space and helps eliminate false "off" switching.
11. Color: As indicated on Architectural drawings.
12. Faceplate: Color as indicated on Architectural drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SENSORS

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's instructions.

3.3 INSTALLATION OF WIRING

A. Wiring Method: Comply with Section 260519 "Wire and Cable (600V and Less)." Minimum conduit size is 1/2 inch (13 mm).

B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors in accordance with conductor manufacturer's instructions.

C. Size conductors in accordance with lighting control device manufacturer's instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, device, and outlet boxes; terminal cabinets; and equipment enclosures.
3.4 IDENTIFICATION

A. Identify components and power and control wiring in accordance with Section 260553 "Identification for Electrical Systems.
   1. Identify controlled circuits in lighting contactors.
   2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Nonconforming Work:
   1. Lighting control devices will be considered defective if they do not pass tests and inspections.
   2. Remove and replace defective units and retest.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
   1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

END OF SECTION 260923
SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

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

1.2 SUMMARY
A. Section Includes:
   1. Branch-circuit panelboards, disconnecting and overcurrent protective devices, and identification.

1.3 ACTION SUBMITTALS
A. Product Data: For each type of panelboard.
   1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
   2. Include dimensions and manufacturers’ technical data on features, performance, electrical characteristics, ratings, and finishes.

1.4 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 include the following:
   1. Manufacturer’s written instructions for testing and adjusting overcurrent protective devices.

PART 2 PRODUCTS

2.1 BRANCH-CIRCUIT PANELBOARDS
A. Existing manufacturers:
   1. General Electric.

B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings.

B. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.


D. Features and Accessories:
   1. Standard frame sizes, trip ratings, and number of poles.
   2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

2.3 IDENTIFICATION

A. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

B. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
   1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

PART 3 EXECUTION

3.1 EXISTING WORK

A. Maintain access to existing panelboard remaining active and requiring access.

B. Protect existing panelboards remaining in service from damage during demolition and during construction.

C. Clean existing panelboards to remain of all dust and debris during demolition and during construction. Repair existing panelboards of any damage caused during demolition and during construction.

3.2 INSTALLATION

A. Comply with NECA 1.
B. Install overcurrent protective devices and controllers not already factory installed.
   1. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.

C. Install filler plates in unused spaces.

3.3 IDENTIFICATION

A. Provide a new, typed directory to indicate revised circuit loads; Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:
   1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

C. Tests and Inspections:
   1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS, Paragraph 7.6 Circuit Breakers.
   2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262416
SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. General-use switches.
   2. General-grade duplex straight-blade receptacles.
   3. Receptacles with arc-fault and ground-fault protective devices.
   4. Connectors, cords, and plugs.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Toggle switches.
   2. Fan-speed controllers.
   3. Duplex straight-blade receptacles.
   4. Duplex straight-blade receptacles with integral switching means.
   5. Receptacles with GFCI device.
   6. Cord connectors.

B. Field Quality-Control Submittals:
   1. Field quality-control reports.

PART 2 PRODUCTS

2.1 GENERAL-USE SWITCHES, DIMMER SWITCHES, AND FAN-SPEED CONTROLLER SWITCHES

A. Toggle Switch:
   2. Device Color: As indicated on architectural Drawings.
   3. Heavy-duty, 120-277 V, 20 A.
2.2 General-Grade Duplex Straight-Blade Receptacles

A. Duplex Straight-Blade Receptacle:
   2. Device Color: As indicated on architectural Drawings.
   3. Heavy-duty, NEMA 5-20R.

B. Tamper-Resistant Duplex Straight-Blade Receptacle:
   2. Device Color: As indicated on architectural Drawings.
   3. Heavy-duty, NEMA 5-20R.

2.3 Receptacles with Arc-Fault and Ground-Fault Protective Devices

A. General-Grade, Tamper-Resistant Duplex Straight-Blade Receptacle with GFCI Device:
   2. Device Color: As indicated on architectural Drawings.
   3. Heavy-duty, NEMA 5-20R.

PART 3 EXECUTION

3.1 Examination

A. Receptacles:
   1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 Installation of Wiring Devices

A. Comply with manufacturer's instructions.
   1. Consult Architect for resolution of conflicting requirements.

3.3 Field Quality Control of Wiring Devices

A. Tests and Inspections:
   1. Insert and remove test plug to verify that device is securely mounted.
   2. Verify polarity of hot and neutral pins.
   3. Measure line voltage.
   4. Measure percent voltage drop.
   5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
   6. Healthcare Facilities: Test straight-blade receptacles in patient care spaces with receptacle pin tension test instrument in accordance with NFPA 99. Retention force of ground pin must be not less than 115 g (4 oz).
   7. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.
B. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.4 SYSTEM STARTUP FOR SWITCHES

A. Perform startup service.

1. Complete installation and startup checks for momentary switches, dimmer switches, and fan-speed controller switches in accordance with manufacturer’s instructions.

3.5 ADJUSTING

A. Occupancy Adjustments for Controlled Receptacles: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.6 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

B. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262726
SECTION 26 28 13

FUSES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
   a. Control circuits.
   b. Motor-control centers.
   c. Panelboards.
   d. Switchboards.
   e. Enclosed controllers.
   f. Enclosed switches.

2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
   a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
   b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse. Submit in PDF format.
5. Coordination charts and tables and related data.
6. Fuse sizes for elevator feeders and elevator disconnect switches.
1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01, include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse used on the Project. Submit in PDF format.
4. Coordination charts and tables and related data.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 FUSES

A. Characteristics: Current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
   1. Type RK-1: non-time-delay and time delay.
   2. Type RK-5.
   3. Type CC: fast acting and time delay.
   4. Type CD: fast acting and time delay.
   5. Type J: fast acting and time delay.
   6. Type L: fast acting and time delay.
   7. Type G.

B. Comply with NEMA FU 1 for fuses.

C. Comply with NFPA 70.

D. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
C. Commencement of work shall indicate Installer’s acceptance of the areas and conditions as satisfactory.

D. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

E. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
   1. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
   2. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate layout and installation of switches and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches tops at uniform height unless otherwise indicated.

C. Comply with NFPA 70 and NECA 1.

D. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

A. Label each enclosure with engraved laminated-plastic nameplate.

3.4 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262813
SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Fusible switches.
   2. Nonfusible switches.
   3. Enclosures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers’ technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
   1. Enclosure types and details for types other than NEMA 250, Type 1.
   2. Current and voltage ratings.
   3. Short-circuit current ratings (interrupting and withstand, as appropriate).
   4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
   5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

B. Shop Drawings: For enclosed switches and circuit breakers.
   1. Include plans, elevations, sections, details, and attachments to other work.
   2. Include wiring diagrams for power, signal, and control wiring.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
   1. In addition to items specified in Division 01 include the following:
a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.5 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.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 GENERAL REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

A. Type HD, Heavy Duty:

1. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate fuses.
2. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Service-Rated Switches: Labeled for use as service equipment.

C. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R fuses (30-600 ampere switches employing appropriate fuse rejection schemes).

2.4 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty:

1. UL 98 and NEMA KS 1, horsepower rated.
2. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper neutral conductors.

2.5 ENCLOSURES

A. Enclosed Switches and Circuit Breakers:
1. UL 50, UL 489, NEMA AB 1, NEMA KS 1, and NEMA 250 to comply with environmental conditions at installed location.
2. Enclosure Finish:
   a. The enclosure shall be finished with manufacturer’s standard gray baked enamel paint.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
   1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
   2. Indicate method of providing temporary electric service.
   3. Do not proceed with interruption of electric service without Owner's written permission.
   4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
   1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
   2. Outdoor Locations: NEMA 250, Type 3R.

3.4 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

A. Comply with requirements in Section 260050 "Basic Electrical Materials and Methods."
   1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
   2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform tests and inspections.

E. Tests and Inspections for Switches:
   1. Visual and Mechanical Inspection:
      a. Inspect physical and mechanical condition.
      b. Inspect anchorage, alignment, grounding, and clearances.
      c. Verify that the unit is clean.
      d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
      e. Verify that fuse sizes and types match the Specifications and Drawings.
      f. Verify that each fuse has adequate mechanical support and contact integrity.
      g. Inspect bolted electrical connections for high resistance using one of the two following methods:
         1) Use a low-resistance ohmmeter.
            a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
         2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.

i. Verify correct phase barrier installation.

j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
2. Electrical Tests:

   a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

   b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

   c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

   d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.

   e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports.

   1. Test procedures used.
   2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
   3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816
SECTION 26 51 19
LED INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Materials.
2. Luminaire support.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.
1.5 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. Plastic Lenses: Furnish at least two of each type.
   2. Furnish two gallons of touch-up paint for each different painted finish and color.

1.6 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:
   
   1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
   2. Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

B. Provide luminaires from a single manufacturer for each luminaire type.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.8 WARRANTY

A. Comply with Section 260010.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance:
   
   1. Luminaires shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

2.2 LUMINAIRE 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. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

C. Recessed luminaires shall comply with NEMA LE 4.

D. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

E. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

F. Luminaire Schedule: Refer to Drawings for acceptable manufactures for each type of luminaire.
   1. Substitutions: Comply with the requirements of Division 01.
      a. Samples: Furnish samples for each type of luminaire with the substitution request.

2.3 MATERIALS

A. Metal Parts:
   1. Free of burrs and sharp corners and edges.
   2. Sheet metal components shall be steel unless otherwise indicated.
   3. Form and support to prevent warping and sagging.

B. Steel:
   1. ASTM A36/A36M for carbon structural steel.
   2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:
   1. Manufacturer's standard grade.
   2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.4 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:
   1. Sized and rated for luminaire weight.
   2. Able to maintain luminaire position after cleaning and relamping.
   3. Provide support for luminaire without causing deflection of ceiling or wall.
   4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:
   1. Secured to outlet box.
   2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
   3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:
   1. Attached to structural members in walls.
   2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:
   1. Ceiling Mount: 5/32-inch diameter aircraft cable supports adjustable to 10 feet in length.
4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:
   1. Secure to any required outlet box.
   2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
   3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.4 IDENTIFICATION
   A. Identify system components, wiring, cabling, and terminals.

3.5 FIELD QUALITY CONTROL
   A. Perform the following tests and inspections:
      1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
      2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
   B. Luminaire will be considered defective if it does not pass operation tests and inspections.
   C. Prepare test and inspection reports.

3.6 ADJUSTING
   A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
      1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
      2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
      3. Adjust the aim of luminaires in the presence of the Architect.