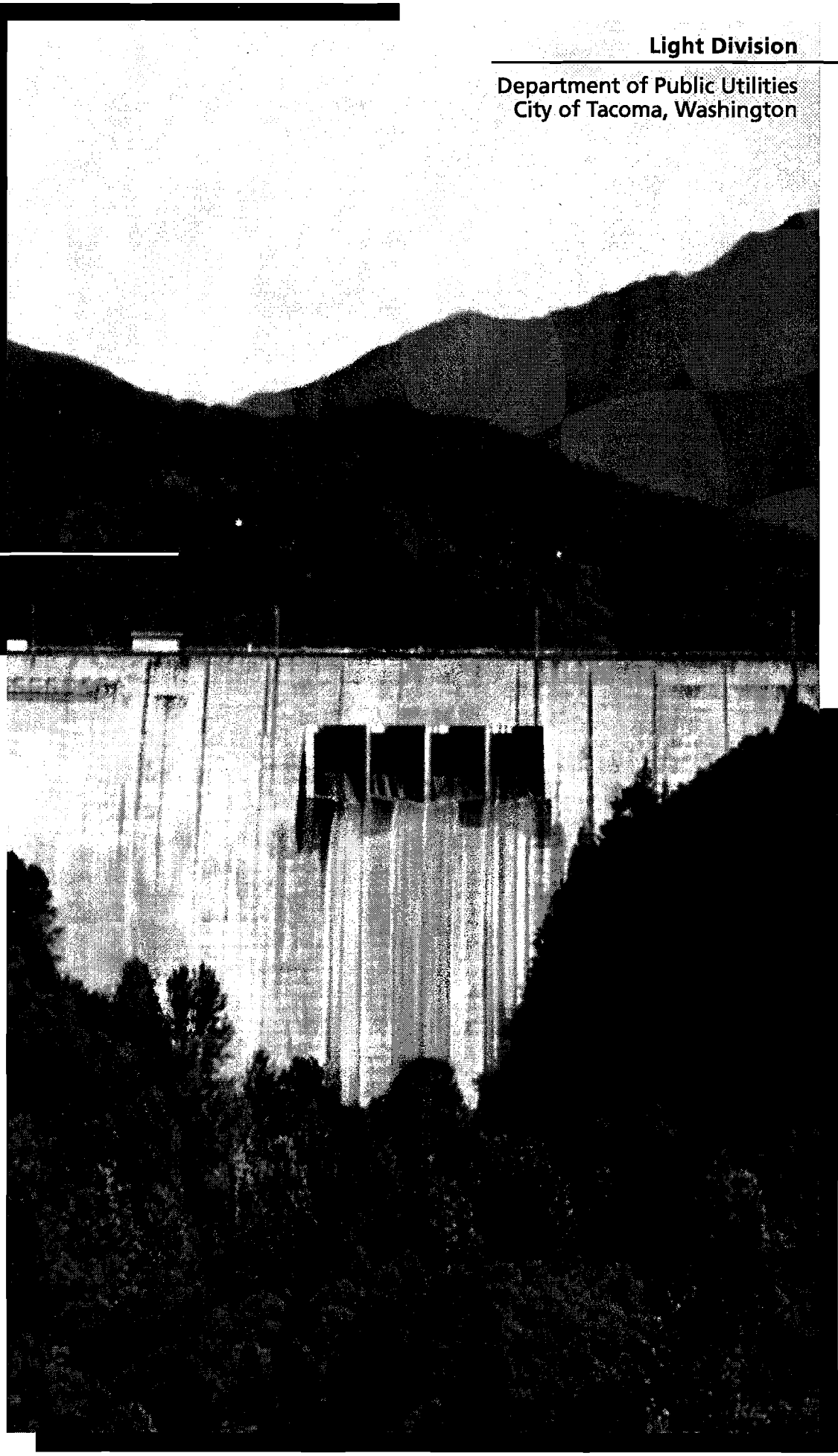
Light Division

Department of Public Utilities
City of Tacoma, Washington

SPECIFICATION



TACOMA POWER
TACOMA PUBLIC UTILITIES

CITY OF TACOMA

SPECIFICATIONS

FOR

NO. PG17-0493F

TACOMA POWER

LAGRANDE SHOP BUILDING

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
TACOMA POWER

Jackie Flowers, Director of Utilities/CEO

Chris Robinson, Power Superintendent/COO

Date: Tuesday, January 8, 2019

Each bid to be enclosed in a sealed envelope bearing the superscription

“Tacoma Power – LaGrande Shop Building"

SPECIFICATION CONTENTS

This Specification contains the following:

1. Request for Bids
2. Bidder's Checklist
3. Letters and Calls
4. *SPECIAL NOTICE TO BIDDERS*
5. Signature Page
6. *State Responsibility and Reciprocal Bid Form*
7. Proposal Sheets
8. Contractor's Record of Prior Contracts
9. List of Equipment
10. Substitution Request Form
11. Bid Bond
12. SBE Special Reminder
13. SBE Goal Utilization Form
14. SBE Utilization Form
15. Prime Contractor’s Pre-Work Form (SBE)
16. Subcontractor’s Pre-Work Form (SBE)
17. Small Business Enterprise (SBE) Code
18. Insurance Certificate Requirements
19. Contractor's Work Hazard Analysis Report
20. Performance Bond
21. Payment Bond
22. Contract
23. Contractor Performance Review
24. General Release
25. General Provisions
26. Local Employment and Apprenticeship Training Program (LEAP)
27. LEAP Employee Verification Form
28. Prime Contractor LEAP Utilization Plan
29. Prevailing Wages
30. Special Provisions
31. Plans

City of Tacoma
Tacoma Power

REQUEST FOR BIDS PG17-0493F
LaGrande Shop Building

Submittal Deadline: 11:00 a.m., Pacific Time, Tuesday, January 29, 2019

Submittal Delivery: Sealed submittals will be received as follows:

By Carrier:	**In Person:**
City of Tacoma Procurement & Payables Division Tacoma Public Utilities 3628 S 35th Street Tacoma, WA 98409	City of Tacoma Procurement & Payables Division Tacoma Public Utilities Lobby Security Desk Administration Building North – Main Floor 3628 S 35th Street Tacoma, WA 98409 **Note: This is a change in location for in-person deliveries.**
By Mail: City of Tacoma Procurement & Payables Division Tacoma Public Utilities PO Box 11007 Tacoma, WA 98411-0007	

Submittal Opening: Sealed submittals in response to a RFB will be opened by a Purchasing representative and read aloud during a public bid opening held in Conference Room M-1, located on the main floor in the same building. Submittals in response to an RFP or RFQ are recorded as received but are not typically opened and read aloud. After 1:00 p.m. the day of bid opening, the names of vendors submitting proposals are posted to the website for public viewing.

Solicitation Documents: An electronic copy of the complete solicitation documents may be viewed and obtained by accessing the City of Tacoma Purchasing website at 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 Nisqually Project Office 46502 State Route 7 East, Eatonville, WA 98328 on January 23, 2019 at 10:00 a.m. Confirm attendance with Samol Hefley via email at shefley@cityoftacoma.org

Project Scope: LaGrande Shop Building

Estimate: $800,000 - 1,000,000

Paid Leave and Minimum Wage: Effective February 1, 2016, the City of Tacoma requires all employers to provide paid leave and minimum wages, as set forth in Title 18 of the Tacoma Municipal Code. For more information visit www.cityoftacoma.org/employmentstandards.

Additional Information: Requests for information regarding the specifications may be obtained by contacting Samol Hefley, Senior Buyer by email to shefley@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.

BIDDER'S CHECK LIST

The bidder's attention is especially called to the following forms which must be submitted with your bid:

(a) Schedule of bid price.

The unit/lump sum prices bid must be shown in the space provided.

(b) Signature page.

To be completed and signed by the bidder.

(c) ~~Proposal data sheets (required when included in the proposal).~~

(d) Contractor's Record of Prior Contracts **(required/~~not required~~)**.

(e) List of Equipment **(required/~~not required~~)**.

(f) State Responsibility and Reciprocal Bid Preference Form **(required/~~not required~~)**.

(g) Bid bond or certified check (for construction contracts only).

Each bid must be accompanied by a certified or cashier's check for 5-percent of the total amount bid, or an approved bid bond by a surety company authorized to do business in the State of Washington. See General Provisions 1.04.

(h) Subcontractor List (applicable only for construction contracts of $1,000,000 and over).

(i) **CONSTRUCTION CONTRACTS:** Bid proposals for contractor labor must include fully completed "SBE Utilization Form", "Prime Contractors Pre-Work Form", and “Subcontractors Pre-Work Form”.

NON-CONSTRUCTION CONTRACTS: Bid proposals for material and services must include fully completed "Personnel Inventory Form".

(j) “Submittals Required with Bid” as are listed in the Special Provisions Section – Submittals and Shop Drawings (for construction contracts) or Submittals Section (for supply contracts).

The following forms are to be executed after the contract is awarded:

(a) Contract

This agreement is to be executed by the successful bidder.

(b) Performance and Payment Bonds **(required/~~not required~~)**.

To be executed by the successful bidder and his surety company, and countersigned by a local resident agent of said surety company.

(c) Contractor's Work Hazard Analysis Report (for construction contracts only)

(d) General Release to the City of Tacoma (for construction contracts only).

To be executed by the successful bidder upon completion of work and prior to the receipt of the final payment.

LETTERS AND CALLS

All information requested prior to the bid opening is subject to the limitations in Paragraph 1.02 of the **General Provisions.**

Address all letters to the Department of Public Utilities, P. O. Box 11007, Tacoma, Washington 98411.

For questions regarding General Provisions, Special or Technical Provisions, direct attention to Samol Hefley, Senior Buyer, shefley@cityoftacoma.org.

For letters and calls regarding the SBE Program, direct attention to the SBE Program Coordinator at 253-591-5224 for calls, and to SBE/Community & Economic Development, Tacoma Municipal Building, 747 Market Street, Tacoma, Washington 98402, for letters.

For letters and calls regarding the LEAP Program, direct attention to the LEAP Coordinator at 253-594-7933 for calls, and to LEAP/ Community & Economic Development, Tacoma Municipal Building, 747 Market Street, Tacoma, Washington 98402, for letters.

All letters shall indicate the title and specification number (prior to award) or title and contract number (following award).

CITY OF TACOMA
FINANCE/PURCHASING DIVISION

SPECIAL NOTICE TO BIDDERS

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 chapter 18.27 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).

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 of this section 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.
    a. Bidder Responsibility. Bidders shall not be in violation of 39.04.350 RCW Bidder Responsibility Criteria - Supplemental Criteria.

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 Small Business Enterprise and Local Employment and Apprenticeship 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

In addition to the State and City bidder responsibility criteria above, the bidder must also comply with the supplemental criteria contained in Section 01010 Summary of work and Section 01300 – Submittals and Shop Drawings of the special provisions.

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 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.

Requests for modifications to the supplemental criteria may be submitted via postal mail or delivered personally, or sent by e-mail or fax, within the above timeline as follows:

By Carrier: City of Tacoma Procurement & Payables Division Tacoma Public Utilities 3628 S 35th Street Tacoma, WA 98409	**In Person:** City of Tacoma Procurement & Payables Division Tacoma Public Utilities Lobby Security Desk Administration Building North – Main Floor 3628 S 35th Street Tacoma, WA 98409
By Mail: City of Tacoma Procurement & Payables Division Tacoma Public Utilities PO Box 11007 Tacoma, WA 98411-0007	Fax: 253-502-8372 E-mail: bids@cityoftacoma.org

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 $200,000 and by Contracts and Awards Board for contracts greater than $200,000.

SIGNATURE PAGE

CITY OF TACOMA - DEPARTMENT OF PUBLIC UTILITIES - TACOMA POWER

All submittals must be in ink or typewritten and must be executed by a duly authorized officer or representative of the bidding/proposing entity. 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.

Submittals will be received and time stamped only at the City of Tacoma Purchasing Division, located in the Tacoma Public Utilities Administration North Building, Main Floor, at 3628 South 35th Street, Tacoma, WA 98409. **See the Request for Bids page near the beginning of the specification for additional details.**

REQUEST FOR BIDS SPECIFICATION NO. PG17-0493F

LAGRANDE SHOP BUILDING

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).

_____
Bidder/Proposer's Registered Name

_____
Address

_____
City, State, Zip

_____
E-Mail Address

_____
E.I.No. / Federal Social Security Number Used on Quarterly Federal Tax Return, U.S. Treasury Dept. Form 941

_____ _____
Signature of Person Authorized to Enter into Contracts for Bidder/Proposer — Date

_____
Printed Name and Title

_____
(Area Code) Telephone Number / Fax Number

_____
State Business License Number
In WA, also known as UBI (Unified Business Identifier) Number

_____
State Contractor's License Number (if applicable)
(See Ch. 18.27, R.C.W.)

Addendum acknowledgement: #1_____ #2_____ #3_____ #4_____

THIS PAGE MUST BE SIGNED AND RETURNED WITH SUBMITTAL

Contractor Name _____

City of Tacoma

Certification of Compliance with Wage Payment Statutes

The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date (January 9, 2019), 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.*

Name of Bidder

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 for 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 on 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:

_____
Name of Bidder

PROPOSAL

	QUANTITY	BID UNIT	UNIT COST	TOTAL COST
ITEM 1 Mobilization/Demobilization		LS	$_____	$_____
ITEM 2 Pre-engineered Building Foundation		LS	$_____	$_____
ITEM 3 Pre-engineered Building Structure		LS	$_____	$_____
ITEM 4 Building Septic Holding Tank		LS	$_____	$_____
ITEM 5 Building Mechanical System		LS	$_____	$_____
ITEM 6 Building Fire Monitoring and Alarm System		LS	$_____	$_____
ITEM 7 Material Removal (Organic)	20,000	CY	$_____	$_____
ITEM 8 Debris Removal (Concrete)	300	CY	$_____	$_____
ITEM 9 Bank Run Material	200	TON	$_____	$_____
ITEM 10 5/8 (-) Crushed Surfacing Top Course	300	TON	$_____	$_____
ITEM 11 1-½ Inch Drain Rock	100	TON	$_____	$_____
ITEM 12 Concrete Fill (2,500 psi)	3000	SF	$_____	$_____
ITEM 13 *Force Account			$ 100,000	$ 100,000

*****Bidders shall include the $100,000 figure as part of their overall bid.

TOTAL ITEMS 1 - 13	$_____
**Sales Tax @ _____	$_____
(**Note Paragraph 1.13 of General Provisions)	
TOTAL AMOUNT	$_____

_____
Name of Bidder

PROPOSAL

NOTE TO BIDDERS

A pre-bid meeting will be held at the project site 46502 State Route 7 East, Eatonville, WA 98328 on Wednesday, January 23, 2018, at 10:00 a.m. Please confirm your attendance with Ms. Samol Hefley via email at shefley@cityoftacoma.org.

If you are unable to attend this meeting, please call the SBE (Small Business Enterprise) Office at 253-591-5224 and/or the LEAP (Local Employment and Apprenticeship Program), at 253-591-5826, for instructions in filling out the SBE/LEAP forms (if applicable) or for questions concerning these requirements.

CONTRACTOR'S RECORD OF PRIOR CONTRACTS

NAME _____ ADDRESS _____

Beginning Date	Completion Date	Contract With	Contact Person Telephone #	Amount of Contract

REMARKS: _____

Name of Bidder

LIST OF EQUIPMENT

Following is a list to be filled in by the bidder, showing equipment definitely available for use on the proposed work as required. (Give quantity, description, size or capacity, condition and present location of each item of equipment.)

TACOMA POWER / GENERATION
SUBSTITUTION REQUEST FORM

This request shall be submitted to engineer listed below per Specification Submittals and Shop Drawings Section (Construction) or Substitutions Section (Supply). Substitution requests not received by the engineer will not be considered.

TO: Tacoma Power/Generation
3628 South 35th Street
Tacoma WA 98409
Fax: 253-502-8136

ATTN: **Steve Fairchild** Date: _____

PROJECT: **Specification PG17-0493F LaGrande Shop Building** Transmittal No. _____

(Specification/Name/Contract No., if applicable)

We hereby submit for consideration, the following product instead of the specified item for the above project:

Specification Section: _____

Specified Item: _____

Proposed Substitution: _____

NOTES: Attach complete technical data, including laboratory tests and samples as applicable.

Provide a detailed comparison of the significant qualities (size, weight, durability, performance and similar characteristics, and including visual effect, where applicable) for the proposed substitution in comparison with the original requirements.

List completely, installation changes and changes to drawings and specifications required by the proposal.

FILL IN BLANKS BELOW:

A. Does substitution require change in drawing dimensions? ☐ Yes ☐ No
   If yes, provide detail: _____

B. Will undersigned pay for resulting building design changes including engineering/detailing costs? ☐ Yes ☐ No

C. What effect does substitution have on other trades?

_____

D. Difference between proposed substitution and specified item?

_____

E. Manufacturer's guarantees of proposed and specified items are? ☐ Same ☐ Different*
   *Explain differences on attachment(s).

F. Are maintenance/service parts locally (within 50 miles) available for proposed substitution? ☐ Yes ☐ No

G. Will the proposed substitution have any effect on compliance with applicable codes? ☐ Yes ☐ No
   If yes, explain: _____

H. Name and address and current phone number the Project Lead for three (3) similar projects where the proposed product was used, along with the Project name and date of installation:

1. _____
2. _____
3. _____

I. Contract completion date is? _____ ☐ Same ☐ Different*
   **Explain differences on attachment(s).*

TACOMA POWER / GENERATION
SUBSTITUTION REQUEST FORM

This request shall be submitted to engineer listed below per Specification Submittals and Shop Drawings Section (Construction) or Substitutions Section (Supply). Substitution requests not received by the engineer will not be considered.

Undersigned attests function and quality equivalent or superior to specified item and waives their rights to additional payment and time which may subsequently be necessitated by failure of the substitution to perform adequately, and for the required work to make corrections thereof.

SUBMITTED BY:

Name

Firm

Address

City, State, Zip

Phone No.

Signature Date

FOR USE BY TACOMA POWER:

☐ Accepted ☐ Accepted as Noted

☐ Not Accepted ☐ Received Too Late

By: _____
(Project Lead/Manager)

Signature: _____

Date: _____

REMARKS:

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

Pursuant to RCW 39.30.060(1), the City of Tacoma hereby requires bidders to identify the subcontractors required by statute as part of their bid. Bids that are not accompanied by a listing of those subcontractors at the time the bid is submitted will be deemed non-responsive and void.

To be Submitted with the Bid Proposal

Project Name _____

Failure to list subcontractors who are proposed to perform 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 will result in your bid being non-responsive and therefore void.

Subcontractor(s) that are proposed to perform 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 must be listed below. The work to be performed is to be listed below the subcontractor(s) name.

If no subcontractor is listed below, the bidder acknowledges that it does not intend to use any subcontractor to perform those items of work.

Subcontractor Name _____
Work to be Performed _____
_____
_____
_____

Subcontractor Name _____
Work to be Performed _____
_____
_____
_____

Subcontractor Name _____
Work to be Performed _____
_____
_____
_____

Subcontractor Name _____
Work to be Performed _____
_____
_____
_____

Subcontractor Name _____
Work to be Performed _____
_____
_____
_____

SBE SPECIAL REMINDER
TO ALL BIDDERS

Equal Opportunity and Small Business Enterprise forms must be fully and accurately completed and returned with the submittal by the deadline posted in the specification documents. Failure to do so may result in the proposal being considered non-responsive. These forms are necessary to determine if the bidder complies with Chapter 1.07 of the City of Tacoma Municipal Code and state law.

The following steps shall be used to determine the level of SBE Usage:

a. The low bidder who meets the City's participation goal for SBEs, shall be presumed to have met the requirement.
b. Otherwise, the bidder who has the lowest evaluated bid based on the formula set forth below:

$$\text{(Base Bid)} - \left[\frac{\text{SBE Usage Percentage}}{\text{SBE Goal Percentage}} \text{ X (.05 X Low Base Bid)} \right] = \text{Evaluated Bid}$$

shall be presumed to have met the requirement and may be recommended for award.

NOTE: The ratio of SBE usage to the SBE goal in this formula above shall not exceed 1.

For the purposes of determining the Evaluated Bid, all alternates, additives, and deductives selected by the City will be added to your base bid as indicated in the proposal.

Contractors are also subject to the City's ordinances and regulations pertaining to having an affirmative action program and prohibiting discrimination. If needed, please contact the SBE Office at 253-591-5224 or 253-573-2435 for assistance. The list of SBE subcontractors is available at http://www.cityoftacoma.org/Page.aspx?nid=136.

SBE GOAL UTILIZATION FORM

SMALL BUSINESS ENTERPRISE REQUIREMENTS & PROCEDURES:

All bidders must complete and submit with their bid the following solicitation forms contained in the bid submittal package:

City of Tacoma – SBE Utilization Form to receive SBE usage **AND**
City of Tacoma – Prime Contractor's Pre-Work Form

IMPORTANT NOTE:

It is the bidder's responsibility to insure that the SBE subcontractor(s) listed on the SBE Utilization Form are currently certified by the City of Tacoma at the time of bid opening. This may be verified by contacting Carrie Wickstrom, SBE Program Coordinator of the SBE Program at (253) 591-5224 or via email at cwickstrom@ci.tacoma.wa.us between 7AM - 4PM, Monday through Friday. This form must have clear expression of SBE participation that your company will use on this project. Ordinance 27867, passed by the City Council on December 15, 2009, establishes the overall SBE goal of 22%, *except where modified through appropriate procedures*. Please refer to the City of Tacoma SBE Provisions included elsewhere in these Special Provisions.

SBE GOAL: 15%

The following scope of work(s) have been identified as SBE abled bid items and were used to calculate the above-referenced SBE goal:

Temporary Pedestrian / Traffic Control and Street Cleaning,

This is NOT an all-inclusive list. Bidders are free to identify any additional bid items that you deem appropriate to attain the above **15% SBE goal**. A list of certified SBE companies is available on the following City of Tacoma web site address:

www.cityoftacoma.org

MATERIAL MISSTATEMENTS CONCERNING COMPLETED ACTIONS BY THE BIDDER IN ANY SWORN STATEMENT OR FAILURE TO MEET COMMITMENTS AS INDICATED ON THE SBE UTILIZATION FORM MAY RENDER THE BIDDER IN DEFAULT OF CITY ORDINANCE 27867.

City of Tacoma
Community & Economic Development
Office of Small Business Enterprise
747 Market Street, Rm 900
Tacoma WA 98402
253-591-5224 or 253-573-2435

SBE UTILIZATION FORM

This form is to document only the SBE subcontractors or material suppliers that will be awarded a contract. This information will be used in calculating the **EVALUATED BID**. Additional forms may be used if needed.

- Prime contractors are encouraged to solicit bids from SBE approved firms.
- Be sure to include this form with your bid submittal in order to receive SBE credit.
- It is the prime contractor's responsibility to check the certification status of SBE subcontractors prior to the submittal deadline.

Bidder's Name:_____

Address:_____ City/State/Zip: _____

Spec. No. _____ Base Bid * $_____ Are You a SBE Mentor? ** ☐ Yes ☐No Are you using any SBE firms? ☐ Yes ☐ No

Complete company names and phone numbers are required to verify your SBE usage.

a. **Company Name and Telephone Number**	**b.** **Scope of Work, Services or Supplies/Materials Provided**	**c.** **Bid Amount**	**d.** **Subcontractor (100%)**	**e.** **Material Supplier (20%)**	**f.** **Actual SBE Usage Dollar Amount**
	Enter Total of Actual SBE Usage Dollar Amount $ ***				
Block g. Actual SBE Usage as a percent of the Base Bid: %			**Block h.** Total SBE Usage: %		

By signing and submitting this form the bidder certifies that the SBE firms listed will be used on this project including all applicable change orders.

_____ _____ _____

Type or Print Name of Responsible Officer / Title **Signature of Responsible Officer** **Date**

INSTRUCTIONS FOR COMPLETING
SBE UTILIZATION FORM

The purpose of these instructions is to assist bidders in properly completing the SBE Utilization Form.

This form when submitted with your bid provides information to the City of Tacoma to accurately review and evaluate your proposed SBE usage.

1. * Base Bid is the prime contractor's bid, plus any alternates, additives and deductive selected by the City. Also, please refer to Item #9 below.

2. **Note: As a SBE Mentor you can receive up to 50% of the identified SBE goal that may be applied towards your SBE usage. Please check (√) appropriate field on the SBE Utilization Form.

3. *** This amount should total all dollar amounts included in Column "f."

4. Column "a" – List all SBE companies that you will be awarding a contract to if you are the successful bidder.

5. Column "b" – List the scope of work or services for each subcontractor **OR** list the materials/supplies provided.

6. Column "c" – The bid amount must be indicated for ***all*** listed **SBE** subcontractors and material suppliers that you plan on doing business with. This quote is the price that you and the subcontractor have negotiated prior to bid opening.

7. Column "d" – Indicate with a checkmark (√) if the SBE will serve as a subcontractor.

8. Column "e" – Indicate with a checkmark (√) if the SBE is a material supplier.

9. Column "f" – Actual SBE Usage Dollar Amount: Multiply the amount in Column "c" by 1.0 if subcontractor (d) is checked (√) OR by 0.20 if Material Supplier (e) is checked (√). Insert the total amount in this column.

10. Block "g" – The percent of actual SBE usage calculated on the Base Bid only and does not include any additional credit for being a SBE Mentor. (Divide your Total Actual SBE Usage Dollar Amount (Column "f") by your Base Bid (*) then multiply by 100 to get a percentage: $ amounts from column "f" divided by Base Bid (*) x 100 = SBE usage as a percent of the Base Bid.)

11. Block "h" – Total SBE usage is the percent of "Actual SBE Usage" (Column f) <u>plus</u> up to 50% of **identified** SBE goal as a mentorship credit <u>when applicable.</u>

12. Whether or not you have SBE participation this form **MUST** be submitted with your bid proposal package to receive SBE usage.

It is the prime contractor's responsibility to check the status of SBE subcontractors prior to bid opening. Call the SBE Office at 253-591-5224 or 253-573-2435 for additional information.

City of Tacoma
Community & Economic Development
Office of Small Business Enterprise
747 Market Street, Room 808
Tacoma, WA 98402
253-594-7933 or 253-591-5224

PRIME CONTRACTOR'S PRE-WORK FORM

Company Name _____ **Telephone** _____

Address/City/State/Zip Code _____

Specification Number _____ **Specification Title** _____

JOB CATEGORIES SPECIFY	TOTAL EMPLOYEES		TOTAL MINORITY EMPLOYEES		BLACK		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE		HISPANIC	
	M	F	M	F	M	F	M	F	M	F	M	F
Officer / Managers												
Supervisors												
Project Managers												
Office / Clerical												
Apprentices												
Trainees												
TOTALS												

CONTRACTOR'S PROJECTED WORK FORCE - THIS PROJECT

Superintendent												
Foreman												
Operators												
Laborers												
Apprentice												
Trainee												
TOTALS												

Type or Print Name of Responsible Officer / Title _____ **Signature of Responsible Officer** _____ **Date** _____

INSTRUCTIONS FOR COMPLETING
PRIME CONTRACTOR'S PRE-WORK FORM

This form only applies to employees who will be working on this specific project.

1. "Heading" the company name and address should reflect the prime contractor actually doing business with the City of Tacoma. If this address is different from that of the Equal Employment Opportunity Officer that administers the EEO programs of the company, the Equal Employment Opportunity Officer's address should be noted in the "Comments" section at the bottom of the form. "Telephone" should contain the area code, telephone number and extension (if any) for the Equal Employment Officer or the responsible official.

2. "Job Categories" at the extreme left hand column of the form specifying "Job Categories" lists "Officials & Managers." You are to list in addition to Officials & Managers any appropriate job titles such as Sales Workers, Office/Clerical, Professionals, Technical, etc., as they apply to your own company and only as pertains to this specific project.

3. The "M" and "F" headings at the top of each column refer to "Male" and "Female."

4. The "Total Employees" column should list the total number of male employees under "M" and the total female number of female employees under "F" for each job category listed. They should be listed in a similar manner in the "Total" category at the bottom of the form. The "Total Employees" column should include all those employees listed under "Non-Minority" and "Total Minorities." "Non-Minority" should include all employees not listed in the minority columns.

5. "Total Minorities" should include all employees listed under the "Black," "Asian or Pacific Islander" (A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.), "American Indian or Alaskan Native," and "Hispanic" columns. These columns should include only employees who are members of that particular minority group. Designation and definitions of ethnic/national origin status follow the instructions and definitions of the Federal EEO-1 Form of the U. S. Equal Employment Opportunity Commission.

6. "Totals" this line should reflect the total of all lines in each of the above columns.

7. The signature of your company's designated responsible official or similar official responsible for equal employment opportunity must appear in the designated space at the bottom of the form. Please PRINT OR TYPE the person's name on the top line across from the signature. This is required since some signatures are difficult to read.

8. "Comments" this section is to be used as needed for explanations to under utilization rate or lack of turnover, proposed expansion or reduction of staff or any other pertinent information you believe will help clarify or explain the data presented on the form. If you need additional space, please explain on a separate sheet of paper.

9. If you need assistance or have questions regarding the completion of this form, please call the SBE Office at 253-594-7933 or 253-591-5224.

City of Tacoma
Community & Economic Development
Office of Small Business Enterprise
747 Market Street, Room 808
Tacoma, WA 98402
253-594-7933 or 253-591-5224

SUBCONTRACTOR'S PRE-WORK FORM

Company Name _____ **Telephone** _____

Address/City/State/Zip Code _____

Name of Prime Contractor _____ **Specification Number** _____

Type of work to be performed on this project _____

QUESTIONS 1 and 2 BELOW REFER TO ANY FURTHER SUBCONTRACTING OF YOUR FIRM'S PORTION OF THIS PROJECT

1. What is the total number of **ALL** subcontracts to be let on this project? _____

2. What specific efforts were made by your company to obtain or assure minority and women subcontractor participation on this project?

SUBCONTRACTOR'S PRESENT WORK FORCE

JOB CATEGORIES SPECIFY	TOTAL EMPLOYEES		TOTAL MINORITY EMPLOYEES		BLACK		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE		HISPANIC	
	M	F	M	F	M	F	M	F	M	F	M	F
Officers/Managers												
Foreman												
Apprentices												
Trainees												
TOTALS												

SUBCONTRACTOR'S PROJECTED WORK FORCE - THIS PROJECT

Superintendent												
Foreman												
Operators												
Laborers												
Apprentice												
Trainee												
TOTALS												

Type or Print Name of Responsible Officer / Title _____ **Signature of Responsible Officer** _____ **Date** _____

INSTRUCTIONS FOR COMPLETING
SUBCONTRACTOR'S PRE-WORK FORM

This form only applies to employees who will be working on this specific project.

1. "Heading" the company name and address should reflect the subcontractor actually doing business with the City of Tacoma. If this address is different from that of the Equal Employment Opportunity Officer that administers the EEO programs of the company, the Equal Employment Opportunity Officer's address should be noted in the "Comments" section at the bottom of the form. "Telephone" should contain the area code, telephone number and extension (if any) for the Equal Employment Officer or the responsible official.

2. "Job Categories" at the extreme left hand column of the form specifying "Job Categories" lists "Officials & Managers." You are to list in addition to Officials & Managers any appropriate job titles such as Sales Workers, Office/Clerical, Professionals, Technical, etc., as they apply to your own company and only as pertains to this specific project.

3. The "M" and "F" headings at the top of each column refer to "Male" and "Female."

4. The "Total Employees" column should list the total number of male employees under "M" and the total female number of female employees under "F" for each job category listed. They should be listed in a similar manner in the "Total" category at the bottom of the form. The "Total Employees" column should include all those employees listed under "Non-Minority" and "Total Minorities." "Non-Minority" should include all employees not listed in the minority columns.

5. "Total Minorities" should include all employees listed under the "Black," "Asian or Pacific Islander" (A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes, for example, China, India, Japan, Korea, the Philippine Islands, and Samoa.), "American Indian or Alaskan Native," and "Hispanic" columns. These columns should include only employees who are members of that particular minority group. Designation and definitions of ethnic/national origin status follow the instructions and definitions of the Federal EEO-1 Form of the U. S. Equal Employment Opportunity Commission.

6. "Totals" this line should reflect the total of all lines in each of the above columns.

7. The signature of your company's designated responsible official or similar official responsible for equal employment opportunity must appear in the designated space at the bottom of the form. Please PRINT OR TYPE the person's name on the top line across from the signature. This is required since some signatures are difficult to read.

8. "Comments" this section is to be used as needed for explanations to under utilization rate or lack of turnover, proposed expansion or reduction of staff or any other pertinent information you believe will help clarify or explain the data presented on the form. If you need additional space, please explain on a separate sheet of paper.

9. If you need assistance or have questions regarding the completion of this form, please call the SBE Office at 253-597-7933 or 253-591-5224.

Chapter 1.07
SMALL BUSINESS ENTERPRISE

Sections:

1.07.010 Policy and purpose.
1.07.020 Definitions.
1.07.030 Discrimination prohibited.
1.07.040 Program administration.
1.07.050 Certification.
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 Sunset and 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 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 reasonably achievable goals 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. 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.

A. "Affidavit of Small Business Enterprise Certification" means the fully completed, signed, and notarized affidavit that must be submitted with an application for SBE certification. Representations and certifications made by the applicant in this Affidavit are made under penalty of perjury and will be used and relied upon by City to verify SBE eligibility and compliance with SBE certification and documentation requirements.

B. "Base Bid" means a Bid for Public Works to be performed or Supplies or Services to be furnished under a City Contract, including additives, alternates, deductives, excluding force accounts, and taxes collected separately pursuant to Washington Administrative Code ("WAC") 458-20-171.

C. "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.

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

E. "City" means all Departments, Divisions and agencies of the City of Tacoma.

F. "Contract" means any type of legally binding agreement regardless of form or title that governs the terms and conditions for procurement of Public Works and Improvements and/or Non-Public Works and Improvements Supplies and Services. Contracts include the terms and conditions found in Specifications, Bidder or Respondent Submittals, and purchase orders issued by the City. A "Contract" as used in this chapter shall include an agreement between the City and a non-profit entity to perform construction-related services for Public Works. A "Contract" does not include: (1) awards made by the City with federal/state grant or City general funds monies to a non-profit entity where the City offers assistance, guidance, or

supervision on a project or program, and the recipient of the grant awards uses the grant moneys to provide services to the community; (2) sales transactions where the City sells its personal or real property; (3) a loan transaction where the City is acting as a debtor or a creditor; (4) lease, franchise; (5) agreements to use City real property (such as Licenses, Permits and Easements) and, (6) banking and other financial or investment services.

G. "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.

H. "Evaluated Bid" means a Bid that factors each Respondent's Base Bid including any alternates, deductive and additives selected by the City that will result in a weighed reduction based on that Respondent's percentage of SBE participation, as defined by formula set forth in this chapter or in the SBE Regulations adopted pursuant to this chapter.

I. "Goals" means the annual level of participation by SBEs in City Contracts as established in this chapter, the SBE Regulations, or as necessary to comply with applicable federal and state nondiscrimination laws and regulations. Goals for individual Contracts may be adjusted as provided for in this chapter and shall not be construed as a minimum for any particular Contract or for any particular geographical area.

J. "SBE Certified Business" (or "SBEs") means a business that meets the criteria set forth in Section 1.07.050 of this chapter and has been certified as meeting that criteria by the Community and Economic Development Department-SBE Program Coordinator.

K. "SBE Program Coordinator" means the individual appointed, from time to time, by the City's Community and Economic Development Director to administer the SBE Regulations.

L. "SBE Regulations" shall mean the written regulations and procedures adopted pursuant to this chapter for procurement of Supplies, Services and Public Works.

M. "Lowest and Best Responsible Bidder" means the Bidder submitting the lowest Bid received that is within the range of acceptable bids, that also has the ability to timely perform the Contract bid upon considering such factors as financial resources, skills, quality of materials, past work record, and ability to comply with state, federal, and local requirements, including those set forth in the SBE Regulations.

N. "Non-Public Works and Improvements" means all competitively solicited procurement of Supplies and/or Services by the City not solicited as Public Works.

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

P. "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.

Q. "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.

R. "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.

S. "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.

T. "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.

U. "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.

V. "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.

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

1.07.040 Program administration.

A. The Community and Economic Development Director, or his or her designated SBE Program Coordinator, 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 rules and regulations known as the SBE Regulations to properly implement and administer the provisions of this chapter. The SBE Regulations shall be in conformance with City of Tacoma policies and state and federal laws and be designed to encourage achievement of the SBE goals set forth herein. The SBE Regulations shall become effective following public notice and an opportunity to comment by the public.

C. The SBE Regulations adopted pursuant to this section are for the administrative and procedural guidance of the officers and employees of the City and are further expressions of the public policy of the City. The SBE Regulations, when adopted, shall not confer an independent cause of action or claim for relief cognizable in the courts of the state of Washington or the United States of America to any third parties, and such provisions shall not be used as the basis for a lawsuit in any court of competent jurisdiction challenging the award of any contract by the City.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.050 Certification.

A. The SBE Program Coordinator shall approve a person as a SBE Certified Business if all of the following criteria are satisfied:

1. Each person with an ownership interest in the company has a personal net worth of less than $1,320,000 excluding one personal residence and the net worth of the business;

2. The company's total gross receipts for any consecutive three year period within the last six years is not more than $36,500,000 for public works companies and not more than $15,000,000 for non-public works and improvements companies;

3. The owner(s) of the company executes an Affidavit of Small Business Enterprise Certification and files it with the City which states that all information submitted on the SBE application is accurate, that the business has sought or intends to do business with the City and/or within the Pierce County area and has experienced or expects to experience difficulty competing for such business due to financial limitations that impair its ability to compete against larger firms; and

4. The company can demonstrate that it also meets at least one of the following additional requirements:

a. The company's business offices, or the personal residence of the owner, is located within a City of Tacoma designated Renewal Community/Community Empowerment Zone, prior to designation as a SBE, or

b. The company's business offices, or the personal residence of the owner, is located within the City of Tacoma for at least six months prior to designation as a SBE; or

c. The company's business offices are located in a federally designated HUBZONE in Pierce County or any adjacent county for at least 12 months prior to designation as a SBE; or

d. The company's business offices are located in a federally designated HUBZONE in a County wherein the work will be performed, or an adjacent county, for at least 12 months prior to designation as a SBE.

B. Application Process. The SBE Program Coordinator shall make the initial determination regarding certification or recertification. Each SBE applicant shall provide the following documents; as such documents are more fully described in the SBE Regulations, to the SBE Program Coordinator:

1. A completed Statement of Personal Net Worth form;

2. A completed, signed, and notarized Affidavit of Small Business Enterprise Certification that affirms compliance with the certification and documentation requirements of this section;

3. List of equipment and vehicles used by the SBE;

4. Description of company structure and owners;

5. Such additional information as the SBE Program Coordinator or designee may require.

When another governmental entity has an equivalent SBE classification process the City may enter into an interlocal cooperative agreement for mutual recognition of certifications.

C. Recertification. A SBE qualified business shall demonstrate annually to the satisfaction of the SBE Program Coordinator that the following SBE qualifications are still in effect for such business:

1. That the company still meets all of the criteria set forth in subsection 1.07.050.A. TMC, and

2. That the company has maintained all applicable and necessary licenses in the intervening period, and

3. That the company demonstrates that the owner and/or designated employees have completed the minimum annual continuing business education training requirements set forth in the SBE Regulations.

D. Appeals. The applicant may appeal any certification determination by the SBE Program Coordinator under this chapter to the Director. The appeal must be made in writing and must set forth the specific reasons for the appeal. The Director shall make a decision on the appeal request within a reasonable time, which decision shall be final unless further appeal is made to the Hearing Examiner. In that event, the Hearing Examiner Rules of Procedure for Hearings, Chapter 1.23 TMC, shall be applicable to that appeal proceeding.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28147 Ex. A; passed May 7, 2013: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.060 Program requirements.

A. Establishment of Annual SBE Goals. The SBE Regulations adopted pursuant to this chapter shall state reasonably achievable cumulative annual goals for utilization of SBEs in the provision of supplies, services, and public works procured by the City. Cumulative annual goals for the participation of SBEs in City contracts shall be based on the number of qualified SBEs operating within Pierce County or in a county that is adjacent to Pierce County or in a HUBZone in a county where the supplies, services and/or public works will be delivered or performed. The dollar value of all contracts awarded by the City to SBEs in the procurement of supplies, services, and public works shall be counted toward the accomplishment of the applicable SBE goal. The initial cumulative annual SBE goal for all public works, non-public works and improvements supplies and services procured by the City of Tacoma is 22 percent.

B. Revision of Annual SBE Goals. SBE utilization goals for supplies, services, and public works shall be reviewed annually to determine the total level of SBE participation reasonably attainable. If no certified SBEs are available to provide supplies, services, and/or public works, the dollar value of such supplies, services, or public works shall be exempt from the calculation of the cumulative annual goals set forth in the SBE Regulations. Proposed reduction of the cumulative annual SBE goals shall be in accordance with the SBE Regulations.

C. Application of SBE Goals to Contracts. The SBE Program Coordinator shall consult with City departments/divisions to establish the SBE goal for competitively solicited contracts of $25,000 and above, in accordance with this chapter and the SBE Regulations. No SBE goal will be established if no certified SBEs are available to provide supplies, services and/or public works.

D. Waivers. City departments/divisions or the SBE Program Coordinator may request to waive one or more of the requirements of this chapter as they apply to a particular contract or contracts. Waivers 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 and waiver must be documented by the department/division awarding the contract.

2. Not Practicable: Compliance with the requirements of this chapter would impose an unwarranted economic burden or risk to the City after consideration of existing budgetary approvals.

3. Sole source: The supplies, services, and/or public works are available from only one source, and subcontracting possibilities do not reasonably exist as determined by the finance purchasing manager.

4. Government purchasing. The City is a party to or included in a federal, state or inter-local government purchasing agreement as approved by the finance purchasing manager.

5. Lack of SBEs: An insufficient number of qualified SBE contractors exist to create SBE utilization opportunities.

6. Best interests of the City: Waiver of SBE goals is in the best interests of the City due to unforeseen circumstances, provided that said circumstances are set forth in writing by the requestor.

E. Review of Waivers. A waiver determination by the finance purchasing manager may be reviewed by the Board of Contracts and Awards (C&A Board). The C&A Board may also review a request to reduce or waive the SBE utilization goals based on Not Practicable or Best Interests of the City circumstances. The C&A Board shall determine whether compliance with such goals 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. If the determination of the C&A Board does not resolve the matter, a final determination shall be made by the City Council or Public Utility Board, as the case may be.

(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 a supplies, services, or public works and improvements contract valued at $25,000 or more shall be evaluated for attainment of the SBE goal established for that contract in accordance with this chapter and the SBE Regulations.

B. The determination of SBE usage and the calculation of SBE goal attainment per this section shall include the following considerations:

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

2. Supplies. A public works and improvements contractor may receive credit toward attainment of the SBE goal for expenditures for supplies obtained from a SBE; provided such SBE assumes the actual and contractual responsibility for delivering the supplies with its resources. The contractor may also receive credit toward attainment of the SBE goal for the amount of the commission paid to a SBE resulting from a supplies contract with the City; provided the SBE performs a commercially useful function in the process.

3. Services and Public Works subcontracts. Any bid by a certified SBE or a bidder that utilizes a certified SBE shall receive credit toward SBE goal attainment based on the percentage of SBE usage demonstrated in the bid. A contractor that utilizes a SBE-certified subcontractor to provide services or public works shall receive a credit toward the contractor's attainment of the SBE goal based on the value of the subcontract with that SBE.

4. Brokers, Fronts, or Similar Pass-Through Arrangements. SBEs acting as brokers, fronts, or similar pass-through arrangements (as such terms are defined in the SBE Regulations) shall not count toward SBE goal attainment unless the activity reflects normal industry practices and the broker performs a commercially useful function.

C. Evaluation of competitively solicited submittals for public works and improvements and for services when a SBE utilization goal 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 SBE goal. Such low bid shall be determined to meet the SBE goal if the bidder is a certified SBE.

a. If the low bidder meets the SBE goal, the bid shall be presumed the lowest and best responsible bid for contract award.

b. If the lowest priced bid does not meet the SBE goal, but the bid of any other responsive and responsible bidder does, and such other bid(s) is or are priced within five percent of the lowest bid, then the following formula shall be applied to each such other bid:

$$\text{(Base Bid)} - \left[\frac{\text{SBE Usage Percentages}}{\text{SBE Goal Percentages}} \text{ X (.05 X Low Base Bid)} \right] = \text{Evaluated Bid}$$

c. The lowest evaluated bid after applying said evaluation formula shall be presumed the lowest and best responsible bid for contract award.

d. In no event shall a bidder's evaluated bid price be adjusted more than 5 percent from its base bid price for purposes of contract award.

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 SBEs. Submittals by respondents determined to be qualified may be further evaluated based on price using the formula applicable to price based contract awards above. The SBE 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).

D. Evaluation of competitively solicited submittals for supplies when no SBE utilization goal has been established for the contract to be awarded shall encourage SBE participation as follows:

1. A submittal from a responsive certified SBE that is priced within five percent of the otherwise lowest responsive bid shall be recommended for award. Otherwise, the lowest responsive bidder shall be recommended for contract award.

E. The SBE Regulations may establish further SBE goal evaluation requirements and procedures for award of contracts between $5,000 and $25,000.00 and for non-competitively solicited contracts. City departments/divisions shall use due diligence to encourage and obtain SBE participation for supplies, services, and public works contracts under $5,000.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.080 Contract compliance.

A. The contractor awarded a contract based on SBE participation shall, during the term of the contract, comply with the SBE goal 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 SBEs projected to be used must be approved in advance by the SBE Program Coordinator. Substitution of one SBE with another shall be allowed where there has been a refusal to execute necessary agreements by the original SBE, 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 SBE is available as a substitute and that failure to secure participation by the SBE identified in the solicitation is not the fault of the respondent, substitution with a non-SBE shall be allowed; provided, that, the substitution does not increase the dollar amount of the bid.

3. If the SBE Program Coordinator determines that the contractor has not reasonably and actively pursued the use of replacement SBE(s), 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 SBEs, and shall include the right of the City to inspect such records.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.090 Program monitoring.

A. The SBE Program Coordinator shall monitor compliance with all provisions of this chapter and the SBE Regulations. The SBE Program Coordinator 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. The SBE Program Coordinator 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 SBE Program Coordinator 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 SBE utilization levels, waivers, proposed modifications to the program, and such other matters as may be specified in the SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.100 Enforcement.

The Director, or his or her 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 SBE Regulations.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

1.07.110 Remedies.

A. Upon receipt of a determination of contractor violation by the SBE Program Coordinator, 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; and/or

5. Recommend appropriate action including, but not limited to, disqualification of eligibility for future contract awards by the City (debarment) per Section 1.06.279 TMC;

B. Prior to exercise of any of the foregoing remedies, 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 SBE Regulations has occurred, the SBE Program Coordinator 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.

(Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 28110 Ex. B; passed Dec. 4, 2012: Ord. 27867 Ex. A; passed Dec. 15, 2009)

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)

1.07.140 Sunset and review of program.

This chapter shall be in effect through and until December 31, 2019, unless the City Council shall determine at an earlier date that the requirements of this chapter are no longer necessary. If this chapter has not been repealed by July 1, 2019, the City Council shall determine by the end of that year whether substantial effects or lack of opportunity of SBEs remain true in the relevant market and whether, and for how long, some or all of the requirements of this chapter should remain in effect.

(Ord. 28274 Ex. A; passed Dec. 16, 2014: Ord. 28141 Ex. A; passed Mar. 26, 2013: Ord. 27867 Ex. A; passed Dec. 15, 2009)

PG17-0493F
CITY OF TACOMA INSURANCE REQUIREMENTS

I. GENERAL REQUIREMENTS

A. The City of Tacoma (the City) reserves the right to approve or reject the insurance provided based upon the insurer (including financial condition), terms and coverage, the Certificate of Insurance (COI), and/or endorsements. The insurance must be provided by an insurer with a rating of (A-) VII or higher in the A.M. Best's Key Rating Guide *(http://www.ambest.com/home/default.aspx)*, and pursuant to RCW 48, licensed to do business in the State of Washington (or issued as a surplus line by a Washington Surplus Lines broker).

B. The Contractor shall keep this insurance in force during the entire term of the Contract and for thirty (30) calendar days after completion of all work required by the Contract, unless otherwise provided herein.

C. The liability insurance policies required by this section shall:
   1. Contain a "severability of insureds," "separation of interest," or "cross liability" provision.
   2. Be primary and non-contributory insurance to any insurance coverage or self-insurance program the City may maintain.
   3. Contain a Waiver of Subrogation clause in favor of the City.
   4. Other than Professional Liability, reflect coverage on an “occurrence,” not “claims-made” policy form.

D. The Contractor shall provide the City notice of any cancellation or non-renewal of this required insurance within 30 calendar days.

E. The Contractor shall forward to the City, a full and certified copy of the insurance policy(s) including endorsements required by this section upon the City’s request.

F. The Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the City.

G. Failure on the part of the Contractor to obtain and maintain the insurance as required by this section shall constitute a material breach of the Contract, upon which the City may, after giving five (5) business day notice to the Contractor to correct the breach, immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith; with any sums so expended to be repaid to the City by the Contractor upon demand, or at the sole discretion of the City, offset against funds due the Contractor from the City.

H. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made by the City to the Contractor.

I. For all liability insurance policies required by this Section, the City, including its officers, elected officials, employees, agents, and authorized volunteers, and any other entities as required by the Contract, shall be named as additional insured(s) by amendatory endorsement, EXCEPT Professional Liability (if applicable), Workers’ Compensation, Owners and Contractors Protective Liability, and Railroad Protective Liability.

II. EVIDENCE OF INSURANCE

The Contractor shall deliver a COI and endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work to the City. The certificate and endorsements must conform to the following requirements:

A. An ACORD certificate or a form determined by the City to be equivalent.
B. Copies of all endorsements showing the policy number and naming the City as an additional insured.
C. The endorsement is to state that the insurance is primary and non-contributory over any City insurance or self-insurance.
D. The endorsement is to extend "Products/Completed Operations" coverage to the City as an additional insured.
E. A statement of additional insured status on an ACORD COI shall not satisfy this requirement.
F. Any other amendatory endorsements to show the coverage required herein.

III. CERTIFICATE REQUIREMENTS SPECIFIC REPRESENTATIONS

The following must be indicated on the COI:

A. The City is named as an additional insured *(*"with respect to a specific Contract" or "for any and all work performed with the City" may be included in this statement).
B. "This insurance is primary and non-contributory over any insurance or self-insurance the City may carry" ("with respect to a specific Contract" or "for any and all work performed with the City" may be included in this statement).
C. A Waiver of Subrogation in favor of the City for General Liability and Automobile Liability.
D. Self-Insured Retention and applicable deductible limits must be disclosed on the COI and be no more than Ten Thousand Dollars ($10,000).
E. Contract or Permit number and the City Department.
F. All coverage other than Professional Liability, Cyber/Privacy and Security, and Pollution Liability must be written on "occurrence" form and not "claims-made" form.
G. Reflect the existence and form numbers of all required endorsements.

IV. SUBCONTRACTORS

It is the Contractor's responsibility to ensure that each subcontractor obtain and maintain adequate liability insurance coverage. The Contractor shall provide evidence of such insurance upon the City's request.

V. CERTIFICATE REQUIREMENTS FOR COVERAGES AND LIMITS

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. The policies and/or coverages required by this section shall be subject to a deductible or self-insured retained limit up to Ten Thousand Dollars ($10,000) unless first approved in writing by the City of Tacoma, Risk Management Division.

A. General Liability Insurance

1. Commercial General Liability (CGL) Insurance

The CGL insurance policy must provide limits not less than One Million Dollars ($1,000,000) each occurrence and Two Million Dollars ($2,000,000) annual aggregate.

The CGL policy shall be written on an "occurrence," not "claims-made," basis and shall include the following coverage:

a. Must use (Insurance Services Office (ISO) form CG0001(04-13) or its equivalent).
b. A per project aggregate policy limit.
c. Products Hazard/Completed Operations- for a period of one year following final acceptance of the work.
d. Personal/Advertising Injury.
e. Contractual Liability.
f. Include the City as additional insured and:
    1) Use ISO forms CG2010(04-13) and CG2037(04-13) or equivalent for Contractors performing work on behalf of the City and name the City as an additional insured for ongoing and completed operations.
    2) Use ISO form CG2012(04-13) or equivalent for Permits and name the City as an additional insured.
    3) Use ISO form CG2026(04-13) or equivalent for Facility Use Agreements and name the City as an additional insured.
    4) Blanket additional insured provisions within a policy form will not be accepted in lieu of the specific additional insured endorsement forms specified herein. However, a blanket additional insured endorsement providing the equivalent coverage provided by specific additional insured endorsements specified herein, may be accepted upon written approval from City of Tacoma, Risk Management Division.

B. Commercial Automobile Liability (CAL) Insurance

The Contractor shall obtain and keep in force during the term of the Contract, a policy of CAL insurance coverage, providing bodily injury coverage and property damage coverage for owned (if any), non-owned, hired, and leased vehicles.

The Contractor must also maintain an MCS 90 endorsement or equivalent and a CA 9948 endorsement or equivalent if “Pollutants” are to be transported. CAL policies must provide limits not less than One Million Dollars ($1,000,000) each accident for bodily injury and property damage.
Must use ISO form CA 0001 or equivalent.

C. Workers' Compensation

1. **State of Washington Workers’ Compensation**
   The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.
2.

D. Employers' Liability (EL) (Stop-Gap) Insurance

The Contractor shall maintain EL 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.

E. Professional Liability Insurance (PLI)

The Contractor and/or its subcontractor shall provide evidence of PLI covering professional errors and omissions. Such policy must provide minimum limits of One Million Dollars ($1,000,000) per claim and Two Million Dollars ($2,000,000) aggregate. If the scope of such design-related professional services includes work related to pollution conditions, the PLI policy shall include Pollution Liability coverage. If provided on a "claims-made" basis, such coverage shall be maintained by policy renewals or an extended reporting period endorsement for not less than three years following the end of the Contract.

F. Excess or Umbrella Liability (UL) Insurance

The Contractor shall provide Excess or UL coverage at limits of not less than Five Million Dollars ($5,000,000) per occurrence and in the aggregate. This Excess or UL coverage shall apply, at a minimum, to the CGL, EL and Automobile Liability forms required herein.

G. 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 the City. The costs of such necessary and appropriate insurance coverage shall be borne by the Contractor.

VI. CONTRACTOR

As used herein, "Contractor" shall be the Supplier(s) entering a Contract with City, whether designated as a Supplier, Contractor, Vendor, Proposer, Bidder, Respondent, Seller, Merchant, Service Provider, or otherwise.

TACOMA PUBLIC UTILITIES
CONTRACTOR'S WORK HAZARD ANALYSIS REPORT

for

_____

(Project Name)

The contractor and his/her subcontractors shall thoroughly review the scope of work described in the proposed project drawings and specifications. Following the review, the contractor will be responsible to indicate below any known or potential safety issues or phases of construction that may require specific safety procedures as identified by WISHA or OSHA regulations, and/or prudent construction practices; i.e., shoring, fall protection, scaffolding, hazardous materials, etc.

Failure to list and comply with safety requirements will be cause for disqualification from future Utilities contracts. A copy of this report shall be posted at the job site at all times.

If, during the course of construction, other safety requirements are identified, they will be added to this report as an addendum. The contractor will be required to adhere to the recommended actions and/or controls identified in the addendum.

SAFETY ISSUES/CONCERNS*	HAZARDS	RECOMMENDED ACTION AND/OR CONTROLS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

*USE A SEPARATE SHEET IF MORE ROOM IS NEEDED

_____ _____

Contractor Name and Title Date Job Site Superintendent Date

_____

Company Officer Signature

PERFORMANCE BOND
TO THE CITY OF TACOMA

Resolution No.
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,

$ _____ , 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

Specification No.

Specification Title:

Contract No.

(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 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. Treasure Department.

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.

Approved as to form:

_____
Deputy City Attorney

Principal: Vendor Legal Name

_____

By: _____

Surety:

_____

By: _____

Agent's Name: _____

Agent's Address: _____

SAMPLE

PAYMENT BOND
TO THE CITY OF TACOMA

Resolution No.
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,

$ _____ , 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

Specification No.

Specification Title:

Contract No.

(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 waivers 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 Bureau of Accounts, U.S. Treasure Department.

SAMPLE

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.

Approved as to form:

_____
Deputy City Attorney

Principal: Vendor Legal Name

_____

By: _____

Surety:

_____

By: _____

Agent's Name: _____

Agent's Address: _____

SAMPLE

CONTRACT

Resolution No.
Contract No.

This Contract is made and entered into effective this _____ day of _____, 20 , ("Effective Date") by and between the City of Tacoma, a Municipal Corporation of the State of Washington ("City"), and ("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. and Title together with all authorized addenda.
2. Contractor's submittal (or specifically described portions thereof) dated submitted in response to Specification No. and 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.

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
2. List remaining Contract Documents in applicable controlling order.

II. The total price to be paid by City for Contracts full and complete performance hereunder may not exceed: $ _____, plus applicable sales tax.

III. 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.

IV. Contractor acknowledges, and by signing this Contract agrees, that the Indemnification provisions set forth in the controlling Contract Documents, including the Industrial Insurance immunity waiver (if applicable), are totally and fully part of this Contract and, within the context of the competitive bidding laws, have been mutually negotiated by the Parties hereto.

V. 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.

VI. 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, as of the Effective Date stated above, which shall be Effective Date for bonding purposes as applicable.

CITY OF TACOMA:

By: _____
Enter title of dept or div staff w/auth to sign for this $ amt

By: _____
Select for over $50K or NA

CONTRACTOR:

By: _____
Signature

_____
Printed Name

Sample

By: _____ _____

Director of Finance *Title*

APPROVED AS TO FORM:

By: _____

City Attorney

Sample

TACOMA POWER, GENERATION SECTION
CONTRACTOR PERFORMANCE REVIEW
(FOR INTERNAL RECOMMENDATION PURPOSES)

Project:	Spec. #
Location:	Contractor: (Use separate sheet for each sub-contractor)
Engineer:	Inspector:

EVALUATION

Rate Each Area: EXCELLENT - 3 GOOD - 2 ACCEPTABLE - 1 INADEQUATE - 0

_____1. Safety

_____2. Quality of Work

_____3. Overall Rating

_____4. Communication/Coordination on Site

_____5. Communication/Coordination with Office

_____6. Supervision on Site

_____7. Quality of Supervisor

_____8. Site Management

_____9. Adequate Equipment

_____10. Adequate Personnel

_____11. Was Project Completed on Time (Y/N)

_____12. Would You Recommend this Contractor Work for Us Again (Y/N)

Comments (Required if Rated Below Acceptable)

Input by _____ Review No. _____ Date _____

GENERAL RELEASE TO THE CITY OF TACOMA

_____

The undersigned, named as the contractor in a certain agreement between (CONTRACTOR) and the City of Tacoma, dated _____ 20__, hereby releases the City of Tacoma, its departmental officers, employees, and agents from any and all claim or claims known or unknown, in any manner whatsoever, arising out of, or in connection with, 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 $_____

Signed at Tacoma, Washington this _____ day of _____, 20__.

_____
Contractor

By _____

Title _____

SAMPLE ONLY

NOTE: ORIGINAL RELEASE WILL BE MAILED TO THE CONTRACTOR AT THE END OF THIS PROJECT

GENERAL PROVISIONS

(Revised September 26, 2018)

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 interlineations 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 to the particular Division of the Department of Public Utilities of the City of Tacoma 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 SMALL BUSINESS ENTERPRISE (SBE) PROGRAM AND EQUAL OPPORTUNITY EMPLOYMENT

It is the policy of the City of Tacoma that all citizens be afforded an equal opportunity for full participation in our free enterprise system. In order to implement this policy, the City of Tacoma is committed to ensuring equitable participation of small business enterprises by establishing goals for their utilization in the provision of construction services, and related goods and/or services, to the City.

A. Public Work or Improvement Type Projects and Contracts:

Respondents for public work or improvement type projects and contracts in excess of $25,000 have an obligation to comply with the requirements set forth in the City's SBE Regulations adopted pursuant to Tacoma Municipal Code (TMC) Chapter 1.07. For further information, contact the City **SBE Office**, 747 Market Street, Room 900, Tacoma, WA 98402. Phone 253-573-2435. Email SBEOffice@cityoftacoma.org

Compliance with State Law RCW 35.22.650 is also required. All respondents for public work or improvement contracts (exceeding $10,000, and $15,000 for construction of water mains) are required to actively solicit minority and women business enterprise subcontractors. With respect to all such contracts, the Contractor agrees that he/she shall actively solicit the employment of minority group members. Contractor further agrees that he/she shall actively solicit bids for the subcontracting of goods or services from qualified minority businesses. Contractor shall furnish evidence of his/her compliance with these requirements of minority employment and solicitation. Contractor further agrees to consider the grant of subcontracts to said minority respondents on the basis of substantially equal proposals. The contractor shall be required to submit evidence of compliance with this section as part of the bid. ALL RESPONDENTS FOR PUBLIC WORK AND IMPROVEMENTS CONTRACTS MUST COMPLETE AND SUBMIT WITH THEIR BID THE FOLLOWING SOLICITATION FORMS CONTAINED IN THE BID SUBMITTAL PACKAGE AND ATTACHED HERETO:

- **SBE Utilization Form** for contracts of $25,000 or more per TMC Chapter 1.07
- **Prime Contractor's Pre-Work Form** for contracts per RCW 35.22.650

B. Purchase of Goods and/or Services Contracts:

Respondents for supply type contracts to which SBE Regulations do not apply have an obligation to demonstrate efforts to ensure equitable participation of minority and women's businesses. Such respondents shall not discriminate against any person on the basis of race, color, creed, sex, age or nationality in employment and are subject to the City's ordinances and regulations prohibiting discrimination. See TMC Chapter 1.50.

Service contracts involving a single trade are also subject to TMC Chapter 1.07, and respondents for such service contracts must submit applicable SBE program forms to be considered for contract award.

ALL RESPONDENTS FOR PURCHASE and/or SERVICES CONTRACTS MUST COMPLETE AND SUBMIT WITH THEIR BID THE FOLLOWING FORM CONTAINED IN THE BID SUBMITTAL PACKAGE AND ATTACHED HERETO:

- **Personnel Inventory Form**

Failure to fully complete and submit the required forms with the bid package may result in the bid being declared non-responsive and rejected.

1.04 RESPONDENT'S BOND OR CERTIFIED CHECK

Each bid for construction must be accompanied either by a certified or cashiers 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. All bid bonds must be signed by the person legally authorized to sign the bid. 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.

1.05 DELIVERY OF PROPOSALS TO THE CITY'S PURCHASING OFFICE

Submittal packages must be received by the City's Purchasing Division, Tacoma Public Utilities Administration Building North, 3628 South 35th Street, Tacoma, WA 98409-3115, prior to the scheduled time and date stated in the solicitation announcement. Each submittal, intact and bound, shall be completely sealed, with the name of the submitting party (hereinafter "Respondent"), the specification number and title clearly marked on the exterior of the package. City offices are not open for special mail or other deliveries on weekends and City holidays.

Submittals may be delivered to the City by mail or in person to the main floor security desk; however, **the Respondent is solely responsible for timely delivery of its submittal to the Purchasing Division.**

Facsimile (fax) copies of submittals for requests for sealed bids, requests for proposals, requests for qualifications and requests for information will not be accepted at any City fax machine.

Submittals received after the time stated in the solicitation announcement will not be accepted and will be returned, unopened, to the Respondent.

For purposes of determining whether a submittal has been timely received, the City's Purchasing Division may rely on Universal Coordinated Time from the National Bureau of Standards as reported by http://wwp.greenwichmeantime.com/

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 requires 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 Purchasing Office. The notice may be submitted in person or by mail; however, it must be received by the City’s Purchasing 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 PUBLIC UTILITY BOARD FINAL DETERMINATION

The 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

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 will be considered in determining the apparent lowest responsible bid. 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.

1.19 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.

1.20 PROPRIETARY OR CONFIDENTIAL TRADE SECRET INFORMATION

Washington State Public Disclosure Act (RCW 42.56 et seq.) requires public agencies in Washington to promptly make public records available for inspection and copying unless they fall within the specified exemptions contained in the Act. Documents submitted under this Specification are considered public records and, unless exempt from disclosure under the Act, will be made available for inspection and copying by the public in response to a public records request.

If the Respondent considers any submittal document to be exempt from disclosure under the law, the Respondent shall clearly mark on the specific page(s) affected such words as “CONFIDENTIAL,” “PROPRIETARY” or “TRADE SECRET.” The Respondent shall also submit an index with its submittal identifying the affected page number(s) and location(s) of all such identified material. **Failure to provide**

an index identifying the location of the material in the submittal that Respondent considers to be protected from disclosure will result in the records being released in response to a request for those records without further notice to Respondent. Marking the entire submittal as "confidential" or "proprietary" or "trade secret" is not acceptable and is grounds to reject such submittal.

If a public records request is made for disclosure of all or any part of Respondent's submittal **and** Respondent has (i) properly marked and (ii) indexed the material it asserts to be exempt from disclosure, the City will determine whether the material is exempt from public disclosure. If, in the City's opinion, the material is subject to a possible exemption to disclosure, the City will notify Respondent of the request and impending release and allow the Respondent ten (10) business days to take whatever action Respondent deems necessary to protect its interests. The City will reasonably cooperate with any legal action initiated by the Respondent to prevent release; provided that all expense of such action shall be borne solely by the Respondent, including any damages, penalties, attorney's fees or costs awarded by reason of having opposed disclosure and Respondent shall indemnify City against same. If the Respondent fails or neglects to take such action within said period, the City will release all materials deemed subject to disclosure. Submission of materials in response to this solicitation shall constitute assent by the Respondent to the foregoing procedure and the Respondent shall have no claim against the City on account of actions taken pursuant to such procedure.

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, Department of Public Utilities, 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 cashiers check or cash may be substituted for the bonds; however, this cash or cashiers 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:

(a) Proposal pages prevail if they conflict with the General, Special or Technical Provisions.

(b) Special Provisions prevail if they conflict with the General Provisions and/or Technical Provisions.

(c) 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 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 Superintendent, whose decision shall be final. The word "Superintendent" means the Superintendent of the City of Tacoma, Department of Public Utilities division which is administering the contract.

The Contract shall be carried out under the general control of the representative of the particular 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 any and all orders and instructions given by the representative of the particular 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 indemnity, 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 ASSIGNMENT AND SUBLETTING OF CONTRACT

A. 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.

B. 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.

2.07 DELAY

A. 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.

B. 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.

2.08 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.

2.09 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.

2.10 CITY OF TACOMA'S RIGHT TO TERMINATE CONTRACT

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 I 0 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.

In the event of any such termination, 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.

2.11 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.

2.12 LEGAL DISPUTES

A. General

Contractor and Surety agree and stipulate that in the event any litigation should occur concerning or arising out of this Contract, or any bids submitted in response to a Call for Bids under the attached Specification, the sole venue of any such legal action shall be the Pierce County Superior Court of the State of Washington and the interpretation of the terms of the Contract shall be governed by the laws of the State of Washington.

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.

2.13 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 I
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.

2.14 Shipping Notices and Invoices

Shipping notices shall furnish complete information of item, or items, contents of item if crated or cased, shipping point, carrier and Bill of Lading number, and City of Tacoma Purchase Order Number.

Unless otherwise directed in these specifications, shipping notices shall be mailed to:

Purchasing Division
City of Tacoma
P. O. Box 11007
Tacoma Washington 98411-2597

Invoices shall be sent in duplicate. Each invoice shall show City of Tacoma Purchase Order Number and Release Number if applicable and the Item Number, Quantity, Description, Unit Price and Total Price by line. Each line total shall be summed to give a grand total to which sales tax shall be added if applicable.

Invoices shall be mailed to:

Accounts Payable
City of Tacoma
P. O. Box 1717
Tacoma Washington 98401-1717

2.15 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.

2.16 Entire Agreement

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

2.17 Code of Ethics

The City's Code of Ethics, Chapter 1.46, Tacoma Municipal Code, provides ethical standards for City personnel and also 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.

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[Pages 11 through 16 are 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.

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 division 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 (division responsible for this Contract) for said "changed or differing" conditions unless said City division 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 CONTRACTOR'S INSURANCE

The Contractor shall not commence work under this Contract until all required insurance has been obtained and such insurance has been approved by the City of Tacoma, nor shall the Contractor allow any subcontractor to commence work on his/her subcontract until all insurance required herein has been obtained by Subcontractor. It is the Contractor's responsibility to ascertain that all Subcontractors have the insurance as required by this Contract at all times such Subcontractors are performing the work. The insurance coverages required herein shall be maintained and effective at all times any work including guarantee work is being performed by the Contractor or a Subcontractor.

A. Compensation Insurance

The Contractor shall, at all times during the existence of this Contract, fully comply with all of the terms and conditions of the laws of the State of Washington pertaining to Workers' Compensation together with any and all amendments and supplements thereto and any and all regulations promulgated thereunder.

In the event any of the work herein is sublet, the Contractor shall require such Subcontractor to fully comply with all of the terms and conditions of the laws of the State of Washington pertaining to Workers' Compensation. For persons engaged in employment who are not within the mandatory coverage of the state Workers' Compensation laws, the Contractor shall provide and shall cause each subcontractor to provide compensation insurance (including self-insurance if it otherwise meets all requirements of state Workers' Compensation laws), satisfactory to the City, at least equivalent to the benefits provided for covered employment under state Workers' Compensation laws.

B. Public Liability and Property Damage Insurance

The Contractor shall procure and maintain during the life of this Contract, a policy of comprehensive general liability insurance, with an insurance carrier authorized to do business in the State of Washington. The policy shall be approved as to form and content by the City Attorney and shall protect the City of Tacoma from liability imposed by law for damages suffered by any persons arising out of or resulting from acts or omissions in the performance of this contract: (1) for bodily injury or death resulting therefrom caused by accidents or occurrences resulting from any act or omission by the Contractor in the performance of the Contract, and (2) for injury to, or destruction of, any property, including property of the City of Tacoma, and including loss of use. The policy or policies shall include coverage for claims for damages because of bodily injury or death or property damage arising out of the ownership, maintenance or use of any motor vehicle, including hired or non-owned vehicles.

The City of Tacoma shall be designated in said policy as a primary additional named insured and shall be given 30 days written notice of cancellation, nonrenewal, or material change in the coverage provided. Said insurance shall be on a Comprehensive General Liability form with coverages to include Blanket Contractor, Broad Form Property Damage, Personal Injury, Protective Liability and Employers Liability. Limits shall be at $1,000,000 per occurrence, $2,000,000 aggregate and for contracts in excess of $500,000 the minimum coverage limits include Umbrella Excess Liability of $5,000,000. Further that the City's insurance is excess to any other collectible insurance.

The Contractor shall furnish evidence of the amount of any deductible or self-insured retention under the policy. This must also be approved by the City Attorney if the amount of the deductible or self-insured retention exceeds $50,000. The City may require the Contractor to furnish evidence of its ability to pay the amount of any deductible or self-insured retention. If the policy provides for a deductible or self-insured retention, the Contractor shall be solely responsible for paying the amount of the deductible or self-insured retention toward the cost of any claim under the policy.

If the Contractor fails to maintain such insurance, the City of Tacoma, at its discretion, may immediately terminate the contract.

Nothing herein contained shall be in any manner construed as limiting the extent to which the Contractor or Subcontractor may be held liable or responsible for payment of damages resulting from their operations.

C. Builder's Risk

The Contractor shall be expected to protect and insure from loss for any tools and equipment owned or rented by the Contractor, Subcontractor of the employees of the Contractor and Subcontractor.

Until the work is completed and accepted by the City of Tacoma, the construction is at the risk of the Contractor and no partial payment shall constitute acceptance of the work or relieve the Contractor of responsibility to deliver to the City of Tacoma the completed project as required by this Contract.

D. Proof of Carriage of Insurance

The Contractor shall furnish and file with the City a certificate of insurance coverage. An up-to-date certificate of insurance must be on file with the City throughout the contract. The City may, at the time the contract is executed or at any other time, require the Contractor to furnish and file with the City a certified true copy of the insurance policy or policies, together with a letter from the insurance carrier verifying that the premium has been paid for the period indicated. The policy or policies shall be approved as to form and content by the City Attorney.

3.06 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).

3.07 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.

3.08 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.

3.09 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

The Contractor and any Subcontractors shall be bound by the provisions of Chapter 39.12 RCW, as amended, relating to prevailing wages and usual fringe benefits. No worker, laborer, or mechanic employed in the performance of any part of this Contract shall be paid less than the "prevailing rate of wage" as determined by the industrial Statistician of the Department of Labor and industries. The schedule of the prevailing wage rates for the locality or localities where this Contract will be performed is by reference made a part of this Contract as though fully set forth herein. Current prevailing wage data will be furnished by the Industrial Statistician upon request. The Contractor shall immediately upon award of the Contract, contact the Department of Labor and Industries, ESAC Division, General Administration Building, Olympia, Washington 98504, to obtain full information, forms and procedures relating to these matters.

Before payment is made by or on behalf of the City, of any sum or sums due on account of a Public Works contract, it shall be the duty of the officer or person charged with the custody and disbursement of public funds to require the Contractor and each and every Subcontractor from the Contractor or a Subcontractor to submit to such officer a "Statement of Intent to Pay Prevailing Wages." Each statement of intent to pay prevailing wages must be approved by the industrial statistician of the Department of Labor and Industries before it is submitted to said officer. Unless otherwise authorized by the Department of Labor and Industries each voucher claim submitted by a Contractor for payment on a project estimate shall state that the prevailing wages have been paid in accordance with the prefiled statement or statements of intent to pay prevailing wages on file with the public agency. Following the final acceptance of a Public Works project, it shall be the duty of the officer charged with the disbursement of public funds to require the Contractor and each and every Subcontractor from the Contractor or a Subcontractor to submit to such officer an "Affidavit of Wages Paid" before the funds retained according to the provisions of RCW 60.28.010 are released to the Contractor. Each affidavit of wages paid must be certified by the industrial statistician of the Department of Labor and Industries before it is submitted to said officer.

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.

3.10 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. Also, 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 $300 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.

City of Tacoma
Community and Economic Development Department
LEAP Office
747 Market Street, Room 808
Tacoma, WA 98402
(253) 591-5826
FAX (253) 591-5232

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. It requires Contractors performing qualifying public works projects or service contracts to ensure that 15 percent of the total labor hours worked on the project are performed by LEAP-Qualified Pierce County apprentices approved by the Washington State Apprenticeship Council (SAC), youth, veterans and/or residents of Tacoma. Compliance may be met through any combination LEAP-Qualified employees. The Prime Contractor shall be solely responsible for meeting the LEAP Utilization Goal requirements.

Prime Contractors may obtain further information by contacting the City of Tacoma's LEAP Program at (253) 591-5826, Fax (253) 591-5232, or e-mail carmstrong@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 808**.**

LEAP PROGRAM REQUIREMENTS:

1. LOCAL EMPLOYMENT GOAL: The Contractor is required to ensure that 15 percent of the total Labor Hours worked on the project are performed by residents of the City of Tacoma or Economically Distressed ZIP Codes for the following projects:

   a) Civil Projects over $250,000
   b) Building Projects over $750,000

2. APPRENTICE GOAL: The Contractor is required to ensure that 15 percent of the total Labor Hours worked on any project over $1,000,000 are performed by Apprentices who are residents of the Tacoma Public Utilities Service Area.

3. SUBCONTRACTOR NOTIFICATION: Prime Contractors shall notify all Subcontractors of the LEAP Program requirement. Subcontractor labor hours may be utilized towards achievement of the LUG. Owner/Operator hours may be used for the Local Employment Goal.

4. FAILURE TO MEET LEAP UTILIZATION GOAL: Contractors shall be assessed an amount for each hour that is not achieved. The amount per hour shall be based on the extent the Contractor met its goal. The amount per hour that shall be assessed shall be 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

*Penalty may be waived in the best interests of the City of Tacoma.

LEAP DOCUMENT SUBMITTALS:**

1. *PRIME CONTRACTOR LEAP UTILIZATION PLAN (PCLUP):* The Contractor is required to provide the *PCLUP* at the **Pre-Construction meeting** showing the goals to be achieved for the project. The Contractor must identify in the *PCLUP* the estimated labor hours to be worked on the project by trade/craft persons.

2. *LEAP EMPLOYEE VERIFICATION FORM*: The Contractor must provide the LEAP Office with a form for every person whom the contractor will claim credit towards meeting the LUG with at least one piece of verifying documentation.

3. *LEAP WEEKLY PAYROLL REPORT:* The Prime and Subcontractors must complete and attach this form to the front of each weekly certified payroll when submitting to the LEAP Office for review.

4. *WEEKLY CERTIFIED PAYROLL*: 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.

5. *L&I STATEMENT OF INTENT TO PAY PREVAILING WAGE FORM*: The LEAP Office shall be provided with a copy for every contractor on the project.

6. *L&I AFFIDAVIT OF WAGES PAID FORM*: The LEAP Office shall be provided with a copy for every contractor on the project.

***WITHHOLDING PROGRESS PAYMENTS*: The LEAP Coordinator may withhold progress payments for failure to submit required forms.

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 Economically Distressed ZIP Codes within the Tacoma Public Utilities Service Area, 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 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.

Z. 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.

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

(Ord. 28147 Ex. B; passed May 7, 2013: Ord. 28110 Ex. C; passed Dec. 4, 2012: Ord. 27815 Ex. A; passed Jun. 30, 2009: Ord. 27368 § 1; passed Jun. 21, 2005: Ord. 26698 § 1; passed Sept. 12, 2000: Ord. 26301 § 1; passed Oct. 6, 1998)

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:

Percent of Goal Met	Assessment per unmet hour
100%	$ 0.00
90% - 99%	$ 2.00
75% to 89%	$ 3.50
50% to 74%	$ 5.00
1% to 49%	$ 7.50
0%	$10.00

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. 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 Good faith efforts. *Repealed by Ord. 27368.*

(Ord. 27368 § 3; passed Jun. 21, 2005: Ord. 26698 § 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 or Improvement contract.

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

1.90.070 Apprentice 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)

City of Tacoma
LEAP Office
747 Market Street, Room 900
Tacoma, WA 98402
Phone (253) 591-5826
FAX (253) 591-5232

LEAP

Document Submittal Schedule

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

- **LEAP Abbreviated Program Requirements**: brief overview of LEAP Program requirements
- **Prime Contractor *LEAP* Utilization Plan**: to be submitted at the Pre-Construction Meeting **(*Required by Prime Contractor Only*)**
- **LEAP Employee Verification Form**: to be submitted on an ongoing basis for each qualified LEAP employee
- **LEAP Weekly Payroll Report**: must be attached and filled out to the front of each certified payroll
- **Tacoma Public Utilities Service Area Map**: for your reference on LEAP-qualified zoning areas

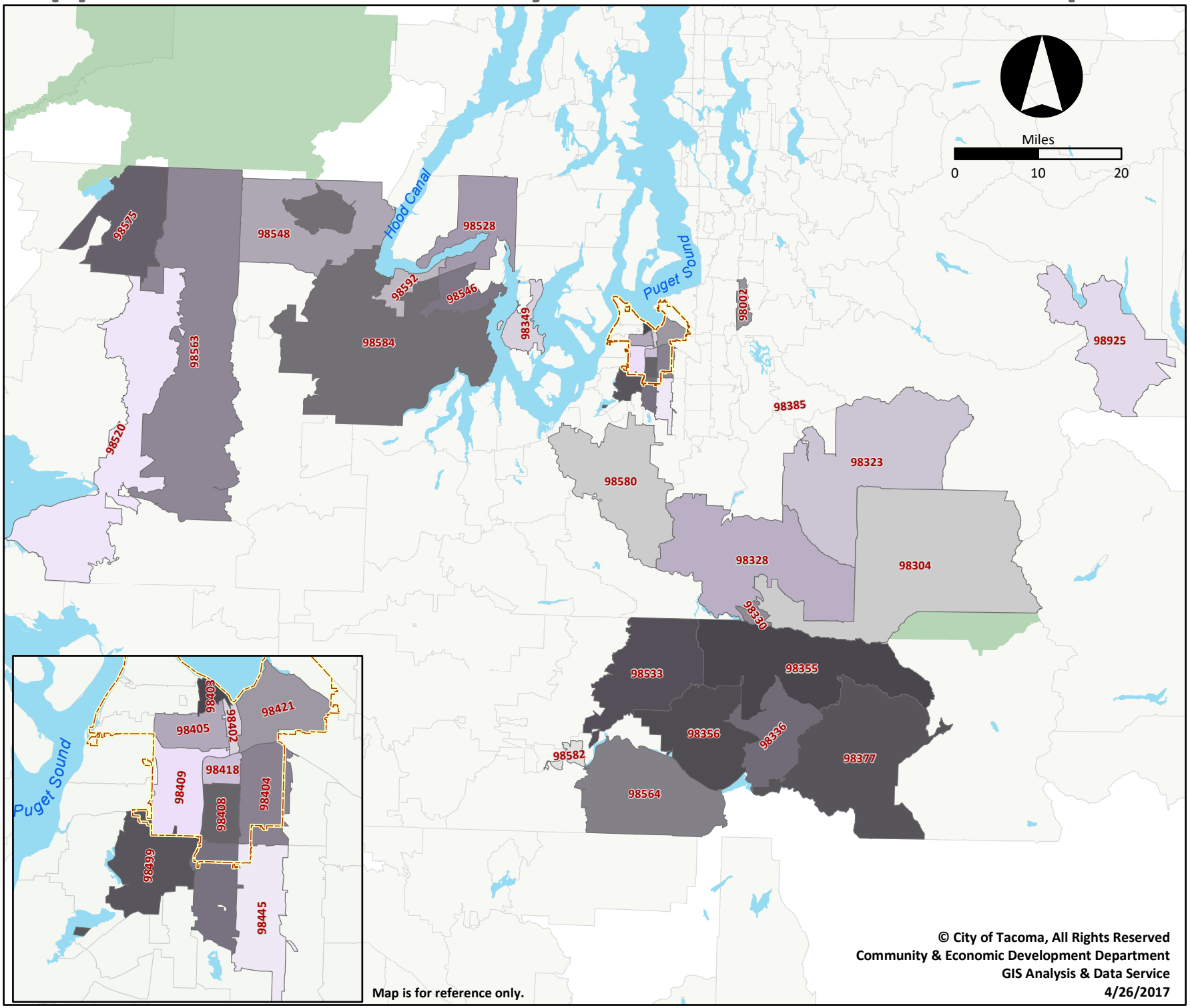
In addition, the City of Tacoma will also require from the Prime Contractor and all its Subcontractors:

- **Weekly Certified Payrolls**: to be submitted weekly, biweekly or monthly with the LEAP Payroll Report attached as scheduled by the Prime
- **Statement of Intent to Pay Prevailing Wages**: to be submitted prior to commencing work
- **Affidavit of Wages Paid**: to be submitted upon completion of each contractor's work
- **Local Resident/Pierce County (State – Approved) Apprentice Verification Form**: to be submitted on an ongoing basis for each qualified LEAP employee
- **Document Verification**: provide required information when requested from LEAP Office

Please submit above documents as instructed by the Project Manager.

If you have any questions or request further information, please feel free to contact the City of Tacoma's LEAP Program at (253) 591-5826, Fax (253) 591-5232, or email **carmstrong@cityoftacoma.org**.

Appendix C: Economically Distressed ZIP Codes Map



Tacoma

City Limits
98002
98304
98323
98328
98330
98336
98349
98355
98356
98377
98385
98520
98528
98533
98546
98548
98563
98564
98575
98580
98582
98584
98592
98925
98402
98403
98404
98405
98408
98409
98418
98421
98444
98445
98499

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City of Tacoma LEAP Office
747 Market Street, Room 808
Tacoma, WA 98402
(253) 591-5826 fax (253) 591-5232
www.cityoftacoma.org/leap

LEAP EMPLOYEE VERIFICATION FORM

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 within the geographic boundaries of the City of Tacoma

_____b. Resident within Economically Distressed ZIP Codes of the Tacoma Public Utilities Service Area

_____c. WA State Approved Apprentice living in Tacoma Public Utilities Service Area

_____d. WA State Approved Apprentice *(Only valid for contracts where 100% of work is performed outside of Pierce County)

Signature of Employee:_____ Date:_____

Contractor Representative:_____ Date:_____

LEAP EMPLOYEE VERIFICATION FORM

To be Completed by Contractor or Subcontractor

Please attach a legible copy of the following document(s) showing the address of residence as proof of local (Tacoma) and/or Pierce County residency and apprentice status, youth status, or veteran status.

.....

_____ For Youth - Copy of Birth Certificate or WA State ID or WA Driver's License (projects advertised after 05-20-13)

_____ For Veterans – Copy of DD-214(Projects advertised after 05-20-13)

_____ 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:_____

LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM (LEAP) INSTRUCTIONS AND GOAL FORM

LEAP REQUIREMENTS & PROCEDURES:

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 Submittals:

- ***Prime Contractor LEAP Utilization Plan*. This form is to be completed and presented at the Pre-Construction Meeting.**
- ***LEAP Employee Verification Form.* This form is to be completed for every qualifying LEAP employee.**
- ***LEAP Weekly Payroll Report.* This form is to be completed and submitted with each certified payroll.**

The City of Tacoma's LEAP office enforces two mandatory goals on City projects above certain monetary thresholds.

The Local Employment Utilization Goal requires the Prime Contractor performing a qualifying public works project to ensure that 15 percent of the total labor hours worked on the project are performed by residents of the City of Tacoma or Economically Distressed Areas of the Tacoma Public Utilities Service Area.

The Apprentice Utilization Goal requires the Prime Contractor performing a qualifying public works project to ensure that 15 percent of the total labor hours worked on the project are performed by Apprentices who are residents of the City of Tacoma or Tacoma Public Utilities Service Area. The accompanying LEAP Regulations, forms, and maps are included in these specifications.

***Exceptions: If the project is located outside of the retail service area of the Tacoma Public Utilities Service Area, then Apprentices may come from the county in which the work is performed.**

This project is subject to the:

1. **15% Local Employment Utilization Goal**
2. **15% Apprentice Utilization Goal**

LEAP staff can assist contractors in the recruitment, screening and selection of 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) 594-7933 or (253) 591-5826. The LEAP Office is located in the Tacoma Municipal Building, 747 Market Street, Room 808, Tacoma, WA 98402. www.cityoftacoma.org/leap

No Work Performed (NWP) Report

Prime/Sub Contractor: _____

Specification Number: _____

Project Description: _____

Payroll Week Ending Date: _____ Payroll Number: _____

NO WORK PERFORMED

I, the undersigned, do hereby certify under penalty of perjury, that the information contained herein is true and correct.

_____ _____ _____

Signature of Responsible Officer Title Date

City of Tacoma
LEAP Office
747 Market Street, Room 900
Tacoma WA 98402
Telephone (253) 591-5826
Fax (253) 591-5232

PRIME CONTRACTOR
LEAP UTILIZATION PLAN

***Failure to submit this plan at the Pre-Construction Meeting may result in Progress Payments being withheld*.**

Part A

Contractor:		**Date:**
Specification Number:	**Contract/Work Order Number(s):**	**Contract Dollar Amount:**
Project Description:		**Notes:**

PART B PLANNED LEAP HOURS*

Trade or Craft	City of Tacoma Resident	Economic Distressed Area Resident	Tacoma Public Utilities Service Area Apprentice Resident	WA State Apprentice *(Contracts outside of TPU Service Area Only)	
	hrs.	hrs.	hrs.	hrs.	
	hrs.	hrs.	hrs.	hrs.	**Date**
	hrs.	hrs.	hrs.	hrs.	
	hrs.	hrs.	hrs.	hrs.	
	hrs.	hrs.	hrs.	hrs.	
	hrs.	hrs.	hrs.	hrs.	**Rejected**
	hrs.	hrs.	hrs.	hrs.	
	hrs.	hrs.	hrs.	hrs.	**Date**
	hrs.	hrs.	hrs.	hrs.	
Totals					
					TOTAL hrs.

Part C

Provide a description of how the Contractor plans to ensure that the LEAP Utilization Goals on the project will be met. (Use additional sheets if necessary)

General Instructions for completing Prime Contractor LEAP Utilization Plan

Part A

Contractor/Contract Information Section: The Prime Contractor is responsible for completing this section. Failure to submit this plan at the Pre-Construction Meeting may result in Progress Payments being withheld.

Part B

Planned LEAP Hours Section: This section should be completed by the Prime Contractor. The information required in Part B is described below.

Trade or Craft: Indicate the Trade or Craft being used.

LEAP Employee Categories: Indicate the number of hours that will be utilized by the Prime Contractor and all Sub Contractors for each craft and broken down by City of Tacoma Resident, City of Tacoma Apprentice, Youth, or Veteran, Pierce County Apprentice, Youth, or Veteran.

For Watershed Projects: King County Apprentice – Approved by Washington State and/or Seattle Renewal Community (CEZ) Resident.

For Hydro Projects: Area Residents (residing in either Pierce County or the County where the work is performed: Lewis, Mason, Grays Harbor or Thurston County), Tacoma Community Empowerment Zone Resident, City of Tacoma Residents.

Totals: Total the number of hours in each of the six (6) columns.

Total Planned LEAP Utilization Hours: This is the total number of hours planned on this project to satisfy the LEAP Utilization Goal.

Part C

Description of how the Contractor plans to ensure fulfillment of the LEAP Utilization Goal: This section is to be completed by the Prime Contractor. Please describe how you plan to satisfy the LEAP Utilization Goal on this project. Provide a summary of your outreach and recruitment procedures to hire LEAP Qualified Employees to work on this project.

Economically Distressed ZIP Codes

Zip Code	200% Pov	Unemployed	25+ College	Area
98002	Y		Y	Auburn
98304	Y		Y	Ashford/Rainier
98323	Y	Y	Y	Carbonado
98328	Y		Y	Eatonville
98330	Y		Y	Elbe
98336	Y		Y	Glenoma
98349	Y	Y		Lakebay
98355		Y	Y	Mineral
98356	Y	Y	Y	Morton
98377	Y	Y	Y	Randle
98385		Y	Y	South Prairie
98402	Y	Y		Downtown
98403	Y	Y		Stadium/St. Helens
98404	Y	Y		Eastside
98405	Y	Y		Hilltop/Central
98408	Y		Y	South End
98409	Y	Y		South Tacoma
98418	Y		Y	Lincoln/South End
98421	Y	Y	Y	Port
98444	Y	Y		Parkland
98445	Y		Y	Midland
98499	Y	Y		Lakewood
98520	Y	Y	Y	Aberdeen
98528	Y		Y	Belfair
98533		Y	Y	Cinebar
98546	Y	Y	Y	Grapeview
98548	Y	Y	Y	Hoodsport
98563	Y	Y	Y	Montesano
98564	Y	Y	Y	Mossyrock
98575	Y		Y	Quinault
98580	Y		Y	Roy
98582	Y		Y	Salkum
98584	Y		Y	Shelton
98591	Y		Y	Toledo
98592		Y	Y	Union
98925	Y		Y	Easton

"200% Pov" = People at or below 200% of the federal poverty line. (69th percentile)
"Unemployed" = Unemployment rate (45th percentile)
"25+ College" = People at or above 25 years old without a college degree. (75th percentile)

Tacoma Public Utility Service Area

98001	Auburn
98002	Auburn
98003	Federal Way
98010	Black Diamond
98022	Enumclaw
98023	Federal Way
98030	Kent
98032	Kent
98038	Maple Valley
98042	Kent
98045	North Bend
98051	Ravensdale
98070	Vashon
98092	Auburn
98198	Seattle
98304	Ashford
98321	Buckley
98323	Carbonado
98327	DuPont
98328	Eatonville
98329	Gig Harbor
98330	Elbe
98332	Gig Harbor
98333	Fox Island
98335	Gig Harbor
98336	Glenoma
98338	Graham
98349	Lakebay
98354	Milton
98355	Mineral
98356	Morton
98360	Orting
98371	Puyallup
98372	Puyallup
98373	Puyallup
98374	Puyallup
98375	Puyallup
98377	Randle
98385	South Prairie
98387	Spanaway
98388	Spanaway
98390	Sumner
98391	Bonney
98402	Tacoma
98403	Tacoma
98404	Tacoma
98405	Tacoma
98406	Tacoma
98407	Tacoma
98408	Tacoma
98409	Tacoma
98416	UPS
98418	Tacoma
98421	Tacoma
98422	Tacoma
98424	Tacoma
98430	Camp Murray
98433	Tacoma
98438	McChord
98439	Lakewood
98443	Tacoma
98444	Tacoma
98445	Tacoma
98446	Tacoma
98447	PLU
98465	Tacoma
98466	Tacoma
98467	University Place
98498	Lakewood
98499	Lakewood
98520	Aberdeen
98524	Allyn
98528	Belfair
98533	Cinebar
98546	Grapeview
98548	Hoodsport
98555	Lilliwaup
98563	Montesano
98564	Mossyrock
98575	Quinault
98580	Roy
98582	Salkum
98584	Shelton
98585	Silver Creek
98591	Toledo
98592	Union
98597	Yelm
98925	Easton

Apprentices may come from **any** of the ZIP codes listed under this page. If an apprentice lives in a Priority Hire ZIP code, they may count towards those labor hours as well.
Journeyman must be from the Priority Hire ZIP codes.

City of Tacoma
LEAP Office
747 Market Street Room. 900
Tacoma WA, 98402
Phone (253) 591-5826
Fax (253) 591-5232
www.cityoftacoma.org/leap

LEAP
Weekly Payroll Report

Prime / Subcontractor:_____ **Union** ☐ **Non-Union** ☐

Specification Number:_____ **Project:** _____

Payroll Week Ending Date: _____ **Payroll Number:** _____

To the extent possible, Contractors shall recruit Apprentices from multiple trades or crafts. (LEAP Regulations Section III)

Failure to submit this report attached to Weekly Certified Payrolls may result in Progress Payments being withheld.

1) Total Labor hours worked by <u>all</u> employees this payroll period on *this job*:_____

2) Total Wages paid *including benefits* to <u>all</u> employees this payroll period on *this job*:_____

Please include below LEAP qualified employees that have been verified by the LEAP Office *only.* A LEAP employee is a City of Tacoma resident and/or a Washington State approved apprentice who is a resident of Pierce County.
(Use additional sheets if necessary)

3) LEAP Employee Name	4) Social Security Number	5) Craft	6) Class J / A	7) Type of hours	8) Hours worked (this job)	9) Hourly Rate of pay incl. F/B
						$
						$
						$
						$
						$
						$
						$
						$

I, the undersigned, affirm that the information contained herein is true and correct.

_____ _____ _____
Signature of Responsible Officer Title Date

Instructions for completing the LEAP Weekly Payroll Report

If no work was performed on this job for this week, write **No Work Performed** on line # 1.

If work was performed on this job for this week, complete the form using the following instructions.

1) Enter the number of hours worked on this job by **all** employees
2) Enter the total Gross wages paid to **all** employees, (including fringe benefits) for this job
3) Enter employee name for **LEAP** qualified employees
4) Enter Social Security Number
5) Enter Craft as listed on Labor & Industries Intent to Pay Prevailing Wage
   - if this employee worked in more than one craft category, enter 5) through 9) on separate lines
6) Enter the employee class, Journeyman (J) or Apprentice (A)
7) Enter type of hours (regular (R) , overtime (O), double time (DT), for this employee
   - for each change in type of hours enter 5) through 9) on separate lines
8) Enter the hours worked by this employee
9) Enter the rate of pay (including fringe benefits) for this employee

---

Sample

1) Total hours worked on this job by all employees 142

2) Total gross pay for all employees working on this job $ 5412.91

The following employees have been identified as qualified LEAP employees for the purpose of meeting the LEAP Utilization Goal for this project.

3) Employee Name	4) Social Security Number	5) Craft	6) Class J / A	7) Type of hours	8) Hours worked (this job)	9) Hourly Rate of pay incl. F/B
Joe Smith	**123-45-6789**	**Laborer**	**J**	**R**	**15**	**$31.34**
		Laborer	**J**	**O**	**5**	**$47.01**
Tom Thompson	**987-65-4321**	**Laborer**	**J**	**R**	**8**	**$31.34**
		Power Equipment Operator	**J**	**R**	**8**	**$37.24**
Ken Swanson	**654-59-7531**	**Electrician**	**A**	**R**	**32**	**$29.93**

PREVAILING WAGE RATES

This project requires prevailing wages under chapter 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 Lewis 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:
http://www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp

REQUIRED DOCUMENTS

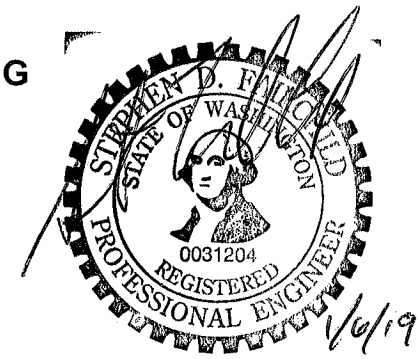
The Contractor shall submit to the City the following Department of Labor and Industries (L&I) forms for itself and for each firm covered under 39.12 RCW that provided work and materials for the Contract:

1. A copy of an approved Statement of Intent to Pay Prevailing Wages, L&I form number F700-029-000. The City will make no payment under this Contract for the Work performed until this statement has been approved by L&I and a copy of the approved form has been submitted to the City.

2. A copy of an approved Affidavit of Prevailing Wages Paid, L&I form number F700-007-000. The Contracting Agency will not grant completion or release retainage held under chapter 60.28 RCW until all approved Affidavit of Wages paid for Contractor and all Subcontractors have been received by the City.

SPECIFICATION NO. PG17-0493F
TACOMA POWER
NISQUALLY PROJECT
LAGRANDE SHOP BUILDING

These Special and Technical Specifications have been prepared under the direction of a licensed Professional Engineer, registered in the State of Washington



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DIVISION 1 - SPECIAL PROVISIONS

SECTION 01010 - SUMMARY OF WORK

1.1 PROJECT DESCRIPTION

This project includes the construction of the LaGrande Shop Building, a 60-ft by 80-ft pre-engineered steel structure with a slab on grade. The intended use of the building is to provide an area for fabrication, machining and vehicle maintenance. In addition to constructing a new building, this contract also includes material and debris removal requirements.

The new pre-engineered building is located inside the forebay structure. The forebay structure was constructed in 1912 (First Nisqually Project). In the 1940's the original forebay structure was bypassed, decommissioned and converted to a maintenance yard. Over the years, several shop and storage buildings have been constructed within the footprint of the forebay structure. The forebay structure consists of a 6-inch slab on grade as shown within the reference drawings. In order to construct the proposed shop building and install the associated site utilities, portions of the forebay concrete is required to be demolished. The City will complete all concrete demolition work as described in Specification Section 01010, subpart 1.13 - Work By City. The City will be installing the majority of the site utilities (City will provide: water, power, comm and building drainage. Contractor will provide all remaining utilities); please reference Specification Section 01010, subpart 1.13 - Work By City for full details. The contractor will be required to backfill the upper portion of the utility trenches with concrete. Additionally, the contractor will be required to compact the native soil (disturbed by the City during concrete demolition) within the footprint of the proposed building prior to installing foundation materials. The demolished concrete will be stockpiled by the City adjacent to the proposed building site and shall be removed by the contractor. Also slated for removal by the contractor, is a stockpile of organic debris located in the southwest corner of the forebay facility. This debris accumulated during the years when the "original" forebay structure was in operation. Turbid water flowed into the facility and organic material was allowed to settle-out and collect within the confines of the forebay walls. In recent years, the City has consolidated the organic debris in the southwest corner of the facility. The volume of organic debris is estimated to be approximately 20,000 yards or ton, all of which are slated for removal and legal disposal.

The contractor shall supply all materials required to complete the work required by this contract, except items supplied by Tacoma Power, as listed in Section 01040 – Project Coordination.

The City's contract is with one (1) general contractor and it is the general contractor's responsibility to ensure all work required to provide a complete and operational facility is included in their bid. When possible, the City has attempted to reference work which should be coordinated with various trades, but it is the contractor's responsibility to coordinate and schedule the work of all subcontractors, trades, and suppliers to assure the proper and timely prosecution and completion of all items of work.

Major components of work under this contract include, but are not limited to, the following list:

A. SITE WORK

General work scope includes, but is not limited to, the following:

1. Site Filling, Grading and Compaction (Building Footprint)

2. Debris Removal (concrete)
3. Material Removal (organic)
4. Trench Backfill with Concrete

B. BUILDING/STRUCTURAL COMPONENTS

General work scope includes, but is not limited to, the following:

1. Slab on Grade (w/ Radiant Floor Heating System) and Footing Drains
2. Embedded Foundation Conduits (Electrical/Mechanical)
3. Pre-Engineered Building System
4. Electrically Operated Coil-Up Vehicle Access Door
5. Man Doors
6. Bathroom and Associated Septic Holding Tank
7. HVAC Equipment (Boiler, HRU, Ductwork, etc.)
8. Air Compressor
9. Mechanical Equipment Enclosure
10. Installation of City-Furnished Vehicle Lift
11. Installation of Contractor Designed Fire Alarm System
12. Bollard Installation
13. Connection to City-Furnished Site Utilities

1.2 PROJECT LOCATION

This project is located at the Nisqually Hydroelectric Project, 46502 State Route 7 East, Eatonville, WA 98328, and as shown on Tacoma Power Drawing No. G-0.1. The project is located in Pierce County, Washington.

1.3 SITE SHOWING

The bidder will be responsible for examining the site(s) and to have compared the sites with the specifications and contract drawings contained in this specification, and 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, special work conditions including work schedules, obstacles and contingencies) before the delivery of their proposal.

No allowance will be subsequently made by the City on behalf of the bidder by reason of any error or neglect on the bidder's part, for such uncertainties as aforesaid.

A site showing will be conducted on **Wednesday, January 23, 2019, at 10:00 a.m**., immediately following the pre-bid meeting. Due to the nature of this project, the bidder is responsible for examining the site prior to placing a bid. **Only one (1) site showing will be conducted. It is strongly encouraged that all bidders attend the scheduled site showing.** If the contractor cannot make the listed showing, they may be able to coordinate a visit to the site on their own. Failure to examine the site may be grounds to reject the bid. Tacoma Power shall make no adjustment to the price or provide any compensation to the contractor for impacts relating to the contractor's failure to consider the potential impacts of not only the site conditions observed, but changes in the observed conditions that could have been foreseen by the contractor.

By entering into the contract, the bidder represents that they have inspected in detail the project site and has become familiar with all the physical and local conditions affecting the project and/or the project site. Any information provided by the City to the contractor, relating to existing conditions on, under, or to the project and/or site including, but not limited to information pertaining to hazardous material abatement and other conditions affecting the project site, represents only the opinion of the City as to the location, character, or quantity of such conditions and is provided only for the convenience of the contractor. The contractor shall draw their own conclusions from such information and make such tests, reviewed and analyses as the contractor deems necessary to understand such conditions and to prepare their proposal.

The City assumes no responsibility whatsoever with respect to the sufficiency or accuracy of such information and there is no guarantee, either expressed or implied, that the conditions indicated or otherwise found by the contractor as a result of any examination or exploration are representative of those existing throughout the work and/or project site.

The contractor shall carefully study and compare the contract documents with each other and shall at once report to the City errors, inconsistencies or omissions discovered. If the contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the contract documents without such notice to the City, the contractor shall assume the risk and responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

The contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the contractor with the contract documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the City at once.

1.4 COMMENCEMENT, PROSECUTION AND COMPLETION

The contractor will be required to complete the contract documents and to provide a surety bond within ten (10) calendar days after the award of the contract. The contractor shall begin the work to be performed in the contract within ten (10) calendar days after the date of notification to commence work. Notification to commence work may either be by letter or, if no letter is issued, by agreement at the preconstruction conference (or if no letter is issued, by the date the contract is executed by the City).

The contractor shall be required to complete all work within **one hundred and eighty-two (182) calendar days** after the date of notification to commence work. If the contractor fails to complete all work within **one hundred and eighty-two (182) calendar days**, the City will assess liquidated damages in accordance with Section 3.14 of the General Provisions.

1.5 SPECIFICATION FORMAT

This specification is written and formatted for use with Public Works specifications and is numbered to be consistent with other specifications, including Construction Specifications Institute (CSI) format, as modified by the City. It is not intended to indicate what work is to be accomplished by various subcontractors on the project. In all cases, the City's contract is with one (1) general contractor and it is the general contractor's responsibility to insure all work required to provide a complete and operational facility is included in their bid.

When possible, the City has tried to reference work which should be included with various trades, but it is the contractor's responsibility to ensure all work is properly coordinated. The numbering system in the Special Provisions Section reflects standard provisions written by the City and assigned constant numbers. Thus, gaps will appear when specific sections are not used.

1.6 CONTRACT WORK TIMES

Contract work times shall be Monday through Friday, 7:00 a.m. to 4:30 p.m., excluding holidays, described in Section 2.13 of the General Provisions or as otherwise approved by the City.

If the contractor elects to work on a Saturday, Sunday, holiday or longer than the designated contract work times, such work shall be considered overtime work. On all such overtime work, a City engineer or their inspector must be present. The contractor shall reimburse the City for the full amount of the costs for City employees who must work any such overtime hours. It shall be the engineer's decision as to when an inspector is required. For the purpose of estimation of reimbursement of City employee's overtime, the bidder shall budget $50.00 per hour.

However, if the City orders work to be performed on overtime, all City employees' overtime costs will be at no expense to the contractor. The City will not require reimbursement for overtime hours worked by the City for inspection as detailed in the General Provisions if the conditions of this paragraph are met to the satisfaction of the engineer.

It is possible that other contractors or the City will be working in the project area during the time of construction. It shall be the responsibility of this contractor to coordinate its work with all other agencies and/or contractors within the project area.

1.7 QUALIFICATION OF CONTRACTORS

A. QUALIFIED CONTRACTORS

Only contractors with management, employees, and staff experienced in the type of work required by this specification, and with a record of successful completion of projects of similar scope, complexity, and overall cost will be considered.

The bidder must complete the Contractor's Record of Prior Contracts form attached to this specification at the time of submitting their bid. The City will be the sole judge of the bidder's ability to meet the requirements of this paragraph. Bidders past work will be judged in complexity of job, time of completion, organization, and other factors that may indicate the abilities of the contractor.

Submit to the engineer within ten (10) calendar days following execution of the contact documents, a list of all subcontractors, including each subcontractor's address, telephone number, and contact person to be used on this project.

After completion of the project, an evaluation prepared on the form titled "Generation Contractor Performance Review" which is attached will be completed for the general and all subcontractors on this project. This form will be used to determine the adequacy of the work performed on this project including supervisor, quality of work, and adequate manpower and equipment, and the ability for the general or subcontractor to perform work for Tacoma Power in the future.

Any exception taken by any contractor to the comments on the form should be directed to the engineer within thirty (30) days of receipt. Failure to adequately respond to a poor evaluation within this time frame will be cause for rejection of future bids. The completed evaluation form will be shared with the contractor and subcontractors, but will be kept confidential by the City.

B. QUALIFIED SUPERINTENDENT

The contractor shall employ a competent superintendent as referenced in Section 01040 – Project Coordination, Paragraph 1.15 – Superintendent.

1.8 SPECIFICATIONS AND DRAWINGS

All construction and reference drawings attached to this specification, and listed on drawing AP2201, are made part of this contract.

All contract drawings are reduced to approximately half-size. Typical full-size prints are available and may be inspected by prospective bidders in the office of the Assistant Generation Manager - Generation Section, Tacoma Power, Third Floor, Tacoma Public Utilities Building, 3628 South 35th Street, Tacoma, Washington. Copies of original drawings may be obtained through the engineer during the bidding period. The contractor will be required to pay for all City-made full-size prints.

An electronic copy of the specifications will be furnished to the successful bidder for construction purposes. It shall be the contractor's responsibility to provide sufficient sets of drawings for building purposes.

The contractor shall keep on the job site a full-size copy of the drawings and the specifications, and shall, at all times, give the engineer access thereto.

1.9 EVALUATION OF BIDS

The award of this contract will not be based on cost alone as other factors and features are equally important. The contract will be awarded to the lowest responsive and responsible bidder complying with the specifications; provided such bid is reasonable and it is in the best interests of the City to accept.

The City, however, reserves the right to reject any and all bids and to waive any informalities in bids received. The City reserves the right to let the contract to the lowest responsive and responsible bidder whose bid will be most advantageous to the City, price and any other factors considered.

All other elements or factors, whether or not specifically provided for in this contract, which would affect the final cost to and the benefits to be derived by the City will be considered in determining the award of the contract. In addition, the bid evaluation factors set forth in City Code Section 1.06.262 may be considered by the City. The conclusive award decision will be based on the best interests of the City. The engineer’s decision as to which contractor best meets the City’s need will be final.

In addition to General Provisions Section 1.08, the following factors will be used in bid evaluation:

A. Experience and success of both company and superintendent completing at least three (3) projects of similar scope, complexity and overall cost.

B. A minimum of ten (10) documented years’ experience in project supervision by superintendent. Bidders shall submit a resume of named superintendent with their bids. See Section 01300 - Submittals and Shop Drawings.

C. Proposal prices, base bid, and cost of any or all alternates listed.

D. Review of all required submittals.

E. Past record with the City (including satisfying safety requirements).

1.10 LOCAL EMPLOYMENT AND APPRENTICESHIP TRAINING PROGRAM (LEAP)

Participation in LEAP is <u>not</u> required for this project. However, contractors are encouraged to volunteer in the LEAP Program. Following are the LEAP Program goals:

LEAP is a City of Tacoma economic development program adopted to provide employment opportunities for City of Tacoma residents on qualifying City funded projects. It requires the prime contractor or service provider performing a qualifying public works project or service contract to ensure that 15-percent of the total labor hours worked on the project are performed by apprentices approved by the Washington State Apprenticeship Council (SAC) and/or residents of Tacoma. Compliance may be met through any combination of utilizing residents of Tacoma or SAC apprentices on the project. Residents entering apprenticeships or other related training programs may be screened to work on City public works projects or service contracts.

Contractors/vendors may obtain further information by contacting the City's LEAP Coordinator, Clifford Armstrong, at 253-591-5826 or e-mail Clifford Armstrong at carmstrong@cityoftacoma.org. The LEAP coordinator can assist contractors in the recruitment of qualified employees from the Private Industry Council and other pre-employment and training organizations available in the area.

The LEAP Office is located in the City's Community & Economic Development Department, Tacoma Municipal Building, 747 Market Street, Room 900, Tacoma, Washington 98402.

1.11 PREVAILING WAGES

In addition to the requirements of Section 3.09(B) of the General Provisions, the contractor shall be required to post on the job site a copy of the intent form to pay prevailing wages.

As identified in the General Provisions, the contractor shall comply with the law regarding prevailing wages. These rules apply to any contractor who does business with the City, including owner/operators.

A Statement of Intent to Pay Prevailing Wages **<u>MUST</u>** be filed with the Washington Department of Labor & Industries upon award of contract. An Affidavit of Wages Paid **<u>MUST</u>** be filed with the Washington Department of Labor & Industries upon job completion.

Payments cannot be released by the City until certification of these filings are received by the engineer. Additional information regarding these submittals can be obtained by calling the Department of Labor & Industries, Prevailing Wage at 360-902-5335, or by visiting their web site at:
http://www.lni.wa.gov/tradeslicensing/prevailingwage/default.asp

1.12 PERFORMANCE (SURETY) BOND OR RETAINAGE

A 5-percent retainage bond may be provided in lieu of the City withholding five-percent retainage. If a retainage bond is not obtained, the City will withhold 5-percent retainage until the end of the contract. If a retainage bond is provided, the City form must be used.

Contractor shall provide notice of intent to provide retainage bond ten (10) days prior to first invoice. The City may elect to allow submission of retainage bond after the first payment at its discretion.

Contractor shall provide a surety bond for 100% of the contract award within ten (10) calendar days after award of contract. Up to 95-percent of the bid amount can be released upon satisfactory completion of the job and completion of the state requirements.

1.13 WORK BY CITY

The City will award separate work related to this overall project. See also section 01040, 1.6 – Division of Work.

Items noted **'NIC'** (not in contract) on the drawings will be furnished and installed by the City operating before or concurrently with the work of this contract, and are not included in this contract:

A. SITE WORK

1. Demolition of existing forebay concrete. This includes all concrete demolition for building construction and as required for installation of site utilities. City will stockpile concrete material adjacent to building site. Contractor required to dispose of material.
2. Installation and partial backfill of site utilities to within 6-ft of building footprint (exception described below). City will install required site water, sewer, and power and backfill trench to within 6-inches of finished grade. Contractor required to cap trench with concrete backfill as shown on the contract drawings. Contractor responsible for foundation footing drains and downspout tight lines to existing catch basins (which go beyond 6-ft of the building footprint).

B. ELECTRICAL

1. City will provide all electrical components except electrical conduits embedded within the building foundation slab, wiring associated with contractor-installed fire alarm system, wiring for septic holding tank alarm system and any wiring required to startup and fully commission the air compressor, boiler and all HVAC equipment. Transformers, vaults and distribution panels are included in Work by City.

C. SHOP EQUIPMENT

1. The Vehicle Lift shown on the drawings is City-Furnished/Contractor Installed. All other machine shop equipment is City Furnished/City Installed.

END OF SECTION

SECTION 01025 - MEASUREMENT AND PAYMENT

1.1 ADMINISTRATION

A. AUTHORITY

The City inspector or engineer in coordination with the contractor shall make all measurements and determine all quantities and amounts of work done for progress payments under the contract.

Approximately once a month, the project engineer shall make an estimate of the work completed or done by the contractor, and such estimates will be made by measurement or approximation at the option of the engineer. The engineer's determination of progress payments shall be conclusive. The City will not pay for material not under City control.

In case work is suspended, nearly suspended, or in case only unimportant progress is being made, the engineer may, at their discretion, make progress estimates at longer intervals than once a month.

Modify Section 2.14 of the General Provisions as follows.

Invoices shall be mailed to the attention of:

Business Systems
Tacoma Power
Generation/Plant Engineering
3628 South 35th Street
Tacoma, Washington 98409

NOTE: All questions regarding contract status or payments should be directed to the project engineer.

B. UNIT QUANTITIES SPECIFIED

Quantities indicated in the proposal are for bidding and contract purposes only. Quantities and measurements supplied or placed in the work and verified by the engineer and contractor determine payment.

Adjustments to contract prices due to changes in quantity shall be in accordance with the latest edition of the Standard Specifications, unless otherwise modified by this specification.

The City reserves the right to delete any bid item from the contract by notifying the contractor in writing of its intent. In the event of deleted work, the contractor's sole compensation shall be the money due the contractor for materials that had been purchased and obtained by the contractor prior to the deletion of the work.

C. CONTRACT PRICE

The lump sum and unit bid prices shall be full and complete compensation for the contract work stated, together with all appurtenances incidental thereto, including materials, equipment, tools, labor, and all the costs to the contractor for completing the contract in accordance with the plans, specifications, and instructions of the engineer.

All work not specifically described or mentioned in these specifications, but are required to be constructed to achieve complete and operable systems, structures or amenities shall be considered incidental items of work, not separately compensable, and its price included in items of work specified in the specifications.

D. NON-PAYMENT FOR REJECTED OR SURPLUS PRODUCTS

Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable

2. Products determined as unacceptable before or after placement
3. Products not completely unloaded from the transporting vehicle
4. Products placed beyond the lines and levels of the required work
5. Products remaining on hand after completion of the work
6. Loading, hauling and disposing of rejected products

E. WORK INCIDENTAL TO BID ITEMS

The following list indicates work which shall be considered incidental to the appropriate bid item as listed in the proposal:

1. Project Survey Costs (Beyond the initial survey offsets provided by the City)
2. Dewatering of Site (As/If Necessary)
3. All coordination with the City during construction for City installed items.

See below Section 1.2 - Proposal Items for additional items to be considered incidental to the contract.

1.2 PROPOSAL ITEMS

1. MOBILIZATION/DEMOBILIZATION, PER LUMP SUM

A. MEASUREMENT

Mobilization/Demobilization shall be measured per the lump sum (LS), not to exceed 5-percent of the base bid price.

B. PAYMENT

The lump sum (LS) contract price for Mobilization/Demobilization shall be full compensation for all labor, equipment, and materials to mobilize to the job site, preparation of work areas, demobilization, including clean up and site restoration. Phases of this job may require multiple mobilizations/demobilizations by some trades/subcontractors. Mobilization/demobilization will only be paid once regardless of the number of mobilizations.

70-percent of the bid amount will be paid upon completion of the initial mobilization and job site preparation. The remaining 30-percent will be paid upon completion of all site restoration and clean up.

2. PRE-ENGINEERED BUILDING FOUNDATION

A. MEASUREMENT

Pre-Engineered Building Foundation shall be measured per lump sum (LS) and shall include all labor, materials, and equipment required to construct the building foundation slab, the perimeter sidewalk slab, the foundation for the mechanical enclosure and the transformer slab in accordance with the attached plans and specifications and as listed in this proposal. This shall include (but is not limited to) all costs associated with the installation of the under slab vapor barrier, steel reinforcing, embedded electrical conduits, embedded plumbing components associated with bathroom, under slab insulation, foundation perimeter insulation, concrete slab on grade with required finishes, spread footings, concrete building curbs, control/construction joints, cast-in-place column/frame anchors, cast-in-place vehicle lift frame anchors, concrete bollards, and all others foundation details shown on the drawings and described within this specification.

Costs associated with the installation of the perforated foundation footing drain, filter fabric at perforated footing drain, downspout drain, shall be incidental to this bid item. Connecting the footing drain and downspout tight lines to the existing catch basins shall also be incidental to this bid.

Costs associated with compacting the native subgrade (as disturbed by City demolition of forebay concrete) beneath the building footprint per the specifications shall be considered incidental to this bid item.

Costs associated with drain rock bedding around the perforated footing drain shall be paid under Bid Item 10 – 1-1/2 Inch Drain Rock. Costs associated with installing and compacting Bank Run Material and 5/8 (-) Crushed Surfacing Top Course below the concrete foundation shall be paid for under their applicable bid item.

Costs associated with the supply and installation of the radiant floor heating system shall be paid for under Bid Item 4 – Building Mechanical Systems, however, all costs associated with coordination between trade and multiple concrete pours shall be incidental to this bid item.

Note: Design of Building foundation and building column connections to the foundation shall be by a Tacoma Power licensed structural engineer. Final footing sizes will be determined following contractor submittal of pre-engineered building drawings and calculations.

B. PAYMENT

The contract price per lump sum (LS) for Pre-Engineered Building Foundation shall be full compensation for all costs associated with this bid item.

3. PRE-ENGINEERED BUILDING STRUCTURE

A. MEASUREMENT

Pre-Engineered Building Structure shall be measured per lump sum (LS) and shall include all labor, materials and equipment required for the supply and construction of the complete pre-engineered building system in accordance with the attached plans and specifications and as listed in this proposal. This shall include (but is not limited to) all costs associated supply and installation of the building envelope (roof and walls), coil-up doors, man doors, gutters, downspouts, interior wall sheathing, roof and wall insulation, complete bathroom with appurtenances, complete mechanical enclosure with doors and insulation, building frames, wind columns, portal frames, wall and roof framings, construction hardware, louvers, trim/flashing and all other items required for the completion of the building structure.

Costs associated with structure design, engineering, and preparation of shop drawings associated with the pre-engineered building structure shall be incidental to the bid item.

Note: Design of Building foundation and building column connections to the foundation shall be by a Tacoma Power licensed structural engineer. Costs associated with coordination between building designer and TPU engineer shall be incidental to the bid item.

Costs associated with coordination between coil up door manufacturer and building designer for door size and support framing shall be incidental to this bid item.

B. PAYMENT

The contract price per lump sum (LS) for Pre-Engineered Building Structure shall be full compensation for all costs associated with this bid item.

4. BUILDING SEPTIC HOLDING TANK

A. MEASUREMENT

Building Septic Holding Tank shall be measured per lump sum (LS) and shall include all labor, materials and equipment required to supply and install the Septic Holding Tank in accordance with the attached plans and specifications and as listed in this proposal.

Installation and wiring of control system shall be considered incidental to this bid item.

Connection of the septic holding tank to the bathroom plumbing shall be considered incidental to this bid item.

Excavation and foundation preparation for the holding tank shall be considered incidental to this bid item.

Foundation rock below the holding tank shall be paid for under Bid Item 10 - 5/8 (-) Crushed Surfacing Top Course

B. PAYMENT

The contract price per lump sum (LS) for Building Septic Holding Tank shall be full compensation for all costs associated with this bid item.

5. BUILDING MECHANICAL SYSTEM

A. MEASUREMENT

Building Mechanical Systems shall be measured per lump sum (LS) and shall include all labor, materials and equipment required for installation of Division 15 systems in accordance with the attached plans and specifications and as listed in this proposal. This shall include (but not limited to) mechanical air handling equipment, hydronic boiler, boiler appurtenances, complete air compressor package and piping, radiant floor heating system piping, ductwork, hangers, equipment, equipment connections, coordination between trades, equipment controls and interlocks, and all embedded mechanical piping associated for a complete and fully functioning radiant floor heating system.

Cost associated with the installation of the City-Furnished Vehicle Lift shall be considered incidental to this bid item.

B. PAYMENT

The contract price per lump sum (LS) for Building Mechanical Systems shall be full compensation for all costs associated with this bid item.

6. BUILDING FIRE MONITORING AND ALARM SYSTEM

A. MEASUREMENT

Building Fire Monitoring and Alarm System shall be measured per lump sum (LS) and shall include all labor, materials and equipment required to design, permit, install and commission the Building Fire Monitoring and Alarm System described in Division 16 and in accordance with the attached plans and specifications.

B. PAYMENT

The contract price per lump sum (LS) for Building Fire Monitoring and Alarm System shall be full compensation for all costs associated with this bid item.

7. MATERIAL REMOVAL (ORGANIC)

A. MEASUREMENT

Material Removal (Organic) shall be measured per cubic yard (CY) for the removal and legal disposal of material located in the southwest corner of the forebay facility in accordance with the attached plans and specifications and as listed in this proposal.

Legal disposal is required and associated costs are considered incidental in this bid item.

Costs associated with contractor providing weight tickets along with a detailed and organized spreadsheet outlining the details of the weight tickets and ticket material product totals shall be incidental to this bid item.

B. PAYMENT

The unit price per cubic yard (CY) for Material Removal (Organic) shall be full compensation for all costs associated with this bid item.

8. DEBRIS REMOVAL (CONCRETE)

A. MEASUREMENT

Debris Removal (Concrete) shall be measured per cubic yard (CY) for the removal and legal disposal of concrete debris created by the City's demolition activity in accordance with the attached plans and specifications and as listed in this proposal.

Legal disposal is required and associated costs are considered incidental in this bid item.

Costs associated with contractor providing weight tickets along with a detailed and organized spreadsheet outlining the details of the weight tickets and ticket product totals shall be incidental to this bid item.

B. PAYMENT

The unit price per cubic yard (CY) for Debris Removal (Concrete) shall be full compensation for all costs associated with this bid item.

9. BANK RUN MATERIAL

A. MEASUREMENT

Bank Run Material shall be measured per ton (TON) and shall include all labor, materials, and equipment required to supply, transport, grade and compact materials in lifts as necessary to establish final grades in accordance with the attached plans and specifications, and as listed in the proposal.

Quantities for Bank Run Material delivered to the site shall be pre-approved by the Tacoma Power inspector and weight tickets collected by inspector.

Costs associated with contractor providing weight tickets along with a detailed and organized spreadsheet outlining the details of the weight tickets and ticket rock product totals shall be incidental to this bid item.

B. PAYMENT

The unit price per ton (TON) for Bank Run Material shall be full compensation for all costs associated with this bid item.

10. 5/8 (-) CRUSHED SURFACING TOP COURSE

A. MEASUREMENT

5/8 (-) Crushed Surfacing Top Course shall be measured per ton (TON) and shall include all labor, materials, and equipment required to supply, transport, grade and compact materials in lifts as necessary to establish final grades in accordance with the attached plans and specifications, and as listed in the proposal.

Quantities for 5/8 (-) Crushed Surfacing Top Course delivered to the site shall be pre-approved by the Tacoma Power inspector and weight tickets collected by inspector.

Costs associated with contractor providing weight tickets along with a detailed and organized spreadsheet outlining the details of the weight tickets and ticket rock product totals shall be incidental to this bid item.

B. PAYMENT

The unit price per ton (TON) for 5/8 (-) Crushed Surfacing Top Course shall be full compensation for all costs associated with this bid item.

11. 1-1/2 INCH DRAIN ROCK

A. MEASUREMENT

1-1/2 Inch Drain Rock shall be measured per ton (TON) and shall include all labor, materials, and equipment required to supply, transport and place materials as necessary around footing drains in accordance with the attached plans and specifications, and as listed in the proposal.

Quantities for 1-1/2 Inch Drain Rock delivered to the site shall be pre-approved by the Tacoma Power inspector and weight tickets collected by inspector.

Costs associated with contractor providing weight tickets along with a detailed and organized spreadsheet outlining the details of the weight tickets and ticket rock product totals shall be incidental to this bid item.

B. PAYMENT

The unit price per ton (TON) for 1-1/2 Inch Drain Rock shall be full compensation for all costs associated with this bid item.

12. CONCRETE FILL (2,500 PSI)

A. MEASUREMENT

Concrete Fill (2,500 psi) shall be measured per square foot (SF) of 6-inch thick slab installed to cap all utility trenches prepared by the City. Concrete Fill (2,500 psi) shall include all labor, materials, and equipment required to supply, transport and place concrete to final grades in accordance with the attached plans and specifications, and as listed in the proposal.

Quantities for Concrete Fill (2,500 psi) delivered to the site shall be pre-approved by the Tacoma Power inspector and weight tickets collected by inspector upon request.

B. PAYMENT

The unit price per square foot (SF) for Concrete Fill (2,500 psi) shall be full compensation for all costs associated with this bid item.

13. FORCE ACCOUNT, PER LUMP SUM

A. MEASUREMENT

Measurement will be made for Force Account in accordance with Section 1-09.6 of the latest edition of the Standard Specifications for Road, Bridge and Municipal Construction of the Washington State Department of Transportation as modified by Force Account Work in the Special Provisions or on negotiated lump sum or unit price change orders added to the contract.

B. PAYMENT

Payment shall be made for change order items added to the contract which shall be treated as a deduct to the force account remaining available.

“Force Account,” as listed in the proposal

1.3 FORCE ACCOUNT WORK

This section supersedes Section 3.10, Paragraph C of the General Provisions.

In certain circumstances, the contractor may be required to perform additional work. Where the work to be performed is determined to be extra and not attributed to the contractor’s negligence, carelessness, or failure to install permanent controls, it shall be paid in accordance with the unit contract price or by force account.

Such additional work not covered by contract items will be paid for on a force account basis in accordance with Section 1-09.6 of the Standard Specifications or as a negotiated change order with lump sum or unit price items. For the purpose of providing a common proposal for all bidders and for that purpose only, the City has estimated the potential cost of force account work, and has entered the amount in the bid proposal to become a part of the total bid by the contractor. However, there is no guarantee that there will be any force account work.

1.4 NON-PAYMENT FOR REJECTED OR SURPLUS PRODUCTS OR WORK

Payment will not be made for work rejected by the City. Products or work not meeting contract requirements shall be replaced by the contractor at no expense to the City, regardless of the impact to work, schedule or cost.

1.5 AS-BUILTS

The final payment of this contract will not be released until complete “AS-BUILT” plans are received and approved by the engineer.

END OF SECTION

SECTION 01040 - PROJECT COORDINATION

1.1 PROJECT ENGINEER/LEAD

The project engineer/lead shall be herein referenced as engineer in these specifications.

Construction management for this project with whom the contractor shall coordinate all their activities will be Mr. Stephen Fairchild, at 253-502-8747 once the notice to commence work is issued. Any changes to these specifications or plans shall be approved by this engineer prior to commencing any work.

Bidder inquiries, regarding technical specifications, may be directed to Stephen Fairchild at 253-502-8747. For general purchasing provisions, contact Samol Hefley, Finance/Purchasing, at shefley@cityoftacoma.org

1.2 MEETINGS

A. PRE-BID MEETING

All bidders are invited to attend a pre-bid meeting on **Wednesday, January 23, 2019**, 10:00 a.m., in the Nisqually Project Office at 46502 State Route 7 East, Eatonville, WA 98328. Email Samol Hefley at shefley@cityoftacoma.org to confirm your attendance.

If you are unable to attend this meeting, please call the SBE (Small Business Enterprise) Office at 253-591-5224, and/or the LEAP (Local Employment and Apprenticeship Program) Office, at 253-594-7933, for instructions in filling out the SBE/LEAP forms or for questions concerning these requirements.

B. PRE-CONSTRUCTION MEETING

Following award of the contract, the engineer will notify the selected bidder of the time and date of the pre-construction meeting to be held at the project location or the Third Floor Engineering Conference Room, Tacoma Public Utilities Administration Building, 3628 South 35th Street, Tacoma, Washington.

Minutes of the pre-construction meeting will be sent to the contractor and all meeting attendees. Recipients of the pre-construction meeting minutes will be required to direct any comments or changes to these minutes to the engineer within seven (7) days from the date of receipt. If no changes or comments are received within the seven (7) days, the meeting minutes will be kept by the engineer and become part of the project file.

C. SITE MEETINGS

The engineer will schedule weekly meetings at the project site prior to each major phase or section of work; prior to installing major pieces of equipment as identified by the engineer; and on an as-needed basis. Attendance is required of the contractor, site superintendent and major subcontractors at all such meetings. The engineer will notify the contractor of all required site meetings during the pre-construction meeting. Agenda will follow the same format as the pre-construction conference for applicable items.

Minutes of the weekly site meeting will be sent to the contractor and all meeting attendees. Recipients of the pre-construction meeting minutes will be required to direct any comments or changes to these minutes to the engineer within seven (7) days from the date of receipt. If no changes or comments are received within the seven (7) days, the meeting minutes will be kept by the engineer and become part of the project file.

1.3 PERMITS

The City has made initial application for the required building permits, however, final design of building foundation and building column connections to the foundation shall be completed by a Tacoma Power licensed structural engineer and submitted to permitting agencies as required. Final permits are dependent upon Contractor's submittal of pre-engineered building drawings and calculations.

1.4 FIELD ENGINEERING

A. SURVEY REFERENCE POINTS

The contractor shall protect survey control points prior to starting site work and preserve permanent reference points during construction.

Promptly report to the engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

Survey control damaged by the contractor shall be replaced by City forces and paid for by the contractor.

B. ESTABLISHED BY ENGINEER

The engineer shall establish the lines and grades for location of the work items listed in the proposal, together with a suitable number of benchmarks adjacent to the work. Contractor's work shall conform to the horizontal and vertical controls unless deviations are obtained from the engineer.

The contractor shall keep the engineer informed in advance of the times they intend to do work, in order that lines and grades may be furnished. All requests for the survey crew to be at the job site shall require at least four (4) days advance notice to the engineer.

The engineer may adjust or relocate any portion of the project to meet site requirements or to improve the project without additional compensation to the contractor, provided such adjustments do not represent appreciable costs for additional labor and materials as determined by the engineer.

C. TO BE ESTABLISHED AND MAINTAINED BY CONTRACTOR

Based upon the information provided by the engineer, all other lines, grades, and detail surveys necessary for the execution and completion of the work, including slope stakes, batter boards, and other working points, lines and elevations, shall be established and maintained by the contractor.

After lines and grades for any part of the work have been given by the engineer, the contractor shall be held responsible for the proper execution of the work to such lines and grades, and all bench marks, reference points and stakes given shall be carefully preserved by the contractor until authorized by the engineer to remove them. The contractor shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes.

The contractor shall be financially responsible for additional stakeout performed by the engineer as required to replace survey reference points destroyed during construction.

The engineer reserves the right to check all work, have free access to all work, and shall have the full cooperation of the contractor in so doing.

1.5 COORDINATION WITH OTHERS

A. OPERATION OF EXISTING FACILITIES

The facilities or portions of facilities within the project limits must be kept in continuous operation throughout the construction period. No interruption will be permitted which adversely affects the degree of service provided. Provided permission is obtained by the City in advance, portions of the existing facilities may be taken out of service for short periods.

It is possible that other contractors or the City will be working in the project area and project during the time of construction. It shall be the responsibility of this contractor to coordinate its work with all other agencies and/or contractors within the project area.

B. SCHEDULE AND COORDINATION OF WORK

The contractor shall coordinate scheduling, submittals, and all work specified herein to assure efficient and orderly sequence of the installation of interdependent construction elements with provisions for accommodating items installed later.

1.6 DIVISION OF WORK

A. MATERIAL FURNISHED AND INSTALLED BY CONTRACTOR

The contractor shall furnish and pay for all necessary materials (except City-furnished) and shall provide all labor, tools, equipment and superintendent, and perform all work incidental to the completion of the project as contemplated by this contract in accordance with the plans, specifications, and instructions of the engineer.

Each subcontractor shall furnish and install all materials and equipment unless otherwise specified.

Requests for use of alternate materials shall be submitted prior to bid opening in accordance with Section 01300, Paragraph 1.4 – “Or Equal” Clause or Substitutions.

B. CITY-FURNISHED MATERIAL INSTALLED BY CONTRACTOR

The Vehicle Lift shown on the drawings shall be City-Furnished/Contractor Installed.

C. SHOP EQUIPMENT

The Vehicle Lift shown on the drawings is City-Furnished/Contractor Installed. All other machine shop equipment is City- Furnished/City-Installed.

D. WORK TO BE DONE BY CITY

The City will provide all materials and perform all work to:

1. Demolition of existing forebay concrete. This includes all concrete demolition for building construction and as required for installation of site utilities. City will stockpile concrete material adjacent to building site. Contractor required to dispose of material.
2. Installation and partial backfill of site utilities to within 6-ft of building footprint (exception described below). City will install required site water, sewer, and power and backfill trench to within 6-inches of finished grade. Contractor required to cap trench with concrete backfill as shown on the contract drawings. Contractor responsible for foundation footing drains and downspout tight lines to existing catch basins (which go beyond 6-ft of the building footprint).
3. City will provide all electrical components except electrical conduits embedded within the building foundation slab, wiring associated with contractor installed fire alarm system, wiring for septic holding tank alarm system and any wiring required to startup and fully commission the air compressor and boiler. Transformers, vaults and distribution panels are included in Work by City.

4. Machine shop equipment is City Furnished/City Installed; this doesn't include the City-Furnished/Contractor Installed Vehicle Lift.

Notify the engineer a minimum of four (4) days prior to needing any work performed by the City.

Items noted N.I.C. (not in contract) on the drawings will be furnished and installed by the City before or concurrently with the work of this contract and are not included in this contract.

The contractor shall be responsible for coordinating and scheduling the work to be performed by the City so that it coincides with their work.

1.7 CONTRACT CHANGES

The City has developed four (4) forms to facilitate and track communications with the contractor. These are the **Request for Information (RFI), Engineering Change Directive (ECD), Proposal Request (PR),** and **Change Order Proposal (COP)**. These forms are included at the end of the Special Provisions.

The **Request for Information (RFI)** shall be used by the contractor whenever written direction on conflicts in plans, insufficient or unconstructable detail is shown, or any other issue which should be documented arises. The City may also use the form to inquire on contractor's methods, schedule or other issues not warranting more formal letter correspondence. The contractor shall maintain the numbering system and, as such, any issued by the City will be unnumbered until delivered to the contractor.

The **Engineering Change Directive (ECD)** shall be used by the City to transmit new or revised drawings, issue additions or modifications to the contract or furnish any other direction which should be documented. Directives are effective immediately. Should the contractor believe that such Directive should result in either a change in cost or time for the project, they shall notify the engineer prior to commencing such work and, if possible, submit a **Change Order Proposal** prior to the start of such work, but in no case, less than seven (7) days from receipt of said Directive.

In the event the City does not receive a **Change Order Proposal** from the contractor within seven (7) calendar days of the contractor's receipt of a Directive from the City, the contractor shall have no claim for extra cost or time or impacts attributable to the work required by the Directive. (Directives are numbered by the City.) Once the City and the contractor have established a price for the changes required by the Directive or any other request by the City for a change in the work, and a **Change Order Proposal** issues reflecting the agreed upon price, it is agreed and understood that the price reflected by the **Change Order Proposal** shall include all direct costs, indirect costs, and the contractor's estimate of impacts to its work, including but not limited to delay impacts, and shall represent a full and final settlement of all issues pertaining to the work required by the Directive, and work performed by the contractor up to the date of the **Change Order Proposal**.

The **Proposal Request (PR)** shall be used by the City to request pricing on a possible change in plans or additional work. The PR may also be used to request credits for deletion or changes in scope of work. The contractor shall respond to such requests with a **Change Order Proposal** within seven (7) days from receipt of said Request unless more time has been agreed to. Requests are numbered by the City.

The **Change Order Proposal (COP)** shall be used by the contractor to respond to City issued Proposal Requests, Engineering Change Directives or when the contractor believes that changed conditions or omitted, but necessary, work items exist.

The COP may be used for requested changes in cost or time of the contract. COPs shall be numbered by the contractor, and, in the case of revision or resubmission of the same basic COP, the number shall be hyphenated with the letter "B", "C", etc.

1.8 DIFFERING SITE CONDITION

Differing site conditions shall be administered in accordance with Sections 1.04.5, 1.04.7, and 1.09.11 of the Standard Specifications except as stipulated in these Special and General Provisions. Contractor shall have no claim for additional costs or work, if it fails to submit a written RFI to the City immediately upon encountering any differing site condition, conflicts in the plans, specifications, or constructability issues.

The contractor shall promptly, and before conditions are disturbed, notify the engineer or their field representative of problems with subsurface conditions at the site, problems or conflicts in the plans or specifications or problems on constructability. A written **Request for Information (RFI)** shall be submitted by the contractor when such problems and direction are required.

The engineer shall promptly investigate the conditions, and if agreed upon with the contractor, adjustment shall be made on the appropriate details in writing to facilitate construction. The response may be on the **RFI** or may necessitate an **Engineering Change Directive (ECD)** or **Proposal Request (PR).** No claim by the contractor under this differing site condition shall be allowed except as agreed upon in writing with the engineer.

Whenever possible, should the City desire extra work to be performed a **Proposal Request (PR)** shall be sent to the contractor**.**

Whenever possible, the contractor shall submit in advance and in writing, a **Change Order Proposal (COP)** for changes in the scope of work and/or contract amount. This proposal shall be either accepted or rejected in writing by the project engineer prior to work commencing. When no agreement can be reached, the City may order extra work on force account.

When time is short, the contractor shall notify the City extra work is required or the City shall notify the contractor that extra work is needed and at a minimum, the engineer shall issue a handwritten **Engineering Change Directive**. In such cases, said handwritten **Directive** will not be considered as agreement that such work is extra. Within seven (7) days, the contractor shall submit a written **Change Order Proposal** for changes in the scope of work and/or contract amount.

1.9 CONSTRUCTION PROGRESS SCHEDULES

A. FORMAT

The contractor shall prepare schedules as a horizontal bar chart (Gant Chart) with separate bar for each major portion of work or operation, identifying the first work day of each week and include holidays and times when facility will not be available to contractor for City installed work.

B. CONTENT

This schedule shall be activity-oriented showing as nearly as can be determined the starting and completion dates of each event. The schedule shall show the materials delivery, structure erection, and installation. It will include the start and completion of each major civil, structural, mechanical, communications and electrical item of work critical to the general contractor's operation.

Show complete sequence of construction, by activity, with dates for beginning and completion of each element of construction.

C. SEQUENCE SCHEDULING

It shall be the contractor’s responsibility to properly phase in all work specified herein including all work done by subcontractors.

Progress schedules are required to be coordinated with Tacoma Power and updated monthly or when changes occur. Acceptance or approval of the progress schedule does not release the contractor from the responsibility to provide the necessary resources to meet the schedule.

D. SUBMITTALS

The contractor shall submit initial schedules at the preconstruction meeting or at a minimum of within ten (10) working days after the contract award. After review, if changes are required by the engineer, resubmit required revised data within ten (10) working days.

The contractor shall use the attached Submittal Transmittal form (electronic version is available from the engineer) for all submittals.

Within twenty (20) days of the date of the contract, the contractor and the engineer will reach an agreement on any and all adjustments and all modifications to the submitted schedule which are warranted. The schedule, thus modified, will become part of the contract.

The failure of the contractor to submit a schedule(s), or the inability of the contractor and the City to reach an agreement as to modifications to a schedule, shall not excuse the contractor's obligation to perform the work required by the specifications in the number of days required by the specification.

Once a month, the City's and the contractor's site representatives will meet and perform a "Line-to-Line" review of items on the schedule, illustrating their plan for meeting the completion dates specified in this contract and the associated construction costs for each subcontractor.

The contractor shall be required to submit all color samples for the entire structure at one time. The contractor will make a color board for the building and submit to the engineer for approval. See Section 01300 – Submittals and Shop Drawings.

1.10 CITY OCCUPANCY

The City reserves the right to use or to occupy any substantially completed part of the project, and to use equipment installed under the contract prior to the date of final acceptance. Such use of occupancy shall not constitute acceptance of the work, or any part thereof.

1.11 SUPERINTENDENT

The contractor shall employ a competent superintendent (foreman) who shall be present at the project site at all times during the entire progress of the work, except those times when the contractor is demobilized. The superintendent shall be on site even when only a subcontractor is working, unless otherwise approved by the engineer. The foreman shall be satisfactory to the contractor, and shall have full authority to act on their behalf.

It will be the foreman's responsibility to have a set of plans and specifications on the project site during the progress of the work. The foreman shall mark or record on the plans all changes made during construction. Such "AS-BUILT" plans shall be available to the engineer at all times and shall be delivered to the engineer upon completion of the work.

The superintendent initially assigned to the project by the general contractor shall remain superintendent for the duration of the contract. If the superintendent is replaced, all work shall stop until an additional preconstruction meeting with the City is held. This work stoppage will be at the contractor's expense. The completion date shall remain unchanged, regardless of any work stoppage.

1.12 CLEAN UP

In addition to Section 3.11 - Cleaning Up of the General Provisions

A. DAILY

The contractor and the City inspector will walk the site daily and as required to determine the clean up and restoration required.

All areas shall be left safe, clean and free of debris.

Surplus excavation, conduit material, tools, temporary structures, dirt and rubbish shall be removed and disposed of by the contractor, and the construction site shall be left clean to the satisfaction of the engineer.

Clean up is considered incidental to the project and no payment will be allowed.

Collect waste daily and when containers are full, legally dispose of waste off site.

Clean-up of any area impacted by the construction shall be done weekly or as directed/instructed by the engineer.

END OF SECTION

TACOMA POWER
TACOMA PUBLIC UTILITIES

SUBMITTALS

CHANGE ORDER PROPOSAL (COP)
GENERATION SECTION

Project Name: _____ Date: _____

Specification No: _____ Contract No. _____ COP No. _____
(Numbered By Contractor)

Contractor Name: _____ Ref No. _____
(Prop Request or Eng Change Dir.)

TITLE:

Scope of Change Order/Work: (Attach City Proposal Request when applicable)

☐ Sketch Attached ☐ Drawing Attached ☐ Additional Pages Attached

Cost/Credit $_____

Time Extension Request _____

Submitted by: _____
Contractor

The change order includes all contractor(s) labor, material, overhead, profit and all direct and/or indirect costs associated with the change in the scope of work.

☐ Approved ☐ Disapproved ☐ Resubmit

Comment:

_____ Date _____
Tacoma Power

Prior to any extra work or within seven (7) days of discovery of any claim, the contractor shall submit a written proposal for changes in the scope of work and/or contract amount using this **Change Order Proposal.**

TACOMA POWER
TACOMA PUBLIC UTILITIES

SUBMITTALS

ENGINEERING CHANGE DIRECTIVE (ECD)
GENERATION SECTION

ECD NO: _____
(Numbered By City)

Date: _____ Project Title: _____

Contract No. _____ Specification No: _____

Contractor Name _____ Ref. No: _____
(RFI, etc.)

TITLE:

You are directed to make the following modification(s) in the scope of work of this contract.

☐ Sketch Attached ☐ Drawing Attached ☐ Additional Pages Included

This document becomes effective upon receipt by the contractor, with signature of a representative of the City. The contractor shall then commence with the modification(s) listed above. Signature by the contractor signifies agreement that the proposed modifications will not, may, or will result in a claim for changes in contract sum or time.

Signed By: _____ Signed By: _____

Tacoma Power Date Contractor (Check Box Below) Date

This construction change directive: ☐ will not; ☐ may; ☐ will; result in a claim supported by filing of a **Change Order Proposal** prior to any extra work, but not later than seven (7) days.

TACOMA POWER
TACOMA PUBLIC UTILITIES

SUBMITTALS

REQUEST FOR INFORMATION (RFI)
GENERATION SECTION

(Form Used By Contractor To Clarify Work Directed By City OR By City When Information Needed From Contractor/Contract)

Date: _____

RFI NO: _____
(Numbered By Contractor)

Project Title: _____

Specification No: _____

Ref. No: _____
(If Available, ECD, etc.)

ARCHITECT:

OWNER:
Tacoma Power
3628 South 35th Street
Tacoma WA 98409

CONTRACTOR:

SUBJECT:

☐ Architectural ☐ Civil ☐ Structural ☐ Mechanical ☐ Electrical ☐ Other

Request/Recommended Solution: _____

☐ Attachments

Date Required For Response: _____

Initiated By:
(*Name*) _____
(*General Contractor*) _____

Response: _____

☐ Attachments

Response Date: _____

*NOTE: Prior to any extra work or within seven (7) days of discovery of any claim, the contractor shall submit a written proposal for changes in the Scope of Work and/or contract amount using the **Change Order Proposal**.*

Response By:
(*Name*) _____
(*Firm*) _____

City Approval:

The Owner (Tacoma Power) reviewed the foregoing request and finds the response to be in order.

Reviewed By: _____ Date: _____
Project Engineer

Copies: ☐ Owner ☐ Consultants ☐ File ☐ _____ ☐ _____

TACOMA POWER
TACOMA PUBLIC UTILITIES

SUBMITTALS

PROPOSAL REQUEST (PR)
GENERATION SECTION

Project Name: _____ Date: _____

Specification No: _____ Contract No. _____ Proposal Request No. _____
(Numbered By City)

Contractor Name: _____ Ref. No. _____
(If Applicable)

Please submit a breakdown of the proposed costs for modification(s) to the contract sum and/or contract time associated with the proposed changes in the scope of work and to the contract documents described below.
This is not a change order or a notice to proceed with the work described below.

TITLE:

Description of proposed changes:

☐ Sketch Attached ☐ Drawing Attached ☐ Additional Pages Attached

Submitted by:

_____
Tacoma Power

_____
Date

Information Provided by:

_____
Contractor

_____
Date

The proposal shall include all contractor(s) labor, material, overhead, profit and all direct and/or indirect costs associated with the change in scope of work.

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SUBMITTAL TRANSMITTAL

Specification Name:
Specification No.:
Contract No.:

ATTN: _____ DATE:

CONTRACTOR: _____ TRANSMITTAL NO. **1**

ADDRESS: _____ Re-Submittal No.

_____ DISCIPLINE: ARCHITECT

WE ARE SENDING YOU:

☒ Attached ☐ Enclosed ☐ Under Separate Cover Via:

THE FOLLOWING ITEMS:

☒ Submittals ☐ Product/Data ☐ Samples ☐ Plans ☐ Shop Drawings ☐ Copies

☐ Specifications ☐ Contract ☐ Other:

COPIES	SECTION	DESCRIPTION OF PRODUCT/DATA	MANUFACTURER

THESE ARE TRANSMITTED AS CHECKED BELOW:

☐ For Approval ☒ For Your Use ☐ Per Your Request ☐ For Review and Comment

☐ Other:

REMARKS:

_____

_____

_____

_____

_____

_____

_____

_____

For Use By Architect/Engineer

☐ NO EXCEPTION TAKEN ☐ MAKE CORRECTIONS NOTED Date:_____

☐ REVISE AND RESUBMIT ☐ REJECTED – SEE REMARKS By:_____

Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is

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SUBMITTAL TRANSMITTAL

Specification Name:

Specification No.:

Contract No.:

responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other contractors and agencies performing his work in a safe and satisfactory manner.

SECTION 01300 - SUBMITTALS AND SHOP DRAWINGS

1.1 SUBMITTALS REQUIRED/REQUESTED WITH BID

In addition to the items listed in the Bidders Checklist, the bidders **shall** submit with their bid package the following information. This information may be used for evaluation purposes.

1. Experience and success of both company and superintendent completing at least three (3) projects of similar scope, complexity, and overall cost. A detailed list of comparable projects with current list of contacts shall be submitted with the bids.
2. A minimum of ten (10) documented years' experience in building or facilities construction supervision by superintendent. Bidders shall submit a resume of named superintendent with their bids.
3. Roofing Guarantee

   At the time of bid, the contractor must submit proof that the manufacturer warrants that, if properly applied, the metal roof system shall last for a period not less than twenty (20) years from the date of acceptance of the work by the City. The roof manufacturers also warrant that the labor and materials shall guarantee a leak-free roof for a period not less than twenty (20) years from date of acceptance of work by the City. The signed warranty shall be provided to the City at the project closeout.

1.2 DOCUMENTS REQUIRED AT PRECONSTRUCTION CONFERENCE

A. Work Hazard Analysis Report as required in Paragraph 3.06(B) of the General Provisions.

B. Construction Schedule as required in Section 01040 – Project Coordination.

C. List of Subcontractors, including each subcontractor's address, telephone number, and contact person to be used on this project.

D. Name of Job Superintendent.

E. List of Number and Names of Workers, Equipment List, and Working Site Layout or Requirements.

F. List of Products.

G. List of Principal Suppliers and Fabricators.

H. Schedule of Values (for Lump Sum Bid).

1.3 SUBMITTALS AND SHOP DRAWINGS DURING CONSTRUCTION

Submittals and shop drawings submitted to the City as specified herein are intended to show compliance with the contract documents. Signatures, corrections or comments made on submittals do not relieve the contractor from compliance with requirements of the drawings and specifications. Neither does acceptance or approval of submittals by signature add to or delete from any contract requirements resulting from these specifications regardless of the wording of the submittals. Submittals will not be reviewed or approved when the term "By Others" is used. Submittals are reviewed or approved for general conformance with the design concept of the project and general compliance with the information given in the contract documents.

The contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processed and techniques of construction, coordinating their work with that of other contractors and agencies, and performing their work in a safe and satisfactory manner. Piece-mealing of submittals will not be accepted.

A. SUBMITTALS PROCEDURES

1. Submittal Requirements: Submit as specified under individual sections. Submittals not requested will not be recognized or processed.
2. Transmittal Form: Accompany each submittal with transmittal letter, in triplicate. Transmittal form will be supplied by the engineer.
3. Submittal Numbering: Sequentially number transmittal forms in order submitted. Add alphabetic suffix to original submittal number of re-submittals.
4. Submittal Identification: Include project, contractor, subcontractor or supplier, pertinent drawing and detail number, specification section number, manufacturer, fabrication, product, material, and, as appropriate
5. Contractor's Certification: Apply contractor's stamp, signed or initialed, certifying that review, verification or products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the contract documents.
6. Contractor shall review submittals for adequate installation interface for all work prior to submitting them to the City.
7. Turn-Around Time: Allow from time of receipt ten (10) working days for each submittal and each re-submittal to be reviewed by the engineer.
8. Critical Issues: Prior to submittal, communicate with engineer reason for critical issue. Upon approval, allow ten (10) working days turn-around time from time of receipt by engineer.
9. Coordination and Consolidation of Submittals: Submit related items, sections or trades under one (1) submittal package for each unit of work or system where possible.
10. Deviations on Submittals: Identify deviations, including products and systems, not conforming with contract documents.
11. Product and System Limitations: Indicate conditions which may be detrimental to successful performance or completion of work.
12. Substitutions to Specified Items: Submit for approval in accordance with Section 1.4 "Or Equal" Clause or Substitution. Do not indicate or otherwise imply substitutions to specified items, except as approved.
13. Job Site Office Records: Maintain one (1) copy of every submittal, regardless of status, along with a current submittal log. Ensure that the most current, architect, and engineer stamped shop drawings and product data are distributed and subsequently used in connection with the work.
14. Re-Submittal Requirements: Revise initial submittal as directed and re-submit. Following procedures specified for the initial submittal. Make any corrections or changes in the submittals required by the engineer. Revise and make any further re-submittals until no exceptions are taken. Identify changes on re-submittal made since previous submittal.

15. Other Pertinent Submittals: Provide templates, inserts, and as applicable in timely fashion to other trades.

B. SHOP DRAWINGS

1. Number and Format: Submit one (1) electronic file of each submittal.
2. Submittal Procedure: Submit for engineer's review in accordance with submittal procedures specified in this section. After approved drawings are return electronically, the contractor shall reproduce and distribute copies to subcontractors and other entities, as applicable. Maintain one (1) copy of each shop drawing at field office and one (1) for project record documents to be delivered to the engineer at project completion.
3. Maximum Sheet Size: 24-inches by 36-inches or other allowable sizes of 8-1/2-inches by 11-inches or 11-inches by 17-inches.
4. Identification: Reference shop drawing details same as reference on contract documents, including sheet and detail descriptions, schedules and room numbers. Indicate by whom materials, products, work, and installations are supplied, performed or installed. Do not use the expression "by others".
5. Presentation: Hand drafted or computer generated, delineated to present information in a clear and thorough manner. Freehand drawings not approved.
6. Variations from Contract Documents due to Standard Shop Practices: Make transmittal outlining variation.
7. Engineer Changes to Submittals which affect Contract Sum or Contract Time: Do not distribute to being work related to submittal. Notify engineer immediately.

C. PRODUCT DATA

1. Number of Copies: Submit electronic file of each to be retained by the engineer.
2. Submittal Procedures: Submit for engineer review in accordance with submittal procedures specified in this section. After review, distribute to subcontractors and other applicable entities. Maintain one (1) copy for project record documents to be delivered to engineer at project completion.
3. Identification: Mark each copy to identify specific products, models, options, tolerances, dimensions, and other pertinent data.
4. Manufacturer's Standard Data: Modify drawings and diagrams to delete inapplicable information. Supplement to provide pertinent information unique to project.
5. Mechanical and Electrical Utilities, Equipment, and Appliance: Where not shown by shop drawings, include electrical characteristics, connection requirements, rough-ins, location of outlets, wiring, piping diagrams, controls, weight where significant, and as required to describe installation requirements. Correct published product data to correlate with specific project requirements.

D. ELECTRONIC FILES OF MANUALS (FROM VENDORS):

1. Electronic manuals must be submitted in .PDF and compatible with the latest version of Adobe Professional.
2. Manuals should be scanned at 300 DPI.
3. Color originals should be scanned to color images if possible.
4. All .PDF files should be scanned at using Optical Character Recognition (OCR)

5. A manual must be submitted as a single .PDF file; addendums and attachments (may or may not include drawings) should not be submitted separately, or in different file formats.
6. Manuals that consist of multiple volumes should be submitted as individual files.
7. Manuals comprised of several sections or chapters should be bookmarked by the vendor.
8. If a vendor wished to include security settings (so that their documents are "read-only"), that is acceptable provided that Tacoma Power can view and print from the file.

E. SAMPLES

1. Quantity or Number: Submit one (1) each to be retained by engineer, except as otherwise specified by individual specification sections. Submit additional as required by contractor for distribution.
2. Submittal Procedure: Submit for engineer's review in accordance with submittal procedures specified in this section. After review, distribute to applicable entities.
3. Size and Completeness: As specified by individual sections. When not specified, submit samples of sufficient size and completeness to clearly illustrate product.
4. Identification: Label each sample with project title and complete product identification, including manufacturer, model number, descriptive name, supplier, and as applicable to sample identification.
5. Functional Characteristics: Include parts, attachments, and components as applicable. Coordinate with interfacing work.
6. Aesthetic Characteristics: As required for selection of colors, finishes, patterns, and as required or requested to finalize selection process. Furnish full range of manufacturer's custom and standard selections. Where selection is specified, submit as required to show conformance to contract documents.

F. COLOR SAMPLES

The contractor shall submit all color samples for the entire project at one time. That shall include roofing, siding and trim, gutters, downspouts, doors, and interior wall paint colors. The contractor will make a color board for the building upon approval of the samples by the engineer. Piece-mealing of submittals shall not be accepted.

G. DESIGN DETAILS

All design details shall be submitted to the City by the contractor during the design phase for review and approval prior to commencing any construction. This includes designs, loads and computations on foundations, connections, columns, beams, and complete details of all structural members and structural connections. During this phase, the contractor shall be required to submit plans, calculations, and all required materials to the applicable authority to obtain all necessary permits for the project.

H. MANUFACTURER INSTRUCTIONS AND CERTIFICATES

Number: Submit one (1) electronic file of both the manufacturer instructions and certificates.

Content: Include manufacturer's printed instructions for delivery, storage, preparation, assembly, installation, start-up, adjusting, balancing, and finishing as specified for individual specification sections. Include special procedures, project conditions, and environmental criteria required for application or installation.

1.4 "OR EQUAL" CLAUSE OR SUBSTITUTIONS

A. GENERAL

When the engineer approves a substitution, it is with the understanding that the contractor guarantees the substituted article to be equal to, or better than, the article specified. The engineer will judge the suitability, reliability, and service availability of a proposed substitute.

To be considered by the engineer, the request for substitution shall be accompanied with complete physical and technical data, manufacturer's catalogue data, photographs, samples, and the address of the nearest authorized service representative, as applicable.

The decision of the engineer on "OR EQUALS" shall be final.

The requirements of General Provision 2.15 - Approved Equals also apply.

B. PRIOR TO BID OPENING

Substitution approvals will be considered prior to the bid opening if the bidder submits their request for substitution not less than ten (10) working days prior to the date set for bid opening. All substitution requests shall be submitted using the “Substitution Request Form” included in the bid packet and shall be sent to the individual as noted at the top of the form. Substitution requests not received by the named individual will not be evaluated and not allowed as a substitution prior to bidding. Submit all requests and product data in triplicate.

Saturday, Sunday and holidays listed in Paragraph 2.13 of the General Provisions are excluded from the calculation of ten (10) days. An addendum listing such approvals may/will be issued prior to bidding.

Bidders who do not receive prior written approvals of "OR EQUAL" by ten (10) days prior to bid submittal must base their bids on the items specified.

C. AFTER BID OPENING

Proposed substitution and deviation requests shall be reviewed during the time of submittal review.

Substitution and deviation requests will be received and considered only when one or more of following conditions are satisfied:

1. The specified product or method of construction cannot be provided within the contract period and the contractor submittal is submitted within time frame allowed.
2. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
3. The specified product or method of construction cannot be provided in a manner that is compatible with other materials.
4. A substantial advantage is offered to the Owner, in terms of cost, time, or other considerations of merit.
5. The product as specified includes the statement, “or equal” and one of the above conditions governs

B. The engineer’s decision on all substitution or deviation requests shall be final.

1.5 COLOR BOARD

Prepare color board of all approved samples that would physically fit on color board. Color board shall be suitable for presentations.

Samples may be smaller than specified if so required to fit on the color board as long as they are large enough to show color, texture, and other required details. Color board shall include project name, approved manufacturer, and contract number. Board shall not be less than 16-inches by 20-inches or more than 24-inches by 36-inches unless otherwise approved by the engineer. Samples not included on the color board shall be submitted separately.

END OF SECTION

SECTION 01400 - QUALITY CONTROL

1.1 REFERENCE STANDARDS

Reference to standards, specifications, manuals or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest Standard Specification manual, code, or laws or regulations in effect at the time of opening of bids (or on the effective date of the agreement if there were no bids), except as may be otherwise specifically stated. However, no provision of any referenced standard, specification, manual, or code (whether or not specifically incorporated by reference in the contract documents) shall be effective to change the duties and responsibilities of City, contractor, or engineer, or employees from those set forth in the contract documents.

Any part of the work not specifically covered by these specifications shall be performed in accordance with the applicable section of the latest Edition of the "Standard Specifications for Road, Bridge and Municipal Construction" as prepared by the Washington State Department of Transportation and the Washington State Department of Public Works Association (APWA) as amended by the latest APWA Amendment No. 1 and the latest City of Tacoma Amendment No. 1.

These specifications will herein be referred to as the Standard Specifications.

1.2 INSPECTION, TESTING AND CERTIFICATION

A. INSPECTION

Construction inspection and testing for the City will be performed by Donna Ebi, at 253-312-4703, or Dave Burns, at 253-381-7701, or others as the City may designate and as the construction situation may dictate. The City inspector will be responsible for insuring that the contractor is complying with the contract plans and specifications.

1. The City will prepare a construction inspection checklist to be presented to the contractor at the preconstruction meeting. The checklist will include all inspections typically required by Tacoma Public Utilities (TPU) inspectors as well as other items as deemed important by the engineer.
2. The contractor shall be required to contact the City 24 hours in advance of all of the construction activities listed on the checklist, have the indicated activity inspected, and the City's inspector initial that the work was performed in accordance with the appropriate technical provision.
3. The checklist shall be posted near each structure and be available for review by the City at all times.
4. Pre-final Inspection: Contractor shall notify the engineer in writing when all work or portions of work are complete and ready for inspection. The engineer will make a "punchlist" and forward the results of same to the contractor who shall promptly correct any deficiencies noted.
5. Final Inspection: Contractor shall notify the engineer in writing when all punchlist deficiencies have been completed. The engineer will promptly set a time for final inspection at which time the engineer and contractor shall jointly inspect the work. The contractor will promptly correct any further deficiencies noted.

B. LABORATORY SERVICES

Testing for quality control certification or special inspections as required by the permitting authority will be conducted by Tacoma Power and/or an independent laboratory which will be furnished and paid for by the City.

Subsequent sampling and testing of rejected material shall be paid for by the contractor.

Failure of the material to achieve the specified density or standards will be just cause for rejecting any portion of, and/or all of the material represented by the test. All costs associated with replacement materials or any delays caused by such failure shall be borne by the contractor.

It shall be the contractor's responsibility to prepare test specimens as required for special inspection as required by the permitting authority or the engineer and the cost shall be incidental to the contract.

END OF SECTION

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.1 UTILITIES

A. ELECTRIC SERVICE

Power (110V, 20 amp, 2 circuits) will be provided for this project at the adjacent existing shop building.

B. TELEPHONE SERVICE

The City will not provide telephone service for the contractor. Mobile telephone service is available at the site.

C. WATER

The City will have water available for use by the contractor within 100 yards of construction site.

D. SANITARY FACILITIES

Housing shall be provided for the sanitary necessities of all persons employed on the project, beginning with the first person employed and shall be of the chemical type. Such conveniences shall be erected and maintained by the contractor, in the number, manner, and place approved by the engineer immediately upon commencing work. The Sanitation Laws of the State of Washington and any applicable county sanitary laws shall be complied with.

E. TEMPORARY FIRE PROTECTION

1. Provide adequate numbers and types of fire extinguishers
2. Store combustible materials in fire-safe containers in fire-safe locations

1.2 JOB SHACK

A. JOB SHACK

The contractor shall supply a job shack where construction plans shall be kept. The shack shall be large enough to keep **"AS-BUILT"** plans and provide access to City inspectors and engineers as required.

The contractor shall keep on the job site a full size copy of the drawings and specifications, and shall at all times give the engineer access thereto.

B. STORAGE AREA

The City will provide an open storage area to the Contractor at a site adjacent to the construction site. The contractor will restore the storage area to its original condition at the end of the job. The contractor will provide security, as necessary, to safeguard its materials and machinery during construction.

1.3 SAFETY

In addition to Paragraph 3.06 “Safety” of the General Provisions, the contractor shall:

A. WORK HAZARD ANALYSIS

The contractor and their subcontractors shall thoroughly review the scope of work of the proposed project.

The contractor will be responsible to indicate a work hazard analysis on the form of "Contractor's Work Hazard Analysis Report" attached with the proposal; i.e., any known or potential safety issues or phases of construction that may require specific safety procedures as identified by WISHA or OSHA regulations, and/or prudent construction practices; i.e., shoring, fall protection, scaffolding, hazardous materials, asbestos removal, etc.

This report shall be completed and submitted to the engineer before the preconstruction conference. A copy of this report will be forwarded to the City Safety Officer for review. A copy of this report shall be maintained at the work site (accessible to the supervisor).

The City will review the submitted report and may require the contractor to clarify their safety procedures submitted or detail their procedures for ensuring safe working conditions for other working conditions not listed in the original submitted report; and/or explain how the procedures meet current safety regulations. In no case, may the contractor commence work until the Job Hazard Analysis Report has been reviewed and approved by the engineer.

1.4 DUST CONTROL

The contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant.

1.5 TEMPORARY DRAINAGE PROVISIONS

Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property.

1.6 POLLUTION CONTROL

The contractor shall follow all of the provisions listed in the attached Pollution and Erosion Control Plan (PECP) and corresponding appendices included in the back of this specification and maintain a copy of the plan on site whenever construction is in progress. Should the erosion and sedimentation control measures initially installed prove to be inadequate, the contractor shall immediately install additional facilities as necessary to protect adjacent properties, sensitive areas, natural water sources and/or storm drainage systems.

The contractor shall identify a Pollution Control Inspector who will be on-site, or on-call and readily accessible to the site, at all times while construction activities are occurring that may affect the quality of ground and surface water.

The Pollution Control Inspector shall have the authority to ensure proper implementation of this Plan, and impose additional corrective actions necessary because of changing field conditions. If the Pollution Control Inspector issues an order necessary to implement a portion of this Plan to prevent pollution from reaching the river, all of the contractor’s employees, shall immediately comply with that order.

No sanitary wastes will be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substances will be permitted to enter sanitary sewers and reasonable measures will be taken to prevent such materials from entering any drain or watercourse.

The contractor shall maintain oil absorption pads on the actual job site whenever any equipment is present to immediately catch and contain any oil and/or fuel leaks.

END OF SECTION

SECTION 01600 - MATERIAL AND EQUIPMENT

1.1 QUALITY OF WORKMANSHIP AND MATERIAL

A. WORKMANSHIP

The contractor shall employ only competent, skillful, and orderly persons to do the work. If, in the engineer's opinion, a person is incompetent, disorderly or otherwise unsatisfactory, the engineer shall notify the contractor, in writing, of same. The contractor shall immediately discharge such personnel from the work and shall not again employ those person(s) on said contract again. Work shall conform to the highest industry standards.

See General Provisions, Paragraph 3.08 - Contractor - Supervision and Character of Employees for additional requirements.

B. MATERIALS

Materials shall be delivered to the project site in the manufacturer's original containers, bundles or packages unopened with the seals unbroken and the labels intact. Each type of material shall be of the same make and quality throughout. Manufactured articles, materials and equipment shall be installed in accordance with each manufacturer's written directions, unless otherwise specified.

All materials and equipment to be provided under this contract shall conform to the latest edition of the applicable codes, but in no case shall be contrary to the laws of the State of Washington and/or Federal Government.

The equipment supplied shall meet appropriate ANSI, OSHA, WISHA, and all Federal, state, and local standards for the type of equipment provided for its intended use.

Deliver, store and handle products according to manufacturer's written instructions, using means and methods that will prevent damage, deterioration, and loss, including theft.

1. Schedule delivery to minimize long-term storage and to prevent overcrowding construction spaces.
2. Deliver with labels and written instructions for handling, storing, protecting, and installing.
3. Inspect products at time of delivery for compliance with the contract documents and to ensure items are undamaged and properly protected.
4. Store heavy items in a manner that will not endanger supporting construction.
5. Store products subject to damage on platforms or pallets, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required.

END OF SECTION

SECTION 01700 - CONTRACT CLOSEOUT

1.1 DOCUMENTS REQUIRED UPON COMPLETION OF WORK

A. CLOSE OUT PROCEDURES

The contractor shall notify the engineer in writing when identified tasks are complete and ready for inspection. The engineer will make the inspection, forward the results of same to the contractor, who shall promptly correct any deficiencies noted.

The contractor shall notify the engineer in writing when all punchlist deficiencies have been completed. The engineer will promptly set a time for final inspection, at which time the engineer and the contractor shall jointly inspect the work. The contractor will promptly correct any deficiencies noted.

It is possible that other contractors or the City will be working in the project area during the time of construction. It shall be the responsibility of this contractor to coordinate their work with all other agencies and/or contractors within the project area.

B. FINAL DOCUMENTATION

Upon completion of the work and before final payment is made, the contractor shall deliver to the engineer, in addition to such other items specified in these specifications, the following documents:

1. "AS-BUILT" Drawings

   "AS-BUILT" drawings and specifications of new or revised existing work, shown in red ink, provided by the general, mechanical, electrical contractors, and all other subcontractors, including all addendum's, change orders, deviations, changes, elevations, and dimensions of their work from the construction documents, updated monthly during the construction. Monthly payments will not be made until all as-builts are updated.

   Two (2) copies of all shop and construction drawings used for the project, the final record drawings ("AS-BUILT" to reflect the actual installation) including one (1) reproducible set of all design drawings and AutoCAD files, if applicable.

   NOTE: The final payment for this contract will not be released until "AS-BUILT" drawings are received and approved by the engineer.

2. Maintenance and Operation Manuals

   Three (3) complete sets of maintenance and operation manuals and supplement drawings and one (1) electronic manual (.pdf), if necessary, for the care and maintenance of materials and equipment items installed. These manuals shall be prepared by the manufacturer's representatives, and collected and bound in one (1) brochure by the general contractor. The contractor shall also instruct the City's maintenance personnel to such care and maintenance as directed by the manufacturers.

   This manual shall include all air handling equipment, air balancing data, electrical and mechanical equipment. It shall also include all appliances, products selected and other material as herein specified.

   The electronic manual shall be formatted as follows:

   a. Electronic manuals must be submitted in .PDF and compatible with the latest version of Adobe Professional.

   b. Manuals should be scanned at 300 DPI.

   c. Color originals should be scanned to color images if possible.

d. All .PDF files should be scanned at using Optical Character Recognition (OCR)

e. A manual must be submitted as a single .PDF file; addendums and attachments (may or may not include drawings) should not be submitted separately, or in different file formats.

f. Manuals that consist of multiple volumes should be submitted as individual files.

g. Manuals comprised of several sections or chapters should be bookmarked by the vendor.

h. If a vendor wished to include security settings (so that their documents are “read-only”), that is acceptable provided that Tacoma Power can view and print from the file.

3. All Guarantees and/or Agreements

   a. All guarantees, warranties, and/or agreements for such equipment and materials as carry such guarantees.

   b. The contractor shall submit to the City at the completion of the project per the attached a "Roofing Contractor's Warranty" for each structure, guaranteeing the roof for a period of twenty (20) years. Any defect or leak that occurs during a twenty (20) year period shall be promptly remedied by the contractor at no expense to the City. Roofing manufacturer shall supply twenty (20) year warrantee.

4. Final Clean Up

   a. After all trades have completed their work, and just prior to occupancy, the general contractor shall:

   b. Vacuum clean the interior of building.

   c. Leave the entire building perfectly clean and ready for occupancy.

   d. Dust removal of all interior surfaces.

   e. Removal of all temporary facilities and contractor equipment.

   f. Remove labels that are not permanent.

   g. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication.

   h. Clean the site. Rake grounds to a smooth, even textured surface.

All surfaces disturbed shall be restored to a condition equal to that before the work began.

Clean up is considered incidental to the project and no measurement and payment will be allowed.

END OF SECTION

SECTION 01950 - COLOR SCHEDULE

PART 1 GENERAL

1.1 SUMMARY

This section includes approved colors and finishes.

1.2 SUBMITTALS

Submit under provisions of Section 01300 – Submittals and Shop Drawings color samples as specified by each section. Color Board Required

1.3 COLOR SCHEDULE

Contractor shall coordinate with City to facilitate the development of a color schedule. Samples shall be submitted for the entire project at one time and shall include: roofing, siding and trim, gutters, downspouts, doors, interior wall paint, FRP panels and sealant.

PART 2 PRODUCTS

2.1 MANUFACTURERS/PRODUCTS

A. As specified in each section or as listed herein, Manufacturer's name shall be listed in the Color Schedule and indicate color matching guarantee of the approved products – regardless of different manufacturers.

B. Substitution requests: Submit under provisions of each section in accordance with Section 01300 – Submittals and Shop Drawings.

PART 3 EXECUTION

NOT USED

END OF SECTION

TECHNICAL PROVISIONS

DIVISION 2 - EARTHWORK

SECTION 02110 - PROTECTION OF ENVIRONMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section covers, but is not limited to the following:

1. Requirements (if deemed necessary during construction) for dewatering excavations. An example of this condition is if the contractor preforms foundation work in wet weather and standing water is found within the footprint of the building or within the utility trenches which were previously demolished and prepared by the City.

B. RELATED WORK SPECIFIED ELSEWHERE

1. Section 02200 - Earthwork

1.2 SUBMITTALS

A. DESCRIPTION OF DEWATERING PLAN

The contractor shall submit drawings showing the arrangement, location, and other data with the operation procedures of a proposed dewatering system, if required, for the excavations, fourteen (14) days before installation is required.

The system shall conform to all applicable Federal, State, and local regulations.

PART 2 PRODUCTS

The contractor is responsible for the selection and adequacy of all materials and equipment used for dewatering and water quality control systems.

PART 3 EXECUTION

3.1 DRAINAGE OF EXCAVATED AREAS

Divert the water into sumps, so that it can be drained or pumped out of the excavations, as approved by the Project Engineer and in conformance to all applicable Federal, State, and local regulations.

END OF SECTION

SECTION 02200 - EARTHWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grading and Excavation

B. Backfill and Compaction

PART 2 PRODUCTS

2.1 FILL MATERIALS

The Rock Products required for this project include the following:

A. Bank run materials (WSDOT 9-03.19)
   • Back fill material if required by engineer

B. 5/8 inch minus (WSDOT 9-03.9(4))
   • Capillary break

D. Conduit and pipe bedding (WSDOT 9-03.13)

E. 1 ½ inch drain rock (WSDOT 9-03.1(4) c AASHTO Grade #4))
   • Footing drain backfill

PART 3 EXECUTION

3.1 BACKFILL AND COMPACTION

Water existing in the excavated area shall be removed by pumping or other means before backfilling.

The scarified and moisture-conditioned subgrade and subsequent structural fill placed beneath any cast-in-place concrete should be compacted to at least 95-percent. The terms "compacted and compaction" refer to relative compaction as determined by ASTM Test Designation D1557. Fill and foundation backfill should be brought to optimum moisture and placed in lifts not exceeding 8-inches in uncompacted thickness. If select fill is used, the required degree of compaction should be achieved at or near optimum moisture content. Compaction shall be performed by mechanical means only.

All areas requiring fill shall be proof rolled with a heavy vibratory compactor following removal of all topsoil, organic debris, and loosened soil. Proof rolling shall be carefully monitored, and any areas exhibiting significant deflection, pumping, or weaving that cannot readily be compacted shall be scarified properly moisture conditioned, and recompacted, or be over-excavated and backfilled in accordance with Paragraphs 3.2 and 3.5.

The contractor shall install and compact a uniform layer 5/8 minus crushed surfacing as called out on the drawings under all foundations, and slabs.

The contractor shall allow the City to test the density of the backfill at any point during the operation. If the density of the compacted backfill does not meet the specified requirements, the contractor shall continue compacting until the specified density is attained.

3.2 RECONDITIONING OF SUBGRADES

Where compacted subgrades that have been inspected and approved are disturbed by the contractor's subsequent operations or adverse weather, scarify the subgrades and compact to the required density prior to further construction thereon.

END OF SECTION

SECTION 02999 – GEOTECHNICAL REPORT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract including general and supplementary conditions and other Division 1 specification sections apply to this section.

B. Structural general notes on structural drawings.

1.2 SUMMARY

Soil data not available at this time. Contractor to assume the allowable soil pressure is 1500 psf. Geotechnical report will be available after slab is removed in forebay. Contractor shall proceed with construction based on information provided in the drawings and specifications. In the event that the contractor discovers conflicts between the design and the recommendations contained within the report that could have negative consequences, he shall immediately notify the engineer of the conflict so that a review and determination can be made by the design team.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

DIVISION 3 - CONCRETE

SECTION 03000 - CAST IN PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

Cast-in-place concrete including:

A. Formwork

B. Reinforcement

C. Placement

D. Finishing

E. Curing

F. Joints in concrete

All materials and workmanship shall be in accordance with ACI 304, ACI 318 and ASTM C94.

1.2 CONTRACTOR SUBMITTALS

A. JOINT SEALANT, JOINT DEVICES, AND CONCRETE SEALER

Prior to ordering the joint sealant, joint devices, and concrete sealer, the contractor shall submit to the engineer for the engineer's review, sufficient data to show general compliance with the requirements of the contract documents.

B. CERTIFIED DELIVERY TICKETS

1. Where ready-mix concrete is used, the contractor shall provide certified weighmaster delivery tickets at the time of delivery of each load of concrete.
2. Each certificate shall show the total quantities, by weight of cement, sand, each class of aggregate, admixtures, and the amounts of water in the aggregate and added at the batching plant as well as the amount of water allowed to be added at the site for the specific design mix.
3. Each certificate shall, in addition, state the mix number, total yield in cubic yards, and the time of day, to the nearest minute, corresponding to when the batch was dispatched, when it left the plant, when it arrived at the job, the time that unloading began, and the time that unloading was finished.

C. CONCRETE DESIGN MIX

The contractor shall submit each concrete design mix to the engineer seven (7) days prior to placing firm order.

D. REINFORCEMENT SHOP DRAWINGS

The contractor shall submit reinforcement shop drawings to the engineer fifteen (15) days prior to placing firm order.

PART 2 PRODUCTS

2.1 FORM MATERIALS

1. Materials for concrete formwork shall be suitable to achieve the finish requirements for formed surfaces specified and meet ACI 347, "Recommended Practice for Concrete Formwork".

2. Form coating, sealers and release agents shall not bond with, stain, nor adversely affect concrete surfaces, and shall not impair subsequent treatments (painting, etc.) of concrete surfaces.
3. Do not use formwork for any above grade exposed concrete that will not perform as well as new formwork. Do not patch formwork or used rust-stained form-facing material.

2.2 REINFORCEMENT

1. Reinforcing steel shall be ASTM A615, grade 60 or ASTM A706 grade 60 (where indicated) deformed bars fabricated in accordance with applicable ACI and CRSI codes.
2. Tie wire shall be heavy annealed black wire.
3. Anchor bolts, heavy hex nuts, and washers shall be ASTM A36 or A307 steel, hot dip galvanized after fabrication, unless noted otherwise on the drawings.
4. Welded wire fabric shall be ASTM A185-65.
5. Metal accessories including spacers, chairs, ties and other devices necessary for proper placement, spacing, supporting and fastening reinforcement in place shall conform to the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.

2.3 CONCRETE MATERIALS

1. All cast-in-place concrete shall be machine mixed, 3,000 pounds per square inch compressive strength in 28 days with 4 to 6-percent air entrainment.
2. Material and installation shall be in accordance with the Standard Specifications, ACI 304 and ASTM C94.

2.4 JOINT DEVICES AND FILLER MATERIALS

1. Engineer approved asphalt impregnated pre-molded joint filler board and mastic compound shall be used at foundation/sidewalk interface, sidewalk joints or as shown on the drawings.
2. Control joints shall be as called out on the drawings.

2.5 COMPOUND – HARDENER AND SEALER

Concrete sealant/hardener shall be J-17, manufactured by Dayton or Xypex.

PART 3 EXECUTION

3.1 FORMWORK

A. ERECT FORMS

1. All forms shall be set true to the lines designated, and the interior shape and dimension shall be such that the finished concrete shall coincide exactly as shown on the plans.
2. Provide bracing to ensure stability of form work. Shore or strengthen form work subject to over stressing by construction loads.
3. Forms shall be constructed to permit proper cleaning, and removal of chips, sawdust, and extraneous matter.
4. In no case shall any concrete be placed in any form until the form has been checked by engineer.
5. Form ties shall be so arranged as to allow the removal of all metal to a depth of not less than 1/2-inch below the concrete surface. Wire tie or clamping devices will not be allowed.
6. Standing water will not be permitted in the forms during the placing of concrete.

7. All forms are to be removed. Fill all tie holes and detection areas with dry pack cement mortar colored to match existing concrete surface. Built-in items shall be placed exactly where shown. Form design is the responsibility of the contractor. Coat all forms with approved form release compound for type of forms used.
8. Remove all dirt, dust, oil, release agents, stains, and other foreign matter forms from concrete floors prior to final finish.
9. All exposed corners shall have a 3/4-inch chamfer or 1/2-inch radius tooled edge, if approved by the Tacoma Power inspector, unless otherwise called out on the drawings.

B. APPLICATION - FORM RELEASE AGENT

1. Forms shall be oiled with a non-staining, colorless, mineral form oil acceptable to the engineer. The oil shall not impair natural bonding or color characteristics of any coatings intended for use on concrete.
2. The oil shall be applied several days before the concrete is placed and shall be in such quantity that it will be fully absorbed by the wood and will not discolor the surface of the concrete.
3. Apply form release agent on form work in accordance with manufacturer's recommendations and prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. INSERTS, EMBEDDED PARTS, AND OPENINGS

1. Provide formed openings where required for items to be embedded in passing through concrete work.
2. Locate and set in place pipe sleeves, drains, conduit, anchor bolts, or other embedments as called out on the drawings, which will be cast directly into concrete.
3. Embedded steel shall be placed as indicated on the contract drawings such that no movement is present during the placement of concrete. Care should be taken not to chip, mark, or otherwise destroy the galvanizing finish during construction. Do not displace or damage vapor barrier.
4. All anchor bolts shall be set plumb and accurate and held securely during the placing of the concrete. All anchor bolt settings shall be checked and approved by the engineer prior to pouring the concrete. All anchor bolts and nuts are to be hot dip galvanized, and the contractor shall take special care not to damage this coating. Damaged materials shall be replaced at the contractor’s expense. Threads of anchor bolts shall be protected by wrapping in tape or other technique for protection during concrete placement. Setting anchor bolts after placement of concrete will NOT be allowed.

D. FORM CLEANING

1. The contractor shall clean form work to remove all foreign matter adhering to the forms.
2. The forms shall be cleaned with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

E. FORM REMOVAL

1. In general, forms shall not be removed until ample time has elapsed after placement of the concrete to permit the development of the proper set. This period shall not be less than four (4) days for slab or foundations unless otherwise directed by the engineer.

2. In removing forms, care shall be taken to avoid damaging of concrete surfaces and especially to avoid damage to the tops of slabs exposed above ground. Methods of removal tending to produce shocks or jars or fractures of concrete will not be permitted.
3. Forms shall be completely removed unless in the discretion of the engineer the ground conditions or other considerations at a particular structure warrant leaving them in place.
4. In any case, removal of forms may not be done without the approval of the engineer, and the contractor shall arrange his stripping operations so that concrete surfaces will be exposed for inspection and any repairing of defects which may be necessary while the excavations are free from water and before the concrete surfaces become covered with soil.

3.2 REINFORCEMENT PLACEMENT

A. REINFORCEMENT STEEL

Reinforcement steel shall be accurately positioned as shown, and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections.

1. All reinforcement steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcement steel.
2. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used, in sufficient numbers to support the bars without settlement, but in no case shall such support be continuous.
3. All concrete blocks used to support reinforcement steel shall be tied to the steel with wire ties which are embedded in the blocks.
4. For concrete over formwork, the contractor shall furnish concrete, metal, plastic, or other acceptable bar chairs and spacers.

B. ACCESSORIES

1. The portions of all accessories in contact with the formwork shall be made of concrete, plastic, or steel coated with a 1/8-inch minimum thickness of plastic which extends at least 1/2-inch from the concrete surface.
2. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. BARS

1. Bars additional to those shown which may be found necessary or desirable by the contractor for the purpose of securing reinforcement in position shall be provided by the contractor at its own expense.
2. Unless otherwise specified, reinforcement placing tolerances shall be within the limits specified in Section 7.5 of ACI 318 except where in conflict with the requirements of the Building Code.
3. Bars may be moved as necessary to avoid interference with other reinforcement steel, conduits, or embedded items.
    a. If bars are moved more than one (1) bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be as acceptable to the engineer.

4. The clear distance between parallel bars shall be not less than the nominal diameter of the bars nor less than 1-1/3 times the maximum size of the coarse aggregate, nor less than 1-inch.
    a. The clear distance between the bars shall also apply to the distance between a contact splice and adjacent splices or bars.
5. Reinforcement bar splices shall only be used at locations shown. When it is necessary to splice reinforcement at points other than where shown, the character of the splice shall be as acceptable to and approved by the engineer.
6. The length of lap for reinforcement bars, unless otherwise shown, shall be in accordance with ACI 318, Section 12.15.1 for a class B splice.
7. Reinforcement shall not be straightened or rebent in a manner which will injure the material.
    a. Bars with kinks or bends not shown shall not be used.
    b. All bars shall be bent cold, unless other permitted by the engineer.
    c. No bars partially embedded in concrete shall be field-bent except as shown or specifically permitted by the engineer.
    d. No welding of reinforcement will be allowed (except where indicated at cross ties only).

3.3 CONCRETE PLACEMENT

A. Notify field engineer at least 24 hours before an intended pour in accordance with construction schedule.

B. SURFACE PREPARATION

1. Earth surfaces shall be thoroughly wetted by sprinkling, prior to the placing of any concrete, and these surfaces shall be kept moist by frequent sprinkling up to the time of placing concrete thereon.
2. The surface shall be free from standing water, mud, and debris at the time of placing concrete.

C. CONCRETE PLACEMENT

1. When placing of concrete is to be interrupted long enough for the concrete to take a set, the working face shall be given a shape by the use of forms or other means, that will secure proper union with subsequent work; provided that construction joints shall be made only where acceptable to the engineer.
2. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel, and preparation of surfaces involved in the placing have been completed and accepted by the engineer at least four (4) hours before placement of concrete.
3. All surfaces of forms and embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.
4. All reinforcement, anchor bolts, sleeves, inserts, and similar items shall be set and rigidly secured where shown on the drawings and shall be acceptable to the engineer before any concrete is placed. Embedded items shall be secured in a manner which allows the concrete to be finished and cured as called out on the plans and these specifications. Accuracy of placement is the responsibility of the contractor.

5. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or has been diverted by pipes, or other means, and carried out of the forms, clear of the work. No concrete shall be deposited underwater nor shall the contractor allow still water to rise on any concrete until the concrete has attained its initial set.
6. Water shall not be permitted to flow over the surface of any concrete in such manner and at such velocity as will injure the surface finish of the concrete. Pumping or other necessary dewatering operations for removing ground water, if required, will be subject to the review of the engineer.
7. Pipe, conduit, dowels, and other ferrous items required to be embedded in concrete construction shall be so positioned and supported prior to placement of concrete that there will be a minimum of two (2) inches clearance between said items and any part of the concrete reinforcement. Securing such items in position by wiring or welding them to the reinforcement will not be permitted.
8. Placing of concrete shall conform to the applicable requirements of Chapter 8 of ACI 304 and the requirements of this section.
9. Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these specifications, or which is of inferior quality, shall be removed and replaced by and at the expense of the contractor.
10. The temperature of concrete when it is being placed shall be not more than 90°F nor less than 40°F in moderate weather, and not less than 50°F in weather during which the mean daily temperature drops below 40°F.
    a. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature.
    b. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90°F, the contractor shall employ effective means, such as pre-cooling of aggregates and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90°F.
    c. The contractor shall be entitled to no additional compensation on account of the foregoing requirements.
11. Earth foundations shall be free from frost or ice when concrete is placed upon or against them. Fly ash concrete shall not be placed when the air temperature falls below 50°F.
12. As concrete is placed in the forms or in excavations, it shall be thoroughly settled and compacted, throughout the entire depth of the layer which is being consolidated, into a dense, homogeneous mass, filling all corners and angles, thoroughly embedding the reinforcement, eliminating rock pockets, and bringing only a slight excess of water to the exposed surface of concrete during placement.
    a. Vibrators shall be high-speed power vibrators (8000 to 10,000 rpm) of an immersion type in sufficient number and with (at least one) standby units as required.
13. Concrete shall be internally vibrated and at the same time rammed, stirred, or worked with suitable appliances, tamping bars, shovels, or forked tools until it completely fills the forms or excavations and closes snugly against all surfaces.
    a. Subsequent layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified.

b. Vibrators shall be provided in sufficient numbers, with standby units as required, to accomplish the results herein specified within 15 minutes after concrete of the prescribed consistency is placed in the forms.
c. The vibrating head shall be kept from contact with the surfaces of the forms.
d. Care shall be taken not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.4 CURING AND PROTECTION

A. A liquid membrane curing compound shall be applied immediately after the finishing operation has been completed.
B. The contractor shall protect all concrete against injury until final acceptance by the City. Fresh concrete shall be protected from damage due to rain, hail, sleet, or snow.
1. The contractor shall provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.
2. Immediately following the first frost in the fall, the contractor shall be prepared to protect all concrete against freezing. After the first frost, and until the mean daily temperature in the vicinity of the work site falls below 40°F for more than one (1) day, the concrete shall be maintained at a temperature not lower than 50°F for at least 72 hours after it is placed.
C. As soon as forms are removed, all exposed surfaces shall be carefully examined and any irregularities shall be immediately rubbed or ground in a satisfactory manner in order to secure a smooth, uniform, and continuous surface.
1. Plastering or coating of surfaces to be smoothed will not be permitted. No repairs shall be made until after inspection by the engineer. In no case will extensive patching of honeycombed concrete be permitted.
2. Concrete containing minor voids, holes, honeycombing, or similar depression defects shall have them repaired as specified herein. Concrete containing extensive voids, holes, honeycombing, or similar depression defects, shall be completely removed and replaced.
3. All repairs and replacements herein specified shall be promptly executed by the contractor at their expense.
D. The contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the City.
1. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade or which for any other reason does not conform to the requirements of the contract documents shall be satisfactorily repaired or removed and replaced with acceptable concrete at the contractor's expense.

3.5 FINISHES

A. Slabs with ponding water will not be accepted by the City.
B. Protect all concrete from rain. Pitted surfaces will not be accepted by the city.
C. All slabs shall be light-broom finished unless otherwise noted.
D. All exposed edges shall have a 3/4-inch chamfer or 1/2-inch radius tooled edge, if approved by the Tacoma Power inspector, unless called out otherwise on the drawings.
E. All concrete shall be free of burrs and ties during curing.

END OF SECTION

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07300 – BUILDING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

This section includes fiberglass batt insulation, extruded polystyrene insulation, and vapor barrier, products to be installed as called for on the contract documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Insulation for roofs and walls shall be unfaced fiber glass batt insulation and conform to ASTM C665, Type 1 as manufactured by Owens-Corning, Johns-Manville, Certainteed or other engineer approved equal.

B. Extruded Polystyrene Insulation: ASTM C578 Type VI cellular type, conforming to the following:

1. Board Density: 1.8 lb/cu. ft.
2. Board thickness: 2-inches.
3. Thermal Resistance: R of 5.0/inch
4. Water Absorption: In accordance with ASTM D2842 0.3 percent of volume maximum.
5. Compressive Strength: Minimum 25 psi

C. Sheet vapor barrier shall be polyethylene film for above grade application, 6 mil. Submit type to be used for engineer approval.

D. Non-Expanding Insulating Foam: Commercial grade, submit sample to the engineer for approval.

PART 3 EXECUTION

Insulation shall meet or exceed the requirements of the Washington State Energy Code and the City of Tacoma Conservation Office.

3.1 SCHEDULES

Bay	Location	R-Value	Type
1	Walls	10	Fiberglass Batt
1	Roof	10	Fiberglass Batt
2	Walls	10	Fiberglass Batt
2	Roof	10	Fiberglass Batt
3	Slab Interior	10	Rigid Insulation
3	Slab Edge	10	Rigid Insulation

3	Walls	19 15	Fiberglass Batt or Rigid insulation
3	Roof	30 20	Fiberglass Batt or Rigid Insulation
4	Slab Interior	10	Rigid insulation
4	Slab Edge	10	Rigid Insulation
4	Walls	19 15	Fiberglass Batt or Rigid insulation
4	Roof	30 20	Fiberglass Batt or Rigid insulation

3.2 INSTALLATION

A. Install insulation and vapor barrier in accordance with insulation manufacturer's instructions.

B. Install in exterior walls, roof and under slab without gaps or voids.

1. Do not compress insulation.

C. Trim insulation neatly to fit spaces.

1. Insulate miscellaneous gaps and voids.

2. Fit insulation tight in spaces.

D. Install with factory applied vapor barrier membrane facing warm side of building spaces.

1. Lap ends and side flanges of membrane between framing members.

E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

F. Place vapor barrier on side of insulation and directly beneath metal roof panels by stapling at 6-inches oc.

1. Lap and seal sheet barrier joints over member face.

G. Extend vapor barrier tight to full perimeter of adjacent door frames and other items interrupting the plane of membrane.

1. Tape seal in place.

H. Spray expanding insulation foam entire perimeter of any penetration to completely seal enclosures.

I. Install venting baffles at eaves and all truss openings to ensure air flow over insulation.

3.3 UNDER SLAB RADIANT FLOOR HEATING INSULATION

A. Typical under floor slab insulation shall be rigid insulation.

B. Typical slab perimeter insulation (Bays 3 and 4) shall be rigid insulation (minimum thermal resistance R-10). See plan sheets for extent.

3.4 THERMAL BREAK

A. Provide R-15 thermal break between wall girt and exterior skin or between P.E. frame/column and wall girt.

B Provide R-20 thermal break between roof purlin and exterior skin or between P.E. frame and roof purlin.

3.5 MISCELLANEOUS

A. Provide miscellaneous and accessory materials, methods, tools, and equipment required for completion of insulation work.

B. Sealing tape: Ideal, No. 375 or as approved.

END OF SECTION

SECTION 07900 – JOINT SEALERS

PART 1 GENERAL

1.1 SUMMARY

This section includes general interior sealant work in accordance with requirements of individual sections.

1.2 REFERENCES

ASTM C 790-90	Recommended Practices for Use of Latex Sealing Compounds
ASTM C 834-91	Specification for Latex Sealing Compounds
ASTM C 920-87	Specification for Elastomeric Joint Sealants

1.3 SYSTEM DESCRIPTION

A. Sealant systems installed with pressure gun. Include sealing of vertical and horizontal joints as required to make airtight

B. Regardless of terminology used on drawings, where "caulking" or "sealant" is called for, use specified sealant continuously to seal entire area and assembly.

C. All sealants used as a filter must meet or exceed standard regulations, with the following limits of VOC contents:

1. Sealants	VOC/Limit (grams/liter)
Architectural	250
Roofing Material Installation	450
PVC Welding	480
Other	420

2. Sealant Primers	VOC/Limit (grams/liter)
Architectural – Nonporous	250
Architectural – Porous	775
Other	750

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

1. Product data: Indicate type of sealant, chemical characteristics, performance criteria, limitations and color availability. Include manufacturer standard Material Data Safety Sheet (MSDS) for each sealant used highlighting VOC limits. Obtain approval from engineer before proceeding.
2. Samples
   a. Backer rods for vertical and horizontal applications
   b. Color samples of sealant proposed for work

B. Submit test reports in accordance with Section 01300.

1. Test sealant bond used at joints between adjacent assemblies or construction as required by the engineer. Submit results of testing in the form of a written report to the engineer prior to sealant work being performed.

1.5 DELIVERY, STORAGE AND HANDLING

Protect from intrusion of any contaminants and follow manufacturer's instructions.

1.6 PROJECT/SITE CONDITIONS

Environmental requirements:

A. Temperature: Minimum 40º F and rising

B. Moisture: Do no work when moisture is present or when surfaces to be sealed are wet.

C. Solvent curing sealants: Do not install in enclosed building spaces.

1.7 WARRANTY

Provide manufacturer's five (5) year warranty as specified herein

1.8 COLOR SCHEDULE

Provide approved colors, textures, patterns and other finish treatments as selected under provisions of Section 01300.

PART 2 PRODUCTS

2.1 GENERAL

A. Comply with contract documents and manufacturer's data. Where these may be in conflict, the more stringent requirements govern.

B. Color: Match approximate color adjacent surfaces, except as otherwise approved from engineer's samples or Section 01950.

C. Verify compatibility with back-up material before beginning work

2.2 MANUFACTURERS/PRODUCTS

A. Interior sealants: Provide following or approved equal

1. General sealant: Paintable, siliconized acrylic latex sealant, complying with ASTM C 834 or approved. Color as selected in accordance to individual sections and Section 01950.

B. AVAILABLE MANUFACTURERS

1. Sonneborn
2. Maco
3. Tremco
4. A. C. Horn
5. DAP
6. Pecora

C. MISCELLANEOUS MATERIALS

1. Joint cleaner: As recommended by sealant or caulking manufacturer for joint surfaces.
2. Joint primers: Non-corrosive and non-staining type, as recommended by sealant manufacturer for joint surface conditions encountered.
3. Bond breaker tape: Polyethylene tape/plastic tape recommended by sealant manufacturer, applied to sealant contact surfaces where bond to substrate or backer rod must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

4. Backer rods: Provide non-adhering type as recommended by sealant manufacturer and the following:
    a. Horizontal joints: Closed cell polyethylene foam rod.
    b. Vertical joints: Closed cell polyethylene foam or "soft rod" (skinned open cell) polyethylene foam
    c. Diameter: 1/3 greater than width of joint where it is to be installed.
    d. Polystyrene foam and open cell rods are not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

Be sure that surfaces are clean and dry before proceeding. Remove lacquers and protective films from metal surfaces.

3.2 PREPARATION

A. Clean and prime joints in accordance with manufacturer's instructions.

B. Remove loose materials and foreign matter which might impair adhesion of sealant

C. Verify that joint backing and release tapes are compatible with sealant

D. Perform preparation in accordance with referenced ASTM C 790 for latex base sealant. No solvent-release type materials permitted except as approved.

3.3 PROTECTION

Completely protect surfaces adjacent to joints. Apply masking around joints to protect adjacent surfaces from defacement and staining during sealing operations.

3.4 INSTALLATION, APPLICATION, PERFORMANCE

A. Install in accordance with contract documents and manufacturer's directions. Where these may be in conflict, the more stringent requirements govern. Seal joints at the following locations:

1. Joints of dissimilar materials
2. Horizontal joints
3. Other locations as detailed or required to make airtight. See requirements of individual sections.

B. BACKING FOR SURFACES

1. Where more than 3/4-inch wide pack with foam rod back-up material to within 1/2-inch of surface.
2. Where less than 1/2-inch wide, install foam rod back-up material to within 1/4-inch of surface.
3. Where less than 1/2-inch deep, apply bond breaker tape to bottom of joints to prevent adhesion of sealant to bottom of joint.
4. Provide backing materials in as long lengths as practicable; install with proper tools. Force backing into joint to proper depth for sealant.
    a. Do not insert with sharp objects. Backer rods must not be punctured.

C. SEALING

1. Apply sealant in accordance with manufacturer's directions and the following:

a. Install elastomeric sealants in joints to size and shape indicated with slight concave surface and depth equal to 50-percent of normal joint width, but not more than 1/2-inch and not less than 1/4-inch (dimension requirements may vary slightly between manufacturers).

b. Install non-elastomeric sealants to size and shape indicated or with slightly concave surface and depth from 75-percent to 125-percent of normal joint width

2. Examine installation carefully. Repair any areas where sealant is not properly adhered due to bubbles, foreign matter or other defects.
3. Seal joints before final coat of finish is applied to adjacent surfaces.
4. Provide positive contact to surfaces.

3.5 CLEAN UP

A. Remove excess material. Remove and dispose of masking materials. Leave surfaces neat, clean and smooth.

B. PROTECTION

1. Protect from dust, moisture and other harmful substances during installation
2. Protect all sealed joints for at least twelve (12) hours

END OF SECTION

DIVISION 8 – DOORS

SECTION 08100 - METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hollow Metal Door Frame for Exterior Door

B. Hollow Metal Door for Exterior Door

1.2 WARRANTY

A. Provide manufacturer's standard one (1) year warranty.

B. Certificates: Manufacturer's written certification attesting that each fire rated door and frame assembly has been designed and fabricated in accordance with NFPA Standard No. 80; tested in accordance to ASTM E-152; and bears a UL, Warnok Hersey, or FM label.

1.3 REGULATORY REQUIREMENTS

A. Comply with Mason County codes, ordinances, and other applicable regulatory requirements.

B. Fabrication and installation of frame assemblies: NFPA Standard No. 80.

C. Provide UL, Warnok Hersey, or FM label on all doors and frames scheduled to be fire rated. See door schedule on drawings for rating required.

1. Do not paint over surface applied labels.

PART 2 PRODUCTS

2.1 HOLLOW METAL DOOR FRAME

Hollow metal door frame shall be fabricated, reinforced, and installed in accordance with the Steel Door Institute and Door Hardware Institute requirements.

A. ACCEPTABLE MANUFACTURERS

1. Steel frame shall be compatible for 1-3/4-inch thick steel doors and have C type profile as manufactured by Curries Company, Mason City, lowa, or engineer approved other.
2. Other acceptable manufacturers include Ceco Door Products, Fleming, Republic Builders Products, and Steelcraft.

B. DOOR REQUIREMENTS

1. Frame to be fabricated of cold rolled steel of 16 gauge.
2. All joints to be welded and ground smooth.
3. All frames shall receive a factory baked-on coat of rust inhibitive primer.
4. Frame to be mortised, reinforced and drilled and tapped for all mortise finish hardware.
5. Frame to be reinforced only for surface mounted hardware, with drilling and tapping to be done in the field by the erection contractor.
6. Provide metal plaster guards for all mortised cutouts.
7. Minimum requirements for hardware reinforcements are to be as follows:

a. Hinge Reinforcing - 7 gauge x 1-5/8-inch x 10-inch
b. Lock Strike Reinforcing - 14 gauge
c. Closer Reinforcing - 12 gauge

2.2 STEEL DOOR

Hollow metal door shall be fabricated, reinforced, and installed in accordance with the Steel Door Institute and Door Hardware Institute requirements.

A. Hollow metal door shall be 747 series, factory primed full-flush seamless Type "F" and Type "HG", 3'- 0" x 7' – 0", 1-3/4-inch thick, insulated, located where shown on the plans.

B. ACCEPTABLE MANUFACTURERS

Hollow metal doors as manufactured by Curries Company, Mason City, Iowa or engineer approved equal.

C. DOOR REQUIREMENTS

1. Door shall be manufactured of the finest quality 16 gauge cold rolled stretcher leveled steel.
2. Door shall be of full flush construction and shall have continuous one (1) piece 20 gauge vertical steel rib stiffeners spaced not to exceed six (6) inches apart.
3. Lock rail to be one (1) piece full height 14 gauge channel.
4. Hinge rail to be one (1) piece full height 12 gauge channel formed and tapped for hinges.
5. Both channels shall be continuously arc welded to face sheets full height.
6. All spaces between ribs shall be insulated with fiberglass insulation.
7. Both top and bottom of doors are to receive 16 gauge closure channels.
8. Doors shall be beveled (1/8-inch in 2-inch) lock edge.
9. Minimum hardware reinforcements shall be as follows:
   a. Closures: 12 gauge channel (5-inch x 16-inch)
   b. Overhead Holders: 12 gauge channel (5-inch x 24-inch)
   c. Rim Panics: 14-inch gauge channel (5-inch x 18-inch)
   d. Butts and Locks as previously specified herein
   e. Checks and Pivots: 7 gauge x template requirements
10. All doors and frames shall be factory primed and finished using baked-on silicone alkyd enamel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install hollow metal frame in accordance with ANSI/SDI-100 and DHI.

B. Frame shall be thoroughly de-greased and cleaned of all imperfections before painting.

C. Hollow metal doors shall be fabricated, reinforced and installed in accordance with Steel Doors Institute and Door Hardware Institute requirements.

D. Adjust all doors for smooth and balanced door movement.

E. Maximum diagonal distortion (warp) shall not exceed 1/8-inch, measured with straight edge or taut string, corner to corner, over an imaginary 36-inch by 84-inch surface area.

F. Maximum vertical distortion (bow) shall not exceed 1/8-inch, measured with straight edge or taut string, top to bottom, over an imaginary 36-inch by 84-inch surface area.

G. Maximum width distortion (cup) shall not exceed 1/8-inch, measured with straight edge or taut string, edge to edge, over an imaginary 36-inch by 84-inch surface area.

H. Adjust all doors for smooth and balanced door movement.

END OF SECTION

SECTION 08600 - DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

The work to be performed under this section includes the procurement and installation of the door hardware required for the doors as shown on the drawings and as specified herein.

1.2 REFERENCES

A. CODES AND STANDARDS

All work shall conform to the following codes, regulations and standards of latest issue:

ANSI/NFPA NO. 80 FIRE DOORS AND WINDOWS, 1996

ANSI/NFPA NO. 101 LIFE SAFETY CODE 1994

UL 10C - Underwriters Laboratories, “Positive Pressure Fire Tests of Door Assemblies

1.3 RELATED SECTIONS

Section 08100 – Metal Doors and Frames

1.4 CONTRACTOR SUBMITTALS

Submit under provisions of Section 01300 – Submittals and Shop Drawings.

A. FINISH HARDWARE SCHEDULE

1. List hardware schedule for each door opening separately. Schedule is to include all quantities, part numbers, sizes and finishes. Provide copies of catalog cuts for each item included in the individual Hardware Group (see 3.4). Provide physical samples when requested by the engineer.
2. Acceptance of the hardware schedule does not relieve the supplier of responsibility for errors or omissions. The contractor must assure the compatibility and functionality of all hardware supplied.

B. TEMPLATES

Upon receipt of reviewed schedule, supply templates or physical hardware to fabricator of factory prepared doors, frames, and other work affected.

C. SPECIAL TOOLS

1. The contractor is to provide to the owner two sets of any special tools shipped with the finish hardware products required for maintenance and installation.
2. Deliver to owner at completion of work.

D. WARRANTY

1. The finish hardware shall carry a limited warranty against defects in workmanship and operation for a period of one year from date of substantial completion.
2. Where the manufacturer’s warranty exceeds one (1) year, the longer period shall apply to this project.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Tag each item or package to clearly identify the item and its intended location. Provide a packing list which clearly indicates the carton location of each item.

B. Inventory hardware jointly with contractor and hardware supplier's representative until both parties are satisfied that the count is correct. A dry, locked storage space shall be provided for the checking, sorting and storage of the hardware.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Provide products listed in the Hardware Schedule in sufficient quantities to complete the job requirements. No requests for substitution will be accepted prior to bidding.

1. Butts and hinges: Hagar
2. Locks and cylinders: Best (no substitution)
3. Mortise locks: Best (no substitution)
4. Overhead closers: LCN (no substitution)
5. Flat goods and trim: Ives, Rockwood, Trimco
6. Thresholds and gasket: Pemko, National Guard
7. Overhead stops and holders: GJ, Rixson

B. SUBSTITUTIONS

Substitutions must fully comply with specification.

2.2 HARDWARE FINISH

Finish of Locksets will be US26D (626). Except as noted otherwise in the schedule, other items of finished hardware shall be of a finish and texture to match the lockset finish. Closers will have manufacturer's standard finish system unless plated closes are specified. The designations used for the hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes".

2.3 BUTTS

A. Type: As scheduled.

B. Size: 3-feet-4-inches wide and under - 4-1/2-inch x 4-1/2-inch. 3-feet-4-inches wide and over 5-inches x 4-1/2-inches. Provide wide throw hinges where required due to trim applications or other conditions. Provide heavy duty hinges for heavily used locations.

C. Quantity: 3 each up to and including 90-inches in height. Add 1 additional hinge for every additional 30-inches or fraction thereof. For unusual size or weight doors, furnish type, size, and quantity recommended by manufacturer.

D. All locking out swinging doors to have non-removable pins.

2.4 LOCKSETS

A. All locksets and latchsets shall be the product of one manufacturer with functions as indicated in the hardware groups. All locksets shall be ANSI/BHMA A156.2 Series 1000 Grade 1 as indicated, and shall be UL listed for use on fire-rated doors.

B. Backset: 2-3/4-inch

C. Locksets and latchsets shall be furnished with strikes having a sufficient strike lip to protect trim.

2.5 KEYING

A. All cylinders are to be Best inter-changeable core type. Provide temporary cores for all locks for the contractors use during construction as requested. Temporary cores are the property of the hardware supplier and are to be returned to supplier upon the installation of the permanent cores. Owner shall install final, permanent cores.

B. Provide six (6) construction keys for contractor's use.

2.6 DOOR CLOSERS, SURFACE

A. Furnish drop plates or other mounting plates where required. Provide Closer of proper size and mounting style for each opening.

B. Furnish sex nuts and bolts for all doors.

C. Provide as specified in hardware groups.

2.7 GASKET AND THRESHOLD

A. Types as specified in hardware groups.

B. Provide material of proper size and configuration for the specified opening.

C. Fire assemblies will comply with the requirement of UBC Standard 7-2.

PART 3 EXECUTION

3.1 HARDWARE INSTALLATION

A. Installation shall be by skilled craftsmen experienced in the installation of commercial builders Hardware, and shall be in accordance with the approved shop drawings of sections 08100 – Metal Doors and Frames.

1. Manufacturer's standard locations shall apply except as otherwise directed by the Project Engineer or as required to meet applicable code requirements.

2. Where cutting and fitting are required to install hardware onto or into surfaces that are later to be finished, coordinate removal, storage and reinstallation with the finishing work specified.

3. Do not install surface-mounted items until finishes have been completed on the substrates involved.

B. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

C. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

D. Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Section 07900 – Joint Sealants.

E. Weather-stripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.2 ADJUSTING, CLEANING AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit.

1. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

2. Where hardware is installed more than one month prior to the acceptance or occupancy of a space or area, the installer is to return to the installation during the week prior to the acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area.
3. Clean operating items as necessary to restore proper function and finish of hardware and doors.
4. Adjust door control devices to compensate for the final operation of the heating and cooling equipment.
5. Clean any adjacent surfaces soiled by hardware operation.

3.3 HARDWARE SCHEDULE

A. Refer to door schedule and related information concerning the following hardware groups. Quantities indicated in any instance are for supplier convenience only and are not guaranteed.

B. HARDWARE GROUPS

NOTE: Where thresholds are specified, the Hardware Supplier is to verify the floor conditions and provide the proper threshold to meet the labeling requirements and the conditions.

3.4 HARDWARE GROUPS

HW 01				
1	EA	Butts	HA	1168NRP
1	EA	Lockset (store room function)	BE	45H7D16H
1	EA	Closer	LCN	4040XP
1	EA	Floor stop (with hook)	RW	473
1	EA	Threshold	PE	254X226AV
1	EA	Gasket	PE	2892AV

END OF SECTION

DIVISION 9 - FINISHES

SECTION 09100 – FIBER REINFORCED PLASTIC

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fiber Reinforced Plastic

1.2 SUBMITTALS

A. General: Submit each item in this article according to the conditions of Section 01300 – Submittals and Shop Drawings.

B. Product Data: For each type of product indicated.

C. MANUFACTURER'S DATA

1. Submit manufacturer's specifications and installation instructions for each product required.
2. Include reports and other data as may be required to show compliance with these specifications.
3. Indicate by transmittal form that a copy of each instruction has been distributed to the installer.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

PART 2 PRODUCTS

2.1 MANUFACTURERS

Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:

A. Gypsum Board and Related Products

1. American Gypsum Co.
2. G-P Gypsum Corporation
3. National Gypsum Co.
4. United States Gypsum Co.
5. Fiberock – Aqua Tough Sheathing and Underlayment – Ceramic Tile Backerboard
6. Or engineer approved substitute.

2.2 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Water-Resistant Gypsum Backing Board: ASTM C630/C630M, Type X

1. Thickness: 5/8-inch, typical, unless specifically indicated otherwise on drawings.
2. Long Edges: Tapered

2.3 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475.

B. INTERIOR GYPSUM WALLBOARD

Joint compound shall be special water resistant type compound. For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Pre-filling: At open joints, rounded or beveled panel edges, and damaged surface areas use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat use setting-type, sandable topping compound.
4. Finish Coat: For third coat use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 4 finish use setting-type, sandable topping compound.

C. Water-Resistant Gypsum Wallboard: Joint compound shall be special water-resistant type for treatment of joints, fastener heads and cut edges.

1. Products: Subject to compliance with requirements, provide Sheetrock Brand W/R compound, United States Gypsum Co, or engineer approved equal.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with installer present, and including welded hollow metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. WALL/PARTITION SUPPORT SYSTEMS

1. Install supplementary framing, blocking and bracing to support fixtures for contract related work which cannot be adequately supported on gypsum base alone.
2. Isolate stud system from transfer of structural loading to system, both horizontally and vertically.

a. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.

3.2 APPLYING AND FINISHING GYPSUM PANELS – GENERAL

A. PRE-INSTALLATION CONFERENCE

Meet at project site with installers of related work and review coordination and sequencing of work to ensure that work concealed by gypsum drywall has been accomplished and that openings, supplementary framing and blocking and similar provisions have been completed.

B. ASTM C840 and GA-216

C. Install gypsum panels with face side out.

1. Butt panels together for a light contact at edges and ends with not more than 1/16-inch of open space between panels.
2. Do not force into place.

D. Locate edge and end joints over supports.

1. Do not place tapered edges against cut edges or ends.
2. Stagger vertical joints on opposite sides of partitions.

E. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

1. Fit gypsum panels around ducts, pipes, and conduits as applies.

F. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

1. Space screws a maximum of 12-inches O.C. for vertical applications.

3.3 PANEL APPLICATION METHODS

A. SINGLE-LAYER APPLICATION

1. Partitions/Walls: Apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing) and minimize end joints.
   a. Stagger abutting end joints not less than one framing member (16-inches) in alternate courses of board.
   b. Install panels horizontally unless otherwise indicated or required.

B. Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

A. GENERAL

For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. EDGE TRIM

1. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed.
2. Provide type with face flange to receive joint compound.
3. Install L-type trim where work is tightly abutted to other work.

C. CONTROL JOINTS

1. Install control joints at locations indicated or as recommended by manufacturer.

2. Install control joints according to ASTM C840 and in specific locations approved by Architect for visual effect.
3. Spacing: In continuous surfaces control joints shall be installed at maximum spacing as follows:
    a. Interior surfaces: 30-feet O.C.
    b. Verify locations with engineer prior to installation.

3.5 FINISHING GYPSUM BOARD ASSEMBLIES

A. GENERAL

1. Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
2. Promptly remove residual joint compound from adjacent surfaces.

B. Pre-fill open joints, rounded or beveled edges, and damaged surface areas by using type of compound recommended by manufacturer.

C. Apply joint tape over gypsum board joints except those with trim having flanges not intended for tape.

D. GYPSUM BOARD LEVELS

Gypsum Board Levels: Finish panels to levels indicated below, according to ASTM C840 for locations indicated.

1. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

E. Water-Resistant Gypsum Board: Comply with requirements of finishing for gypsum board except use water-resistant joint compounds.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

The work under this section includes preparation and painting or finishing of all new interior surfaces, except as specifically excluded or scheduled not to be painted.

1.2 REFERENCES

ASM	Architectural Specifications Manual, Painting, Re-Painting, Wall Covering and Gypsum Wallboard Finishing, (1997 Edition)
SSPC	Steel Structures Painting Council

1.3 SUBMITTALS

A. Submit in accordance with Section 01300 - Submittals and Shop Drawings.

B. PRODUCT DATA

Submit complete product list

1. Arrange in same format as scheduled in this section
2. Include manufacturer's publications, performance criteria, recommendations, and limitations.
3. Show conformance to specifications including ASM and SSPC requirements.
4. Include additional information requested by engineer.

C. SAMPLES

1. Color chips: Manufacturer's complete selection
2. Color samples: Size not less than 8-inches x 10-inches on heavy card stock.
   a. Show colors, specified Section 01300, Paragraph 1.3.F and gloss level specified in this section.
   b. Furnish additional samples as required until colors, finishes, and textures are approved.
   c. Retain approved samples for reference.

D. Subcontractor's written qualifications: Furnish written qualifications attesting to past satisfactory experience. List last three (3) jobs. Include following information:

1. Start and completion dates
2. Project manager, telephone number

1.4 QUALIFICATIONS

A. APPLICATOR

1. Employ only qualified journeymen. Apprentices may be employed to work under direction of qualified journeymen, in accordance with trade regulations.
2. Maintain full competent crew

B. Manufacturers and materials: Listed by ASM, except as otherwise scheduled.

1. Use approved product numbers and finish system codes specified and listed by ASM for each manufacturer.

2. Do not substitute without engineer's written approval.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver in unopened containers, bearing manufacturer's original labels.

B. Store in accordance with manufacturer's instructions and as required by governing codes and ordinances

1. Store and mix material outside building

C. Toxic and explosive materials: Take appropriate safety precautions conforming to manufacturer's instructions, codes and ordinances, ASM, and other applicable industry standards.

1. To prevent fire hazards and spontaneous combustion, place cotton waste, cloths, and other hazardous materials in containers.

2. Daily remove from site.

1.6 PROJECT SITE CONDITIONS

A. Environmental requirements: Do no work under this section when surface or air temperatures are below 40º F or below manufacturer's recommended temperatures for conditions of installation.

B. Ventilation: Verify adequate continuous ventilation as recommended/required by the manufacturer.

C. Illumination: Temporary lighting to attain lighting level of 80 foot candles measured at mid-height at substrate surfaces.

1.7 WARRANTY

A. Guarantee work of this section against ordinary wear and usage for two (2) years from date of substantial completion of the work

B. Warrant work to be in accordance with specifications, standards, and requirements incorporated in referenced ASM.

1.8 EXTRA STOCK

Leave a minimum of one (1) unused gallon of each type and color of paint and other coating products for maintenance purposes.

A. Label for positive identification with minimum 1/2-inch press type, tape over with clear tape, and include color number and name.

B. Store where directed.

C. Turn over to City at job site and obtain signed receipt.

D. Include MSDS (material safety data sheets) with each container of product to City.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. AVAILABLE PRODUCTS

Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, products listed in other Part 3 sections.

B. MANUFACTURER'S NAMES

1. ICI Paints (ICI Paints)

2. Kelly-Moore paint Co. (Kelly Moore)
3. Parker Paint Mfg. Co., Inc. (Parker)
4. Benjamin Moore & Co. (Benjamin Moore)

2.2 PAINT MATERIALS - GENERAL

A. MATERIAL COMPATIBILITY

Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. MATERIAL QUALITY

Provide manufacturer's best quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint material containers not displaying manufacturer's product identification will not be acceptable.

C. PERFORMANCE REQUIREMENTS

All paints used shall comply with Green Seal product standard with VOC limits as follows:

Paints	VOC Limit (Grams/Liter)
Interior Coatings:	
Non-Flat	150
Flat	50

PART 3 EXECUTION

3.1 EXAMINATION

A. Arrange for required lighting, temporary heat, and ventilation.

B. Conduct substrate-moisture content test using an approved electronic moisture meter, if required by engineer. Assure that moisture content does not exceed limits indicated by ASM, Article 3.4, including the following:

1. Gypsum wallboard: 17-percent

3.2 MATERIALS TO BE FINISHED

Furnish all materials, except as specifically excluded or specified in other sections. See finish schedule for any rooms not required to be painted.

A. Mechanical and electrical items: Paint out conduit and other such items to match color of adjacent surfaces

3.3 MATERIALS NOT TO BE FINISHED

The following receive no finish except as specifically indicated:

A. METALS AS LISTED

The metal building including sheet metal roof and siding, purlins, girts, steel columns and rafters, miscellaneous sheet metal clips, rods, etc.

B. Materials having complete factory finish, such as electrical switch plates, lighting fixtures, finish hardware, and the like.

3.4 OTHER TRADES

Unless otherwise indicated, following surfaces are the responsibility of other trades

A. Shop primer coats of metal fabrications: Includes miscellaneous metals, sheet metal, and other shop prime coated metal items, except for minimal spot touch-up surfaces abraded during installation.

3.5 INTERIOR PAINTING AND FINISHING SCHEDULE

A. FERROUS METAL

Provide the following finish system over ferrous metal:

1. Two (2) finish coats over one (1) primer coat.
    a. Primer: Rust-inhibitive metal primer, water-thinned, Kelly-Moore 1725 Acry-Shield, 100-percent Acrylic Metal primer, dry film thickness not less than 1.5 mils.
    b. Finish Coat: Water thinned, Kelly-Moore 1685 Dura-Poxy+, Semi-gloss Acrylic Enamel, dry film thickness not less than 1.3 mils per coat.

B. GYPSUM AND PLYWOOD WALLS

1. Apply two (2) coats Kelly-Moore 95-100 Pre-Cote Latex Primer/Sealer. Applied over interior gypsum wallboard and plywood surfaces prior to finish coating. Dry film thickness not less than 1.4 mils per coat.
2. Apply two (2) coats Kelly-Moore 1686, Dura-Poxy+ Acrylic Enamel Eggshell, <150 g/1 VOC, 1.7 mils dry film thickness.

3.6 PATCHING

As work is completed in bay areas, repair surfaces damaged by other trades and requiring touch-up or refinishing.

3.7 APPLICATION (INTERIOR)

A. Perform work in accordance with contract documents, references, codes, and manufacturer's instructions. Where these may be in conflict, the more stringent requirements govern.

B. Application and workmanship: Conform to "Premium Grade" quality standards in accordance with Architectural Specifications Manual (ASM).

1. Minimum two (2) finish coat applications over prepared and primed substrates unless specifically indicated otherwise. Apply more coats as required to completely cover holidays or color irregularities.

C. Apply paint and other finish by methods generally accepted by the trade to achieve approved finishes.

1. Do not apply finishes on surfaces until sufficiently prepared and dry.
2. Include as many coats as necessary for complete coverage and acceptable appearance, but not less than number of applications indicated.
3. Consult referenced Architectural Specifications Manual (ASM) and Steel Structures Painting Council (SSPC) for surfaces not specifically mentioned in this section. Confirm with engineer.

D. Film thickness tests: Verify mil thickness by use of a suitable wet film gauge. Test surfaces using Tooke, or approved dry film gauge.

3.8 CONTINUOUS CLEAN UP

A. As work proceeds, and on completion of work promptly remove all spilled, splashed, or splattered products so as not to damage surfaces.

B. Keep premises free from any unnecessary accumulation of tools, equipment, surplus materials, and debris.

3.9 GLOSS LEVEL OF FINISHES

Provide indicated gloss level stated, regardless of ASM product number specified.

3.10 REFERENCED PRODUCT NUMBERS AND FINISH SYSTEM CODES

Finish system codes and product numbers are as referenced from the Architectural Specification Manual (ASM) unless otherwise indicated.

3.11 FIELD QUALITY CONTROL

Conform to referenced ASM standards for "Premium" material and work, unless otherwise indicated.

3.12 CLEAN UP

A. At conclusion of project, thoroughly clean paint and splatters from surfaces including adjacent surfaces. Take care not to scratch or otherwise damage surfaces. Verify chemical compatibility of cleaners to be applied to materials to be cleaned.

B. Leave premises net and clean; free from debris and residue from work of this section.

END OF SECTION

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION 13100 - PRE-ENGINEERED METAL BUILDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal frames
B. Roof and wall purlins
C. Bracing
D. Connectors
E. Anchor bolts
F. Prefinished metal roofing, flashings and siding
G. Doors
H. Windows
I. Insulation
J. Partitions (Full height floor to frame)
K. Warranty

PART 2 PRODUCTS

2.1 FRAMING

A. Structural Steel Members: ASTM A36, A500, A529, A572, and Grade 50 per manufacturer's standard. Fabricated in accordance with AISC Specification for plate, bar, tube, and rolled structural shapes.

B. Anchor Bolts: ASTM A307 galvanized or better as specified by the foundation design. Building manufacturer shall provide the contractor with templates for all cast-in-place anchor bolts at the request of the contractor.

C. Bolts, Nuts, and Washers: ASTM A325, A490 or A307 galvanized per manufacturer's standards.

D. Welding Materials: All welding shall be in accordance with AWS D1.1 for the type required for materials being welded.

E. Grout: Grout shall be non-shrink type, pre-mixed compound consisting of non-metallic aggregate with cement, water reducing and plasticizing agents capable of developing compressive strengths per the building manufacturer and foundation designed specifications.

2.2 ROOF SYSTEM

A. ROOFING

Roll formed steel with a minimum yield of 50,000 psi with minimum 2-inch overlap, and 2-inch high standing seams spaced at 16-inches o.c. minimum.

1. Material and Coating: Minimum 24 gauge, Galvalume/Zincalume conforming to ASTM A792. Minimum coating weight shall be 0.5 ounce per square foot.
2. Finish Coating: Per paragraph 2.5 of this section
3. Attachment: Manufacturer’s concealed type, galvanized to ASTM A153 2.0 oz./sq. ft.

4. Uplift Rating: UL580 Class 90
5. Warranty: Twenty (20) years manufactured on finish, twenty (20) year contractor against leaks.

B. GUTTERS AND DOWNSPOUTS

1. Five (5) inch gutters and 5-inch by 3-inch downspouts 24 gauge minimum galvanized steel complete with all required outlet drops, elbows, and connecting hardware and meeting SMACNA requirements.
2. Finish shall match fascia.

C. INSULATION

1. The roof and walls shall be insulated with fiberglass blanket insulation faced on its exposed side with a white, reinforced polypropylene vapor barrier. See architectural plans for minimum R-values.
2. Insulation blanket shall have facing tabs for sealing side joints between adjoining rolls of the faced fiberglass.

2.3 SIDING SYSTEM

A. SIDING

Roll formed steel with a minimum yield of 36,000 psi, with minimum 2-inch overlap and 3-foot coverage.

1. Material and Coating: Minimum 24 gauge galvanized, conforming to ASTM A446
2. Joint Seal Gaskets: Manufacturer's standard type.
3. Warranty: Twenty (20) years manufacturer on finish, twenty (20) years contractor against leaks.
4. Fasteners: Manufacturer's standard type with steel backed EPDM washers, galvanized to ASTM A153 2.0 oz/sq. ft., finish to match adjacent surfaces when exterior exposed.

B. INSULATION

1. The roof and walls shall be insulated with fiberglass blanket insulation faced on its exposed side with a white, reinforced polypropylene vapor barrier. See architectural plans for minimum R-values.
2. Insulation blanket shall have facing tabs for sealing side joints between adjoining rolls of the faced fiberglass.

2.4 ACCESSORIES

A. Provide metal flashings, trim moldings, closure pieces, caps, fascias, infills and other preformed metal panel accessories of the same material, coating and finish as the roof and siding.

B. Accessories that are concealed from view after installation and are galvanized/zincalume coated may be provided unfinished.

2.5 PAINTING

A. PAINTING

The following shall be painted as specified by the attached plans and specifications and as directed by the project engineer:

1. Roofing, siding and accessories
2. Structural framing, purlins, girts and bracing

B. ROOFING, SIDING AND ACCESSORIES

1. Provide factory applied baked coating to the exterior and interior of metal roof and wall panels and accessories.
2. Provide finish top coat with not less than 0.8 mils nominal dry thickness and prime coat not less than 0.2 mils nominal dry thickness.

C. STRUCTURAL FRAMING, PURLINES, GIRTS AND BRACING

1. All primary framing members shall be shop primed with 1.5 to 2.0 mils dry film thickness, gray zinc alkyd primer. The contractor shall repair all scarred primed surfaces after building erection. All secondary framing members including purlins, girts, and bracing shall be unpainted galvanized steel.
2. The contractor shall provide the engineer with the building manufacturer's standard paint color samples a minimum of seven (7) days prior to placing firm order for materials.
3. Do not prime surfaces to be field welded. All field welds shall be thoroughly cleaned and painted as specified herein.

PART 3 EXECUTION

3.1 PERFORMANCE OF WORK

A. Perform work in accordance with:

1. AISC - Quality Certification Program Category MB
2. MBMA - Metal Building Manufacturer's Association Low Rise Systems Manual
3. AWS - Welding Code
4. Applicable local code for submission of design calculations, reviewed shop and erection drawings, and other information as required for acquiring permits.

B. All shop drawings and design details shall be submitted to the City by the successful bidder during the design phase for review and approval and permitting prior to commencing any construction. During this phase, the contractor shall be required to submit plans, calculations, and all required materials to the engineer for approval and to obtain all necessary permits for the project.

3.2 STRUCTURAL DESIGN COMPONENTS

Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a professional engineer licensed in the State of Washington. All shop drawings and plans shall bear the signed seal of a professional engineer licensed in the State of Washington.

3.3 DIMENSIONAL REQUIREMENTS

A. The building shall be 50-feet wide by 100-feet long.

B. See plans for additional requirements

3.4 DESIGN OF MEMBERS

A. DESIGN CRITERIA

Design members to withstand design loads and combinations in accordance with International Building Code (IBC), latest edition, and amended by the permitting authority. Design members to the design loads indicated in the General Notes of the drawing package:

B. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of span: l/180

C. Pre engineered building designer shall coordinate loads, opening sizes, connections, and support framing as required for the Alternate Bid Item 1 coil up doors as indicated in the plans and specification Section 08300- Coiling Roll-up Doors.

D. Pre-engineered building designer shall coordinate loads and connections as required for the Alternate Bid Item 2 Bridge Crane as indicated in the per plans and specification section 14600 – Bridge Crane

3.5 ERECTION - FRAMING

A. Erect framing in accordance with AISC Specification or building manufacturer specifications.

B. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing.

C. Set column base plates on 1-1/2-inch non-shrink grout.

D. Do not field cut or alter structural members without approval by the design engineer and the project engineer.

E. After erection, refinish and prime welds, abrasions, and scratched surfaces with primer as indicated in 2.5 Paint System.

3.6 FACED FIBERGLASS BLANKET INSULATION

A. Examine roof and wall framing for conditions detrimental to roofing, siding and insulation system. Do not start work until connections have been made.

B. The insulation/vapor barrier shall be pulled taut over the purlins and girts before attaching roof and siding. The vapor barrier shall face toward the interior of the building and the seams sealed and taped to maintain a continuous vapor barrier.

C. Repair any damaged areas to the insulation vapor barrier to the satisfaction of the City inspector.

3.7 ERECTION - ROOFING SYSTEMS

A. Install in accordance with manufacturer's instructions.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Locate end laps over supports. End laps minimum two (2) inches. Place side laps over bearing.

3.8 ERECTION - GUTTER AND DOWNSPOUT

A. Rigidly support and secure components. Joint lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.

B. Apply bituminous paint on surfaces in contact with cementitious materials.

C. Provide a minimum of four (4) downspouts on each side of building.

3.9 TOLERANCES

A. Framing members: 1/4-inch from level; 1/8-inch from plumb.

B. Siding and roofing: 1/8-inch from true position.

C. Door hardware spacing from column: 8-inches

D. Spacing between doors: 16-inches

3.10 GUARANTEE

A. The contractor shall provide a two (2) year guarantee on all workmanship and all building components except roofing and siding as previously indicated which require a 20 year warranty.

B. Upon defect in writing to the contractor during the guarantee period, the contractor shall, at his own expense, make necessary repairs or replacement of defective work.

END OF SECTION

DIVISION 15 – MECHANICAL

SECTION 15010 - GENERAL MECHANICAL PROVISIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of mechanical work. This section applies to all Division 15 sections.

B. General Requirements: General Conditions, Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 CODES AND STANDARDS

A. Perform work in accordance with requirements in the state in which the work is performed.

B. Conform to applicable industry standards, such as UL and ETL standards, ANSI standards, and other standards as noted.

C. Notify the A/E of deviations in Contract Documents to applicable codes and ordinances prior to installation of the Work. Perform changes in the Work after initial installation due to requirements of code enforcing agencies at no additional cost to the Owner.

D. If conflict occurs between legally adopted codes and the Contract Documents, the codes prevail, except that this shall not be construed as relieving the Contractor from complying with requirements of the Contract Documents which may exceed code requirements and not contrary to same.

E. Arrange for and pay for required mechanical permits, fees, and inspections.

F. Pressure Vessels and Relief Valves: Select, build, install, and label in accordance with state requirements. Frame and mount a certificate showing approval under this law adjacent to each pressure vessel and relief valve. Pay costs and fees for certificates, inspections, filing, and labeling.

G. National Air Duct Cleaners Association (NADCA):

1. ACR 2005, Assessment, Cleaning, & Restoration of HVAC Systems.
2. Understanding Microbial Contamination in HVAC Systems.
3. Introduction to HVAC System Cleaning Services.
4. NADCA Standard 05, Requirements for the Installation of Service Openings in HVAC Systems.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and with additional requirements indicated in this article.

B. Hard Copy Product Data:

1. Comply with requirements indicated in this article.
2. Submit prior to fabrication of assemblies and delivery of purchased items.

3. Submittal format shall be the same as for prime contractor. If general contractor submits hard copies, submit hard copies only. If general contractor submits electronic copies, submit electronic copies with one hard copy.
4. Submit hard copies complete at one time. Partial product submittals not acceptable and will be returned without review except as follows:
    a. Sections 15820, 15840, and 15845 including products and materials for first submittal and Shop Drawings for second submittal.
    b. Section 15900 including products and materials for first submittal and Shop Drawings for second submittal.
    c. Sections 15200 and 15210 including products and Shop Drawings that are contingent upon approval of specified products.
    d. Section 15060 including products and materials for first submittal and Shop Drawings for second submittal.
    e. Long lead items.
    f. Site and underground work.
5. Clearly mark catalog pages, equipment, and model number to be used. Note required accessories.
6. Format:
    a. Assemble submittals in 3-ring binders. Use multiple binders if pages in a single binder would exceed 2-1/2 inch thickness. Separate binders for each category, such as Plumbing, Fire Suppression, and HVAC. Where one subject matter encompasses more than one binder, differentiate by volume numbers. Include indexed tabs for each binder.
    b. Include overall table of contents of items submitted, organized by specification section.
    c. Include heavy, tabbed divider sheet for each specification section, with specification section number and title on tab. Include table of contents for each specification section, including catalog numbers or drawing numbers if appropriate.
    d. Fold drawings to 8-1/2 inch size and bind as above (with reinforcing at punched holes) or place in clear plastic holder designed for 3 ring binders.
    e. Include contractor and manufacturer's representative contact information for each product.
7. Identify on cover and spine for each binder with printed title "MECHANICAL SUBMITTALS", names of project, Owner, general contractor, mechanical subcontractor, Architect, and mechanical engineer; and year of project completion.

C. Electronic Product Data:

1. Comply with requirements indicated in this article.
2. Submit each specification section complete at one time with a dedicated submittal number for each section. For example, submit products for Section 15845 under one submittal number and products for Section 15900 under a different submittal number. Submitting multiple sections at one time acceptable as long as each section has a dedicated submittal number. Include submittal number and date submitted in file name.
3. Submit one hard copy of product data.
4. Partial product data submittals for a specification section (except as previously indicated in this section) not acceptable and will be returned without review.

a. Sections 15850, 15845, and 15820 including products and materials for first submittal and Shop Drawings for second submittal.
b. Section 15900 including products and materials for first submittal and Shop Drawings for second submittal.
c. Sections 15200 and 15210 including products and Shop Drawings that are contingent upon approval of specified products.
d. Long lead items.
e. Site and underground work.

5. Clearly mark catalog pages, equipment, and model number to be used. Indicate associated specification section and paragraph number on each page. Identify required options and accessories.
6. Format:

a. Adobe PDF file format.
b. Bookmark each submittal to facilitate browsing to each specification paragraph number.
c. Include table of contents for each specification section. Include catalog numbers or drawing numbers.
d. Include Contractor and manufacturer's representative contact information for each product.]
e. Include job name (or abbreviation of job name), specification number, and contractor submittal number in file name.

7. Content:

a. Plumbing: Complete plumbing installation consisting of detailed piping drawings. Show piping, valves, thermal expansion loops, equipment, air compressor equipment, hangers, seismic bracing, vibration isolation, and other HVAC components included in the Contract Documents. Provide electrical schematic and wiring diagram for all equipment. Indicate sizes of piping, installed piping bottom of piping (BOP) above finished floor, equipment dimensions, dimensioned location of equipment and height above finished floor, slope of piping where applicable, and equipment tags.
b. Airside HVAC: Complete duct installation consisting of detailed sheet metal drawings. Show ducts, duct fittings, turning vanes, air devices, flexible ducts, volume dampers, motorized dampers, backdraft dampers, hangers, supports, seismic bracing, vibration isolators, equipment and other HVAC components included in the Contract Documents. Provide electrical schematic and wiring diagram for all equipment. Indicate sizes of ductwork, installed ductwork bottom of duct (BOD) above finished floor, equipment dimensions, dimensioned location of equipment and height above finished floor, air device tags indicating same information included on the Drawings, and equipment tags.
c. Wetside HVAC: Complete pipe installation consisting of detailed piping drawings. Show piping, valves, thermal expansion loops, equipment, hangers, seismic bracing, vibration isolation, and other HVAC components included in the Contract Documents. Provide electrical schematic and wiring diagram for all equipment. Indicate sizes of piping, installed piping bottom of piping (BOP) above finished floor, equipment dimensions, dimensioned location of equipment and height above finished floor, slope of piping where applicable, and equipment tags.

d. HVAC controls: Complete controls installation consisting of electrical schematic and wiring diagram for all equipment.

D. Approval: Approval of a manufacturer's name or product by the A/E does not relieve the Contractor of the responsibility for providing materials and equipment which comply in detail with requirements of the Contract Documents.

E. Re-Submittals: Clearly identify re-submittals. Provide revised tabs, indexes, page renumbering, and other formats to interface with original submittal. Identify changes and include date for project tracking.

F. Test Reports and Certificates: Submit as a package prior to Substantial Completion.

G. Testing and Balancing Reports: Submit as indicated in Section 15980.

H. Certifications: Submit written certifications from the governing building authorities stating that work has been inspected and accepted, and complies with applicable codes and ordinances.

I. Record Drawings: Comply with Article "Record Drawings" in this section.

J. Commissioning: Submit equipment start-up and test procedures and preliminary Operation and Maintenance Manuals to the A/E as specified in Section 15997. Submit under separate bound cover.

K. Schedule of Values:

1. Comply with requirements in Division 1 with additional requirements as indicated in this paragraph.
2. Include labor and materials costs for the following:

a. Division 15:

1) SECTION 15010 GENERAL MECHANICAL PROVISIONS

a) Permit, Mobilization, Submittals, and Bond
b) Trailer, Services, Crane, and Rentals
c) Foreman / Non-Labor
d) Fuel Costs

2) SECTION 15015 PROJECT CLOSEOUT AND SYSTEM START-UP
3) SECTION 15030 ELECTRICAL PROVISIONS
4) SECTION 15050 BASIC MATERIALS AND METHODS
5) SECTION 15080 PIPING SPECIALTIES
6) SECTION 15110 VALVES
7) SECTION 15140 PUMPS

a) Hydronic Water Pumps
b) Domestic Hot Water Circulating Pumps
c) Domestic Water Pressure Booster Assembly
d) Sump Pumps and Accessories

8) SECTION 15200 VIBRATION ISOLATION

a) Vibration isolation mounts and hangers
b) Bases
c) Miscellaneous supports and products

d) Acoustical wrap
e) Flexible connectors
f) Thrust restraints

9) SECTION 15210 SEISMIC CONTROL
10) SECTION 15250 MECHANICAL INSULATION

a) Hydronic Water Piping
b) Domestic Water Piping
c) Fire Resistive Wrap

11) SECTION 15400 DOMESTIC WATER SYSTEM

a) Above Ground Piping
b) Underground Piping

12) SECTION 15410 PLUMBING FIXTURES
13) SECTION 15465 COMPRESSED AIR PIPING SYSTEMS

a) Compressed Air Piping System
b) Air Compressor

14) SECTION 15600 BOILERS

a) Boilers
b) Boiler Accessories

15) SECTION 15710 HYDRONIC PIPING SYSTEMS

a) Hydronic Piping
b) Underground Piping

16) SECTION 15735 WATER TREATMENT SYSTEMS

a) Water Treatment Systems
b) Glycol System

17) SECTION 15740 PACKAGED HVAC EQUIPMENT

a) Rooftop Heat Pumps
b) Rooftop Gas/Electric Units
c) Economizer Power Relief Fans
d) Water Source Heat Pumps
e) Indoor Packaged Air Conditioning Units
f) Fan Coil Units with Matching Condensing Units
g) Air Cooled Condensing Units
h) Process Cooling Equipment
i) Ceiling Mounted Process Cooling Equipment
j) Packaged Terminal Units

18) SECTION 15770 RADIANT FLOOR HEATING SYSTEM
19) SECTION 15820 AIR DISTRIBUTION EQUIPMENT

a) Air Handling Units
b) Heat Recovery Units
c) Fans
d) Dryer Vent Booster System
e) Vehicle and Welding Exhaust System
f) Kiln Exhaust System

20) SECTION 15835 TERMINAL HEAT TRANSFER EQUIPMENT

a) Hydronic Fin Tube Units
b) Electric Baseboard Heaters
c) Convectors
d) Unit Heaters
e) Cabinet Heaters
f) Hydronic Panel Radiators
g) Unit Ventilators

21) SECTION 15840 AIR DISTRIBUTION

a) Galvanized Sheet Metal
b) Stainless Steel Sheet Metal

22) SECTION 15845 AIR DISTRIBUTION ACCESSORIES

a) Air Distribution Accessories
b) Volume Dampers and Quadrants
c) Backdraft Dampers
d) Fire Dampers
e) Smoke Dampers
f) Combination Fire/Smoke Dampers
g) Electric Duct Heaters
h) Heating and Cooling Coils

23) SECTION 15870 AIR DEVICES

a) Grilles, Registers, and Diffusers
b) Louvers
c) Roof Hoods

24) SECTION 15880 FILTERS
25) SECTION 15980 TESTING, ADJUSTING, AND BALANCING
26) SECTION 15996 SYSTEMS TRAINING
27) SECTION 15997 SYSTEMS OPERATION AND MAINTENANCE MANUALS

1.4 DEFINITIONS AND ABBREVIATIONS

A. Refer to Division 1 for definitions and abbreviations. Additional definitions and abbreviations are as follows.

B. “Approved” or “Approval” means written approval by the Owner or “Owner’s agent” (A/E).

C. “Codes” means AHJ adopted codes, rules, and ordinances and additional codes as specified herein.

D. “Concealed” means spaces out of sight. For example, above ceilings, below floors, between double walls, furred-in areas, pipe and duct shafts, and similar spaces.

E. The word “Contractor”, as used in Division 15 sections, means the mechanical subcontractor.

F. “Coordination”, “Coordinating”, and “Coordinate” means to bring, or the bringing, into a common action, movement, or combination so as to act together in a smooth concerted way.

G. “Directed”, “Requested”, “Accepted”, and Similar Terms means these terms imply “by the A/E” unless otherwise indicated.

H. “Exposed” means open to view. For example, pipe installed in a tunnel or pipe installed in a room and not covered by other construction.

I. “Furnish” means supply and deliver to the project site ready for unloading, unpacking, assembly, installation, and similar activities.

J. “Indicated” and “Indicated on the Drawings” means shown on Drawings by notes, graphics or schedules, or written into other portions of Contract Documents. Terms such as “shown”, “noted”, “scheduled” and “specified” have same meaning as “indicated”, and are used to assist the reader in locating particular information.

K. “Install” means to place in position for service or use. Includes operations at project site, such as unloading, unpacking, assembly, erection, placing, preserving, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar activities.

L. “Provide” means furnish and install for a complete, finished, and operable system and ready for intended use.

M. “Shop Drawings” means documents which fully details equipment and intended installation relative to this specific Project.

N. “Substantial Completion” shall mean that the entire project (or readily definable portion thereof if so designated in the Contract Documents) is acceptable to code enforcement authorities and to extent required by such authorities, has been inspected and approved by such authorities, and is suitable for occupancy by the Owner or occupant for the purpose intended. Refer to Division 0 and 1 for additional requirements.

O. “Work” or “Project” means entire scope of work required by the Contract Documents.

P. Abbreviations:

MATERIALS A/E	Architect
AHJ	Authorities Having Jurisdiction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
C	Degrees Celsius
CISPI	Cast Iron Soil Pipe Institute
ETL	Environmental Technology Laboratory
F	Degrees Fahrenheit
FM	Factory Mutual
FOIC	Furnished by Owner Installed by Contractor
HVAC	Heating, Ventilating, and Air Conditioning
IBC	International Building Code

IFC	International Fire Code
IFGC	International Fuel Gas Code
IMC	International Mechanical Code
MERV	Minimum Efficiency Reporting Value
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
NEC	National Electrical Code, NFPA 70 (latest adopted edition with Amendments)
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
psi	Pounds per square inch
psig	Pounds per square inch gage pressure
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association, Inc.
UL	Underwriters Laboratories Inc.
UPC	Uniform Plumbing Code
V	Volts
WOG	Water Oil Gas
WSP	Working Steam Pressure

Q. Where two or more manufacturers are listed, select for use any of those listed. The first mentioned, in general, was used as the basis of design. Bids on any manufacturer named acceptable as long as that manufacturer meets every aspect of the Contract Documents. Where several manufacturers are specified by name for one use, select for use any of those so specified. Note that equipment layout is based on equipment listed in equipment schedules.

R. Ensure that equipment will fit within available space. Where other than basis of design manufacturer is selected for the Project, Contractor is responsible for verifying equipment will fit within available space and meet manufacturer's and code required clearances.

S. Where other than the basis of design manufacturer is selected for the Project, include cost of resulting additional work, coordination with other trades, and redesign of associated building services and structure as required to accommodate selected equipment. Include redesign drawings with submitted Shop Drawings.

T. Should any proposed Product requires redesign work by A/E to accommodate proposed Product, costs for such redesign work shall be included in the Bid amount. The Owner will compensate Engineer through the A/E at rate of $125 per hour for time and expense for required review of submittals and additional coordination for redesign work. Amount of compensation will be deducted from Final Payment to the Contractor.

1.5 STANDARDS OF QUALITY

A. Equipment shall be manufacturer's regularly catalogued items and shall be supplied as a complete unit in accordance with manufacturer's standard specifications and any optional items required for proper installation for equipment unless otherwise noted. Equipment and materials shall be installed in accordance with the manufacturer's recommendations and best trade practices.

B. Furnish products of a single manufacturer for items which are used in quantity. A Product, for the purpose of this paragraph, is an assembly of components such as fans, air handling units, chillers, valves, and similar items. Materials such as pipe, fittings, pipe and duct insulation, and similar items not requiring maintenance are not included in the single manufacturer requirement of this paragraph.

C. Products shall be new unless indicated otherwise in the Contract Documents.

1.6 SUBSTITUTIONS

A. Comply with requirements in Division 1 with additional requirements indicated in this article.

B. Substitutions will be considered following bid award only when a product becomes unavailable through no fault of the Contractor.

C. Where “Manufacturer” paragraphs include the words "or approved", prior approval of the proposed substitution is required. The A/E is sole judge of quality of proposed substitution.

D. When the A/E approves a substitution request, the approval is given with the understanding that the Bidder:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

E. Will provide the same warranty for the Substitution as for the specified Product.

F. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

G. Waives claims for additional costs or time extension which may subsequently become apparent.

H. Whenever a Product is described by detail, specification, trade name, manufacturer's name or catalog reference, use only such Product, unless written approval is given for substitution prior to bid. Submit written requests on substitution request form included in Division 1. Approved substituted manufacturers will be listed by Addendum.

I. Provide as specified certain products, materials, and systems where “manufacturer” paragraphs are followed by the words “no substitutions”.

J. Substitutions will not be considered when they are indicated or implied on Shop Drawings or product data submittals, without separate written prior approval, or when approval will require revision to the Contract Documents.

1.7 DRAWINGS AND SPECIFICATIONS

A. General: The mechanical drawings are diagrammatic. Complete details of building features which affect mechanical installation may not be shown. For additional details, refer to other Contract Documents. Report any discrepancies to the A/E along with suggested revisions. Obtain written response from the A/E before proceeding with changes.

B. Depiction of Work: Drawings do not show exact characteristics of the work, piping and air distributions configurations, or necessary number of fittings and

offsets. Base work on actual field measurements and conditions. Provide work required to complete the installation.

C. Dimensions: Do not scale drawings. Dimensional accuracy is not guaranteed, and field verification of dimensions, locations, and levels to suit field conditions is required.

D. Discrepancies: Field verify dimensions and existing conditions prior to performing work. Bring to the A/E's attention any discrepancies within the Contract Documents and between the Contract Documents and field conditions. Also for any design and layout changes required due to specific equipment selection, prior to the Contractor's work (equipment and material purchasing and installation). Any corrective work required by the Contractor after his discovery of such discrepancies, inconsistencies, or ambiguities shall be performed at no additional cost to the Owner.

E. Specifications: These specifications are written in imperative mood and streamlined form. The imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

1.8 RECORD DRAWINGS

A. Comply with requirements in Division 1, with additional requirements indicated in this article.

B. Prepare Record Drawings. Record Drawings shall be new black line prints and shall show the measured locations of portions of the Work and changes the Contractor has made.

C. Record corrections and changes made during the progress of the work, showing work as actually installed. In general, acceptable tolerance plus or minus 1'-0" from actual location in horizontal plane. Indicate exact installed invert elevations for underground piping. Neatly hand-draft on daily basis. Keep readily available at project site. Use latest revisions and keep neat and clean. Do not use Contractor's working drawings.

D. Record Drawings are subject to review by the A/E on a regular basis throughout construction. At end of construction, check drawings for completeness and accuracy.

E. Drawings shall show addendum items, change orders, clarifications, supplemental instructions, and deviations from the Drawings.

F. Per project closeout procedures, submit in AutoCAD format along with corrected black line drawings. Each sheet shall be noted as "RECORD DRAWING".

1.9 COORDINATION

A. Coordinate Division 15 work with other trades.

B. Be aware of restricted space for installation of mechanical systems. Include offsets and perform rerouting and coordination to fit elements in available space. Include provisions for such requirements in bid.

C. Equipment, ductwork, and piping shown are based on existing drawings as available and on limited project site observations to the extent possible under current conditions. Field verify existing conditions prior to commencement of

work. Obtain specific locations of structural and architectural features or equipment items from referenced drawings, field measurements, or trade providing material or equipment.

D. Coordinate ductwork and piping installations to clear light fixtures and electrical cable trays. Include clearance over light fixtures to allow removal and replacement. Include minimum 6 inch clearance above and to sides of cable trays. Coordinate routing of ductwork and piping with each other and other trades so grade of piping can be accomplished and fit in available space.

E. Coordinate clearance requirements with piping installation for piping insulation applications, duct installation for duct insulation applications, and equipment installation for equipment insulation applications. Before preparing piping and duct Shop Drawings, establish and maintain clearance requirements for insulation applications and field-installed insulation jackets and finishes and for space required for maintenance.

F. Ductwork takes precedence over piping for available space and routing. Coordinate installation based on this precedence.

G. Do not install ductwork and piping over electrical panels and where clearance is required by code and for maintenance.

H. Existing Conditions:

1. General Construction:

   a. Installation of mechanical work will require openings, removal and replacement of ceilings, sleeves, and restoration of general construction to match existing. Some work occurs in areas not requiring alterations as part of architectural work. Coordinate new openings and restoration work so that there is no additional cost to the Owner.
   b. General construction work shown on the architectural drawings may require removal, relocation, and reinstallation of existing mechanical work. Since existing conditions cannot be completely detailed on the Drawings, survey the site and perform required Work at no additional cost to the Owner.

2. Piping: Verify exact location, flow direction and service before making connections to such piping. Remove and provide new piping where existing piping is damaged or broken during construction.

I. Be responsible for beam penetrations as they relate to the mechanical work. Submit sizes and locations to the structural engineer for review and determination of structural details.

J. Coordinate attachments to structure to verify that attachment points on equipment and structure can accept seismic, weight, and other loads imposed.

1.10 WORKMANSHIP

A. Work shall be in accordance with best trade practices. Remove substandard workmanship and provide new material at no additional cost to the Owner.

1.11 HVAC SYSTEM USAGE

A. Contractor's use of permanent HVAC systems for temporary heat and ventilation prior to requirements of Section 15016 is not allowed.

B. The Owner may give permission under the following minimum conditions. Other conditions will be determined by the A/E at the time of HVAC system use.

1. No use until after sanding and painting is completed.

C. Clean inside surfaces of ductwork and equipment prior to Substantial Completion. Work shall be performed by a certified member of NADCA in accordance with NADCA's publication ACR 2005.

D. Provide temporary filters and provide permanent filters at Substantial Completion of project. Comply with requirements in Section 15880 for filters during construction.

E. Warranty commences at final acceptance regardless as to equipment warranty conditions.

1.12 SITE VISIT

A. The Contractor shall visit site during bidding period to note conditions affecting installation of Work. No additional charges allowed due to failure to adequately review conditions.

B. Investigate each space through which equipment must be moved. Where necessary, arrange with equipment manufacturers to ship equipment in sections with suitable dimensions for moving through restricted spaces. For movement through occupied spaces, ascertain from the Owner as acceptable times of day or night that movement could occur. Include costs in bid for off hour's labor, reassembly, and field testing.

1.13 CERTIFICATION

A. By submitting a bid for the mechanical systems, the Contractor and his subcontractors acknowledge and certify the following:

1. That they have carefully examined and fully understand the Drawings and Specifications including but not limited to architectural, site, utility, mechanical, structural and electrical drawings and specifications. In addition, they have determined that the Drawings and Specifications are adequate to complete the mechanical systems and that they can provide a complete finished and operable system in accordance with the Contract Documents.

B. That they have had a reasonable opportunity to discover any ambiguities in the Contract Documents and such ambiguities have been brought to the attention of the A/E in writing prior to submitting the bid.

C. That they have reviewed the project progress schedule with the general contractor, fully understand the schedule, and they have verified, prior to submitting a bid, availability of necessary labor and materials, including supervision and office backup, and can comply with the schedule requirements.

D. That there may be changes to the scope of work and that they understand that any proposal submitted for performance of additional work shall include costs associated with such change including but not limited to labor, materials, subcontracts, equipment, taxes, fees, schedule impact, loss of efficiency, supervision, overhead and profit.

E. That the Contract requires them to coordinate their work with that of other trades and that responsibility for coordination includes rerouting, offsets, and similar

provisions, to fit Work and address manufacturer's recommended clearances for service access, maintenance, and replacement of equipment in a manner that is compatible with work of other trades in the same area.

F. That routing of elements of mechanical systems shown on the Drawings is schematic only and that offsets and rerouting will be required in installation and that labor and materials for offsets and rerouting have been included for such in their bids.

G. That they have consulted with affected utilities and included in their bids labor and materials to meet requirements which may be imposed by each utility and have included in their bids costs and fees to be paid to such utilities, including temporary services and temporary and permanent connections unless specifically excluded in the Contract Documents.

H. That they understand submittals of material and equipment to the A/E is for the purpose of establishing what they are providing for the project. Any review undertaken by the A/E does not relieve them of their responsibilities to furnish and install materials and equipment required for work in the project nor does such review relieve them of their responsibilities for coordination with other trades and designers to ensure that such materials and equipment will fit and be suitable for purpose intended.

I. That they agree to receive payment for bid amounts as full compensation for furnishing materials and labor which may be required in prosecution and completion of work required under the Contract Documents, and in respects to complete the contract work to the satisfaction of the A/E.

J. That they include in their bids costs to furnish bonds as specified in the Contract Documents.

1.14 WARRANTY

A. Conform to requirements in General Conditions, Supplementary Conditions, and Division 1. Where not so prescribed or defined, the period shall be 1 year. Warranty periods within Division 15 shall not commence until final acceptance date. Contractor shall extend longer warranties specified in other sections.

1.15 EQUIPMENT FURNISHED BY OWNER INSTALLED BY CONTRACTOR (FOIC)

A. Material Handling and Delivery: Coordinate delivery of FOIC equipment. Receive, off load, transport, store, hoist, unpack, dispose of packing, same as for other project equipment arriving at job site. Requirements of the Contract Documents apply to FOIC equipment.

B. Operation and Maintenance Data: Obtain from the Owner operation and maintenance data for the FOIC equipment and incorporate them into the Operations and Maintenance Manuals.

C. Start-Up and Warranty:

1. FOIC equipment suppliers will pass on to the Contractor start-up information, maintenance and parts information, and warranty provisions of their products in accordance with the equipment suppliers contract requirements. Organize and coordinate start-up and warranty requirements for the FOIC equipment.

D. Include one year warranty on FOIC equipment starting at final acceptance regardless of shorter time limits by FOIC suppliers.

1.16 DEMONSTRATION

A. Comply with requirements in Division 1 with additional requirements indicated in this article.

B. Following installation of mechanical work and prior to final acceptance, demonstrate that equipment and systems operate as indicated in the Contract Documents and in accordance with manufacturer's recommendations.

C. Perform in presence of the A/E and Owner's representative, unless otherwise directed by the A/E. Give minimum 1 week notice prior to demonstrations.

D. Provide instruments and personnel required to conduct demonstrations.

1.17 SUBSTANTIAL COMPLETION

A. Comply with requirements in Division 1.

B. Prepare list of items that are not complete prior to asking for a substantial completion review by the A/E.

C. Review of Work: A/E's fee for mechanical work includes 2 final construction observation reviews. First one is the Substantial Completion review of the Work and will be in response to the Contractor's notice of final completion of the Work. If necessary, the second one is the post-Substantial Completion review of the Work and will occur after notification by the Contractor that deficiencies noted during the Substantial Completion review have been corrected.

D. Cost of Additional Reviews: If additional reviews by the A/E are required due to Contractor's failure to correct deficient work, the Owner will compensate A/E on a time and expense basis at rate of $125 per hour. Amount of additional compensation for additional reviews will be deducted from final payment to Contractor.

1.18 ALTERNATES

A. General: See Bid Form and Alternates described in Division 1 for possible effect on work of Division 15.

1.19 COMMISSIONING

A. Submit equipment start-up and test procedures and preliminary Operation and Maintenance Manuals to the A/E as specified in Section 15997. Submit under separate bound cover.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 15015 - PROJECT CLOSEOUT AND SYSTEM START-UP

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes material and labor required to perform start-up of equipment and systems installed in project, to perform checkout of systems, and to verify completeness of project requirements.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

C. Refer to requirements in Sections 15016.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Submit within 3 weeks of award of Contract the following for review and approval by the A/E.

1. Checklist for each piece of scheduled equipment indicating items that will be verified for proper operation and completeness of installation. Include an area for comments and completion date for correction of deficiencies. Use of the equipment manufacturer's standard start-up/checkout form is acceptable.
2. Checklist of controls by system or piece of equipment indicating items that will be checked, sequences that will be checked, and completeness of the installation. Include an area for comments and completion date for correction of deficiencies.
3. Checklists shall have a place at each item for the person doing checkout to initial item indicating task has been completed and date it was completed.
4. Preliminary schedule indicating sequence of events involved with pre-functional check-out, mechanical equipment start-up, testing and balancing (TAB), TAB verification, and mechanical system functional testing. Schedule shall indicate approximate time intervals required for completion of respective tasks.
5. Prepare and submit a list of items that are not complete prior to requesting substantial completion review by the A/E.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 PROJECT CLOSEOUT PROCEDURES

A. Complete Work described in this section prior to time of Substantial Completion.

B. Representatives for the mechanical subcontractor, plumbing subcontractor, sheet metal subcontractor, temperature control subcontractor and TAB subcontractor shall be present at the pre-startup meeting and at the initial startup of each mechanical system.

C. Mechanical subcontractor shall bear prime responsibility for startup of heating and cooling and plumbing systems.

D. If a piece of equipment is not performing satisfactorily during TAB, TAB subcontractor shall notify the installing subcontractor for corrective action.

E. All subcontractors shall comply with the decision of the Construction Manager and the A/E of any conflict of responsibility.

F. Include completed checklists in the Operation and Maintenance Manuals.

G. Prepare draft of preliminary commissioning report (required by the Washington State Energy Code (WSEC)) for review by the A/E prior to the commissioning. Include documentation required by the WSEC, including, but not limited to, the documentation and description of deficiencies found during pre-functional check-out/start-up and functional testing, resolution of items that were resolved, and listing of items and testing that are not complete or will need to be deferred.

3.2 SYSTEM START-UP PROCEDURES

A. As a minimum, the items listed in this article shall be completed. Include recommendations by manufacturers of systems and equipment.

B. Division 16 shall test voltage at incoming power supply, motor or heater contactor contact resistance, inspect and clean electrical enclosures at equipment. Motor leads, fuses, and terminations for all equipment shall be checked for tightness.

C. Inspect bearings for cleanliness and alignment and remove foreign materials found. Grease in accordance with manufacturer's recommendations. Replace bearings that run rough or noisy.

D. Adjust tension in V-belt drives, adjust variable-pitch sheaves and drives for required equipment speed. Change belts and sheaves to obtain proper equipment speed, remove any foreign materials from sheaves and belts before starting operations, adjust drives for alignment of sheaves and V-belts. "Required equipment speed" is that speed which produces intended performance. Adjust fans and rotating equipment to maintain operation within the performance curve provided by manufacturer without over speeding equipment or causing excess vibration.

E. Adjust direct drives for proper alignment of flexible couplings, lubricate particular couplings, check security of couplings to driver and driven shafts, and set drive components to ensure free rotation with no undesirable stresses on coupling and attached equipment.

F. Check pump packing glands and mechanical seals for cleanliness and adjustment before running pump. Inspect shaft sleeves for scoring and proper placement of packing, replace if necessary. Inspect mechanical faces, chambers and seal rings. Replace if necessary. Ensure piping systems are free of dirt and scale before circulating liquid through pumps.

G. Tighten flanges and packing glands after systems have been placed in operation. Replace gaskets in flanges that show signs of leakage after tightening.

H. Inspect both manual and automatic control valves, clean bonnets and stems, tighten packing glands to ensure no leakage, but permit valve stems to operate properly. If leaking, replace packing in valves to retain maximum adjustment

after system is judged complete. Replace packing in any valve that continues to leak after adjustment, remove and repair bonnets that leak, coat packing gland threads and valve stems with surface preparation similar to MolyCote or FelPro after cleaning.

I. Inspect and make certain that automatic control valve seats are free from foreign material and are properly positioned for intended service.

J. Inspect screwed joints for leakage and remake each joint that appears to be faulty. Do not wait for rust to form. Clean threads on both parts, apply compound and remake joint.

K. Clean strainers, dirt pockets, orifices, valve seats and headers in fluid systems after systems have been placed in operation to ensure they are free from foreign materials.

L. Adjust pipe hangers and supports for correct pitch and alignment.

M. Remove rust, scale, and foreign materials from equipment and renew any defaced surfaces. If equipment is badly marred, the A/E has authority to require new materials be provided.

N. Install clean air filters. Refer to requirements in Section 15880.

O. Inspect pressure gages and thermometers for calibration. Remove and provide new for those that are defaced, broken, or read incorrectly.

P. Repair damaged insulation.

Q. After each system has been put into operation, repeat certain checks described in preceding paragraphs.

R. Complete applicable start-up procedures described in preceding articles and paragraphs prior to Substantial Completion.

S. Provide adjustment services as necessary to ensure proper functioning of mechanical systems after building occupancy and during warranty period.

3.3 SCHEDULE OF VALUES

A. Include a line item in schedule of values for doing the project closeout and system start-up work. Value shall include the time for preparing initial checklists, for checking out project, and for starting up systems. Value shall accurately reflect amount of time and material Contractor estimates to spend on these tasks.

3.4 FINAL ACCEPTANCE

A. Final acceptance of Work will not occur until functional testing is complete and outstanding issues resolved.

END OF SECTION

SECTION 15030 - ELECTRICAL PROVISIONS FOR MECHANICAL WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes factory and field installed motors, motor starters, and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. IEEE 112, IEEE Standard Test Procedure for Polyphase Induction Motors and Generators.

C. NEMA MG 1, Motors and Generators.

D. NFPA 70, National Electrical Code (NEC).

E. UL 508A, Standard for Industrial Control Panels.

F. UL 1995, Heating and Cooling Equipment.

G. Comply with applicable NEMA standards and refer to NEMA standards for definitions of terminology herein. Comply with NFPA 70 for workmanship and installation requirements and to applicable Division 16 sections.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Motors
2. Motor starters

PART 2 PRODUCTS

2.1 MOTORS

A. Motor Characteristics: Except where more stringent requirements are indicated, and except where required item of mechanical equipment cannot be obtained to meet requirements in this article. Comply with the following requirements for motors for mechanical work:

1. Comply with NEMA MG 1 unless otherwise indicated.

B. Temperature Rating: Rated for 40 C ambient temperature and at 3300 foot elevation with maximum 50 C temperature rise for continuous duty at full load (Class B insulation).

C. Capacity and Torque: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, but without exceeding nameplate ratings or considering service factor.

D. Phases and Current Characteristics: Coordinate current characteristics with power specified in Division 16 sections and with individual equipment requirements specified in other Division 15 sections.

E. Do not purchase motors that are either factory or field installed until power characteristics and rotation direction have been confirmed.

F. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors.

G. Motors 2 HP and Larger: Include factory or field installed shaft grounding system to prevent damage to motor bearings from induced shaft currents. Electro Static technology AEGIS SGRTM, Shaft Grounding Systems or approved.

H. Motor Construction: General purpose, continuous duty motors, Design "B", except "C" where required for high starting torque.

1. Frames: NEMA standard.
2. Bearings: Antifriction ball or sleeve bearings with inner and outer shaft seals, greaseable except permanently sealed where motor is normally inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, bearings designed to resist thrust loading. Refer to other Division 15 sections for fractional-hp light-duty motors where sleeve-type bearings are permitted.
3. Enclosure Type: Except as otherwise indicated open dripproof motors for indoor use where satisfactorily housed, and guarded dripproof motors where exposed to contact by employees and building occupants. Totally enclosed fan cooled for outdoor use. Refer to other Division 15 sections for other enclosure requirements.
4. Overload Protection: Include for each motor. Built-in (manual reset) for 120, 208, and 277 Volt, single phase motors.
5. Efficiency: Minimum efficiencies as tabulated in current edition of the energy code in the state in which the work is performed as tested in accordance with IEEE 112, Test Method B.
6. Power Factor: Minimum 85 percent under full load conditions. Where less than 85 percent, include power factor correction to minimum 90 percent.
7. Electronically Commutated Motors (ECMs): Variable speed DC brushless motor with single phase integrated controller/inverter. Motor designed for synchronous rotation to overcome reverse rotation. Rotor permanent magnetic type with near zero rotor losses. Motor with built-in soft start, soft speed change ramps, and permanently lubricated ball bearings. Include anti-back rotation feature or include motor designed to overcome reverse rotation without effect on motor life expectancy. Include device to limit electric harmonic distortion. General Electric ECMTM, or approved.

8. Motors Controlled by VFDs: Inverter rated, Class F temperature rise and Class H insulation. Compatible with VFDs specified in Section 15825 using insulated gate bipolar transistors (IGBTs).

   a. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
   b. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
   c. Turndown: Capable of turndown ratio of 10 to 1.
   d. Include factory or field installed shaft grounding system to prevent damage to motor bearings from VFD induced shaft currents. Electro Static technology AEGIS SGRTM, Shaft Grounding Systems or approved.

9. Multi-Speed Motors: Two speed, two winding, variable torque, pole-changing type with reduced speed.
10. Nameplate: Include, indicating full identification of manufacturer, ratings, characteristics, construction, special features, and similar information as required by NEMA MG 1.

I. Manufacturers: Except where item of mechanical equipment (which otherwise complies with requirements in this section) is integrally equipped with motor produced by another manufacturer, include motors by one of the following manufacturers: Baldor Electric Co., General Electric Co., Marathon Electric Mfg. Co., Reliance Electric Motors, Toshiba International Corp., Siemens Energy & Automation, Emerson Climate Technologies, U.S. Electrical Motors, Goulds, Louis Allis Co., Lincoln Motors, or Magnetek Electric Motors.

2.2 MOTOR STARTERS

A. General: Comply with requirements in Division 16 for factory installed starters. Field installed starters are specified in Division 16 work.

2.3 EQUIPMENT SHORT CIRCUIT CURRENT RATING

A. 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.

PART 3 EXECUTION

3.1 MOTORS

A. Where motors are furnished for field mounting, install motors on motor mounting systems in accordance with motor manufacturer's instructions, securely anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws, except motors of 1/3 hp and less may be secured with Allen screws on flat surfaces of shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.

3.2 STARTERS

A. Coordinate with Division 16 work to install starters and wiring devices near motors or as indicated on the Drawings. Securely support and anchor in accordance with manufacturer's installation instructions. Locate for proper operational access, including visibility for safety.

3.3 EQUIPMENT AND MOTOR CONNECTIONS

A. Install flexible-conduit connection to motor and equipment for packaged and non-packaged equipment that is factory assembled. Comply with applicable provisions of Division 16 sections for wiring materials and wiring services.

B. Refer to Division 16 sections for installation requirements. Division 15 shall provide work not indicated in Division 16 for a complete and operating system. Where a conflict occurs between Division 15 and Division 16, Division 15 contractor shall provide work for a complete and operating system. Refer to schedule included in this section for additional information.

3.4 EQUIPMENT FABRICATION

A. Fabricate mechanical equipment for secure mounting of motors and other electrical items including in work. Include permanent alignment of motors with equipment, or adjustable mountings as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Install safe, secure, durable, and removable guards for motor drives, arranged for lubrication and similar running maintenance without removal of guards.

END OF SECTION

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes equipment supports, sleeves, identification, appurtenances, and miscellaneous work. This section applies to all Division 15 sections.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. UL Compliance: Where UL fire-resistance rating is indicated for construction penetrated by access units, furnish UL listed and labeled units, except for those units which are smaller than minimum size requiring ratings as recognized by governing authority.

C. Codes and Standards:

1. ASME A13.1, Scheme for the Identification of Piping Systems for lettering size, colors and installed viewing angles of identification devices unless other requirements are specified.
2. ASTM D 709, Standard Specifications for Laminated Thermosetting Materials.
3. ASTM D 1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).
4. ASTM D 2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
5. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM E 814, Standard Test Method for Fire Tests of Penetration Firestop Systems.
7. NFPA 255, Surface Burning Characteristics Building Materials.
8. UL 723, Test for Surface Burning Characteristics of Building Materials.
9. UL 1479, Fire Tests of Through-Penetration Firestops.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Equipment supports
2. Sleeves
3. Pipe markers
4. Underground pipe markers
5. Equipment nameplates
6. Valve tags
7. Access doors

8. Pipe curb assembly

C. Test Reports: As required in specific specification sections.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods to prevent damage, deterioration, and loss, including theft.

B. Deliver products to site in manufacturer's original containers, complete with labels.

C. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

D. Store products subject to damage by weather conditions above ground, under cover in weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

E. Close open ends of equipment and work with temporary covers or plugs during storage and construction to prevent entry of foreign material.

PART 2 PRODUCTS

2.1 MATERIALS

A. Materials shall be new and of manufacturers specified herein. They shall be U.S. made and bear the UL, ETL, or CSA labels where possible.

2.2 EQUIPMENT SUPPORTS

A. Select and size supports, expansion shells and bolts, concrete inserts, and anchor bolts per requirements for seismic restraints specified in Section 15210. Hot dipped or mechanically galvanized where installed outdoors unless noted otherwise on the Drawings. Damaged galvanized surfaces repaired with ZRC Galvilite.

B. Expansion Shells and Bolts and Concrete Screws:

1. Manufacturers for Expansion Bolts for Equipment: Simpson Strong-Tie, Hilti, or approved for holes drilled in concrete.
2. Manufacturers for Concrete Screws for Equipment: Simpson Strong-Tie, Hilti, or approved for holes drilled in concrete.

C. Concrete Inserts: Comply with requirements in Section 15080.

D. Formed Steel Channels: Twelve gage minimum, 1-5/8 inch by 1-5/8 inch minimum cross-section size, epoxy coated. Cooper B-Line Dura-Green or Dura-Copper, Unistrut, Powerstrut, or approved.

E. Anchor Bolts: Include for equipment. Number and size per manufacturer's recommendations or as indicated on the Drawings.

F. Supplementary Steel Framing: Standard structural steel shapes or Schedule 40 steel pipe.

G. Welding to Building Structural Members: Not acceptable except as indicated on the Drawings.

H. Concrete Bases (Housekeeping Pads): Include bases under floor mounted equipment, nominal 3-1/2 inch high. Size bases 4 inches larger than equipment footprint in each direction unless noted otherwise on the Drawings.

2.3 SLEEVES

A. Materials, General: Schedule 40 galvanized steel pipe with unthreaded ends, cast iron pipe, or minimum 26 gage galvanized sheet steel. Use steel pipe for sleeves through floor slabs.

B. Below Grade Watertight Wall and Slab On-Grade Floor Penetrations: Manufactured pipe-to-wall penetration closure. PSI - Thunderline Link-Seal® Modular Seal as manufactured by Pipeline Seal & Insulator, Advance Products & Systems “InnerLynx”.

1. Description: Modular mechanical type assembly consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and wall opening. Seal constructed to provide electrical isolation between pipe and wall, reducing cathodic reaction. Glass reinforced nylon pressure plates with zinc plated nuts and bolts.
2. Sleeves for New Construction: HDPE thermalplastic with full circle molded in waterstop plate and reinforcing ribs. Length to suit wall thickness. Inside diameter to suit seal requirements. Century Line® Model CS.
3. Openings for Existing Concrete Wall Construction: Core drill opening, inside diameter to suit seal requirement.

2.4 PIPE MARKERS AND COLOR BANDS

A. General: Manufacturer’s standard preprinted, flexible or semi-rigid, permanent, color-coded, plastic sheet pipe markers. Comply with ASME A13.1 for label color and lettering size. Color code markers in accordance with Article “Pipe Markers and Color Bands Schedule” in this section. Include flow direction arrows.

B. Small Pipes: For external diameters less than 6 inches (including insulation), full band pipe markers.

C. Lettering: Indicate piping system using full name or abbreviation as indicated on the Drawings. Manufacturer’s standard pre-printed nomenclature which best describes piping system in each instance acceptable, as selected by the A/E in cases of variance with names indicated on the Drawings.

D. Manufacturers: Seton, Brady, Craftmark, Marking Services, or approved.

2.5 EQUIPMENT NAMEPLATES

A. General: Engraved stock melamine plastic laminate. Comply with ASTM D 709. Engraved with engraver’s standard letter style of sizes and wording, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate. Plastic strips with raised letters made by a marking device not acceptable. Include area (room) served on nameplate. Coordinate naming convention with the Owner. Color of nameplates for access doors for fire dampers, smoke dampers, and combination fire/smoke dampers as selected by the AHJ.

B. Thickness: 1/16 inch thick for nameplates up to 20 sq. in. or 8 inch length and 1/8 inch thick for larger nameplates.

2.6 VALVE TAGS

A. General: Manufacturer's standard solid plastic valve tags with printed enamel lettering, piping system abbreviation in approximately 3/16 inch high letters, sequenced valve numbers approximately 3/8 inch high, and 5/32 inch hole for fastener. Coordinate naming convention with the Owner.

B. Valve Schedule: Typewritten on 8-1/2 by 11 inch bond paper. Tabulate valve number, piping system, system abbreviation (or as shown on tag), location of valve (room or space), and variation for identification (if any). Identify valves for emergency shutoff and similar uses in margin of schedule.

C. Fasteners: Manufacturer's standard solid brass beaded type chain, length as required for proper attachment of tags to valves manufactured specifically for that purpose.

D. Valve Schedule Frames: Glazed display frame with screws for removable mounting on masonry walls. Frame finished hardwood or extruded aluminum with SSB-grade sheet glass. Laminated plastic with reinforced mounting holes acceptable.

2.7 ACCESS TO MECHANICAL EQUIPMENT

A. General: Universal 1-piece frame, flush type, welded steel ground smooth rounded safety corners, 1-piece spring hinge, slot screwdriver type cam latches, shallow 1-1/4 inch mounting flange. Where located in a painted surface area, units primed for painting; otherwise, polished chrome or stainless steel units, unless another type of finish is indicated.

B. Construction:

1. For sizes 16 inch by 16 inch and smaller: 16 gage panel, 18 gage flange.
2. For sizes 18 inch by 18 inch and larger: 14 gage panel, 16 gage flange.

C. Fire Rating: Where building fire-resistance rating is indicated, on the Drawings, doors shall be UL listed and labeled to meet fire rating requirements, except for those doors which are smaller than minimum size requiring fire ratings as recognized by governing authority.

D. Access Door Sizes:

1. One-Hand or Inspection Access: 8 inches by 5 inches.
2. Two-Hand Access: 12 inches by 6 inches.
3. Head and Hand Access: 18 inches by 24 inches.
4. Head and Shoulder Access: 24 inches by 24 inches.
5. Body Access: 30 inches by 14 inches.
6. Body plus Ladder Access: 36 inches by 24 inches.

E. Manufacturers: Milcor, Elmdor, Acudor Products, or approved.

2.8 PERSONNEL PROTECTION

A. General: Where support angles, hangers, equipment supports and appurtenances, and similar items are exposed above floors, walkways, and maintenance access ways, cover such protrusions less than 6'-6" above floor with protective padding.

B. Protective Padding: Soft elastomeric foam material or equivalent with composite and component ratings per NFPA 255, ASTM E 84, or UL 723. Flame spread 25, smoke developed 50. Armstrong or Rubatex.

C. Finish: White field-applied finish of same manufacturer as protective padding.

2.9 PAINTING

A. Paint for Equipment, Piping, Sheet Metal Work, and Mechanical System Appurtenances: Alkyd enamel semi-gloss, including prime and finish coat(s). Etch galvanized steel and aluminum sheet with phosphoric acid and apply galvanizing primer.

B. Paint for Iron and Steel Hangers and Equipment Supports: Alkyd enamel semi-gloss, including zinc chromate primer and finish coat.

C. Paint colors in accordance with Article “Painting Schedule” in this section. Indicate system using full name or abbreviation as indicated on the Drawings. Name minimum 1/2 inch height. Include flow direction arrows.

D. Manufacturers: Cowman-Campbell Paint Company (C&C), Preservative Paint Company, Fuller-O’Brien Corp., Glidden-Durkee Paint Co., Parker Paint Sales, Dutch Boy (National Lead Co.), Pittsburgh Paint Company, or Sherwin-Williams Paint Company.

PART 3 EXECUTION

3.1 MEASUREMENTS

A. Verify measurements at job site. Locate equipment and fixtures on centers of walls, openings, spaces, and similar locations except where noted otherwise. Check that piping, ducts, and similar elements clear openings.

3.2 INSTALLATION OF EQUIPMENT

A. Equipment Installation:

1. General: Install supports for equipment and appurtenances.
2. Suspended Equipment:
    a. Install concrete inserts before concrete is placed. Fasten inserts securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through openings at top of inserts.
    b. Install hangers from structure. Comply with requirements in Section 15080 for hanger rod sizes.
    c. Span between structural members with additional structural steel to mount equipment in locations shown. Do not fasten hangers to metal deck. Powder actuated fasteners not acceptable.
3. Floor-Mounted Equipment, General:
    a. Install machine and floor or foundation fastenings. Set equipment on concrete pads. For new construction, install anchor bolts through concrete equipment pads to structural concrete slabs. For existing construction, install concrete expansion anchors or concrete screws through concrete equipment pads to existing structural concrete slabs.

b. Install equipment at locations and to dimensions indicated in the drawings using manufacturer's leveling screws, blocks, shims, or wedges. Do not distort equipment or baseplates.

4. Stands: Fabricate structural steel stands to support equipment not floor mounted or suspended from structure. Fabricate from structural steel members or steel pipe and fittings.
5. Manufacturer-Supplied Bases: Bases may be supplied by the equipment manufacturer if equivalent to base requirements specified above.

B. Equipment Seismic Restraints: Comply with requirements in Section 15200.

3.3 CUTTING AND PATCHING

A. General: Include in cost of mechanical work, cutting, coring, patching, and painting of existing walls, ceilings, and floors as required to accommodate work as indicated in the Contract Documents and specified in Division 15 work, except where specifically shown on architectural drawings. Employ skilled workmen to perform cutting and patching and restore disturbed surfaces to original condition. Material and workmanship for patching shall be as specified in respective sections for general construction. If not specified, patch and paint to match existing surfaces. In addition, comply with requirements in Division 1.

B. Coordinate cutting work with other trades to minimize patching work and to protect existing finishes and structure from damage. Trenching shall not exceed 2'-0" in width unless approved by the A/E. Cutting of structural members shall be done with the A/E's approval.

C. During demolition efforts, cover duct open-ends and grille openings with taped on plastic sheet to keep construction dust out of the ducted system. Comply with requirements of Section 15055.

3.4 SLEEVES AND SEALING OF SLEEVES

A. Install sleeves for pipes and ducts for penetrations through cast-in-place concrete walls and floors, non-rated walls and floors, fire rated walls and floors, mechanical room walls and floors, and acoustical walls. Seal air and watertight. At Contractor's option, install cast-in-place watertight firestop devices through cast-in-place concrete fire rated floors.

B. Dimensions:

1. Annular Clear Space, General: Include annular clear space of approximately 1/4 to 1/2 inch. Size to accommodate insulation passing through sleeve.
2. Annular Clear Space for Sleeves through Fire Rated Walls and Floors: Include annular clear space between sleeve and insulated or uninsulated surfaces of pipe, tubing, conduit, and wiring per firestopping manufacturer's installation requirements. Coordinate with requirements in Division 7 and insulation thicknesses specified in Section 15250.
3. Annular Clear Space for Sleeves through Mechanical Room Walls and Floor and Acoustical Walls: Comply with requirements in Section 15200.
4. Cast-in-Place Watertight Firestop Devices: Match uninsulated through-penetrant pipe outside diameter size.

C. Extension: Wherever piping passes through floor slab above occupied space or equipment, install pipe sleeves extending 1 inch above floor, except where cast-in-place watertight firestop devices are installed.

D. Setting: Set sleeves or cast-in-place watertight firestop devices in place prior to pouring of concrete in new construction. Core drill and grout sleeves in place for unit masonry construction. Core drill existing concrete wall and floor construction.

E. Sealing of Sleeves:

1. Through Walls and Floors: Fill both ends of sleeve with non-hardening silicone sealer as specified in Division 7.
2. Through Fire Rated Walls and Floors: Firestopping will be installed by a specialty subcontractor as specified in Division 7.

F. Through Acoustical Walls: Comply with requirements in Section 15200.

G. Sheet Metal Dams: Install 16 gage galvanized sheet metal dams around opening on top of floor for core drilled, saw cut, and formed openings through floor slabs without concrete curbs above occupied or equipment spaces. Solder or weld watertight. Seal and anchor to floor watertight. Install with minimum 1 inch projection above floor with 2 inch wide flange on floor.

H. Below Grade Watertight Wall and Slab-On-Grade Floor Penetrations: Install manufactured pipe-to-wall penetration closures where pipes pass through openings in concrete walls below grade adjacent to occupied and equipment spaces.

3.5 ACCESSIBILITY

A. General: Locate valves, dampers, controls, and similar components to be readily accessible. Install access doors to achieve accessibility. Access shall include, but not limited to, mechanical equipment above inaccessible ceilings and trap primers, valves, and similar items behind walls and above ceilings. Coordinate access door locations with the A/E.

B. Equipment:

1. Install equipment which requires periodic servicing or repairs to be readily accessible, except where specifically shown on architectural drawings. Otherwise, obtains A/E approval of location.
2. Piping, ducts, and conduit shall not interfere with required access.
3. Locate mechanical equipment above ceilings within 2 feet of access doors. If access to equipment is from bottom of unit, locate access door directly under unit sized large enough to accommodate access to internal components.

C. Access Tile Identification: Apply circular dot stickers on ceiling grid frame to indicate location of valves, dampers, controls, and equipment that requires maintenance. Color as selected by the A/E.

3.6 PIPE MARKERS AND COLOR BANDS

A. Install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment. Install to be visible on sides or bottom of pipe.

B. Locate pipe markers and color bands as follows wherever piping is exposed in occupied spaces, accessible maintenance spaces, and exterior non-concealed locations.

1. Near each valve and control device.
2. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch where there could be question of flow pattern.
3. Near locations where pipes pass through walls and floors/ceilings or enter non-accessible enclosures.
4. At change in direction of pipe.
5. At access doors, manholes, and similar access points which permit view of concealed piping.
6. Near major equipment items and other points of origination and termination.
7. Spaced intermediately at maximum spacing of 30 feet along each piping run, except reduce spacing to 15 feet in congested areas of piping and equipment. Stagger alternately on adjacent pipes.
8. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.7 PERSONNEL PROTECTION

A. General: Secure and permanently fasten elastomeric foam material in neat and smooth manner using band straps, clamps, snaps, or similar methods.

B. Finish: Apply 1 or 2 coats to result in uniform white color.

3.8 VALVE TAGS

A. Install valve tags on valves and control devices in each piping system. Install wherever destination or identity of pipe is not visible from valve. Fasten with chain to valve stem.

B. Tags for check valves, valves within factory-fabricated equipment units, plumbing fixture supply stops, hose bibbs, wall hydrants, shutoff valves at HVAC terminal devices and similar rough-in connections of end-use equipment not required. Include tagged valves in valve schedule for each piping system.

C. Install valve schedule in mechanical rooms and in custodial room or as directed by the A/E.

3.9 EQUIPMENT NAMEPLATES

A. Install nameplates on or near each major item of mechanical equipment and each operational device. Install on accessible sides of equipment for the following general categories of equipment, operational devices, and for equipment scheduled on the Drawings:

1. Boilers
2. Pumps
3. Fans
4. Packaged HVAC units
5. Tank and pressure vessels
6. Control panels
7. Air handling units

B. Install with self-tapping stainless steel screws or steel rivets, except use of contact-type permanent adhesive where screws cannot or should not penetrate substrate is acceptable.

3.10 EARTHWORK

A. Perform earthwork required for installation of mechanical work below grade. Provide earthwork meeting requirements in this article, UPC, and Division 2, whichever is most stringent.

B. Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling. Perform excavation in a manner which protects walls, footings, and other structural members from being disturbed or damaged in any way.

C. Coordinate excavations with weather conditions to minimize possibility of washouts, settlements, and other damages and hazards.

D. Do not excavate until required materials are on site and the work is ready to proceed without delay so that total time lapse from excavation to completion of backfilling will be minimal. Remove excavated material from jobsite. Reuse of excavated material from trenches inside existing structures acceptable upon approval by the A/E.

E. Excavate trenches of necessary width for proper laying of pipe with banks as nearly vertical as possible from trench bottom to 12 inch above top of pipe and conduit. Excavate trenches in accordance with Article “Minimum Trench Width for Non-Metallic Pipe” in this section. Grade trench bottoms to provide uniform undisturbed bedding for each section of pipe. Form holes and depressions for joints after trench bottom has been graded. Provide temporary pumping equipment to keep excavation free from water. Install pipe bedding in rock excavation consisting of not less than 6 inches of sand or equivalent material. For non-metallic sewer and storm drain piping (for example, PVC, CPVC, PP, PVDF, and ABS), comply with ASTM D 2321.

F. Store native excavated material (temporarily) near excavation in manner which will not interfere with or damage excavation or other work.

G. Provide bracing and shoring as necessary to maintain stability of excavation and to comply with safety codes.

H. Provide imported material from off-site for use as final backfill if excavated material is not approved by the A/E for reuse.

I. Backfill trenches only after completion of pressure tests and inspection by the A/E. Install backfill material under, around, and between pipe and sides of trench by hand, shovel tamped in place. Cover in 6 inch layers to 12 inch thickness over top of pipe. For final backfill, fill and tamp remainder of backfill material in 6 inch layers. Provide backfill materials as follows:

1. For metallic sewer and water piping, use pea gravel.

J. For gas piping, use sand.

K. For non-metallic, sewer and storm drain piping (for example, PVC, CPVC, PP, PVDF, and ABS), comply with ASTM D 2321.

L. Wherever paving or future paving is indicated over backfill and areas where mechanical work is located outside of building perimeter, such as for oil interceptors, oil tanks and grease interceptors, where heavy equipment may impact piping, provide remainder of backfill with granular subgrade backfill material (Butler fill).**]**

M. Compacting:

1. Perform compacting individually, for each 6 inch layer (maximum) loose thickness of initial and final backfill. Comply with ASTM D 1557. Where roadway or parking area surfaces will be placed over backfill and to 10 feet beyond building perimeter, compacted to 95 percent of maximum density. Elsewhere, 90 percent. Test in accordance with Divisions 1 and 2.

N. Take special care in compacting under services where they enter building to prevent settling. Contractor fully responsible for damage to piping and property as a result of settling around service piping.

O. Dispose of surplus earth off-site in a suitable location.

P. Place and maintain barricades, construction signs, torches, lanterns and guards as required during periods of open excavation to protect persons from injury and to avoid property damage.

Q. Leave premises thoroughly clean at completion of earthwork.

R. Installation of Piping in Backfilled Areas: Wherever piping is to be installed in areas which have been excavated below pipe inverts, for any purpose, install piping to prevent subsequent settlement. Do not install piping until backfill is to full compaction, completed to minimum 18 inch above pipe to be installed. Install piping in re-excavated trenches and backfill as previously specified.

S. Where subsidence is measurable or observable at mechanical work excavations during project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.11 PAINTING

A. General:

1. Paint equipment, piping, sheet metal work, and mechanical system appurtenances inside mechanical rooms and machine rooms.
2. Painting in finished rooms is specified in Division 9.
3. Painting of metal jacketing specified in Section 15250 not required.

B. Application:

1. Thoroughly clean surfaces to be painted to remove dirt, grease, and scale. Wash galvanized surfaces with mild solution of acid prior to painting.
2. Paint insulated surfaces and covered piping with 1 primer coat and 2 finish coats.
3. Paint exposed equipment, ducts, pipes, and supports with 1 primer coat and 2 finish coats. Equipment painted at the factory with lacquer or enamel need not be painted. Touch up damaged areas with paint to match factory color.
4. Paint supporting devices for mechanical systems specified to be painted.

3.12 MISCELLANEOUS EQUIPMENT AND FIXTURE CONNECTIONS

A. General: Install piping, ducts, and make final mechanical connections in accordance with manufacturer's recommendations for Owner-furnished equipment and fixtures, and equipment and fixtures specified in Divisions 1 through 14. This applies to work of, but not limited to, Sections 15410, 15710, and 15845.

B. Coordination: Perform on-site review and refer to manufacturer's Shop Drawings for details of connections. Perform rough-in at locations to conveniently serve items.

3.13 CLEANING AND HOUSEKEEPING

A. General: Comply with requirements in Division 1 and Section 15820 for air handling equipment.

B. Remove debris, cuttings, crates, cartons, and similar items, created by Division 15 Work at regular intervals. Perform at sufficient frequency to eliminate hazard to the public, other trades personnel, building, and the Owner's employees.

C. Before Substantial Completion, carefully clean equipment, fixtures, exposed ducts and piping, and similar items. Remove construction labels, dirt, dust, cuttings, paint, plaster, mortar, concrete, and similar items.

3.14 PIPE MARKERS AND COLOR BANDS SCHEDULE

PIPE SYSTEM	COLOR
Domestic Water	White Letters on Green
Compressed Air	White Letters on Blue
Hydronic Heating	White Letters on Green

OUTSIDE PIPE DIAMETER (INCLUDING INSULATION) (INCH)	MINIMUM LENGTH OF LABEL COLOR FIELD (INCH)	MINIMUM LETTER HEIGHT (INCH)
3/4 to 1-1/4	8	1/2
1-1/2 to 2	8	3/4
2-1/2 to 6	12	1-1/4

3.15 MINIMUM TRENCH WIDTH FOR NON-METALLIC PIPES

PIPE SIZE (INCH)	TRENCH WIDTH PER ASTM D 2321 (INCH)
Up to 4	21

END OF SECTION

SECTION 15060 - PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes piping and associated appurtenances for piping that apply to multiple systems. Piping specific to a single system is specified in that particular section.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.3, Malleable Iron Threaded Fittings: Classes 150 and 300.
3. ASME B16.4, Gray Iron Threaded Fittings: Classes 125 and 250.
4. ASME B16.5, Pipe Flanges and Flanged Fittings NPS 1/2 through 24 Inch Standard.
5. ASME B16.9, Factory-Made Wrought Steel Buttwelding Fittings.
6. ASME B16.11, Forged Fittings, Socket-Welding and Threaded.
7. ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
8. ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
9. ASME B16.39, Malleable Iron Threaded Pipe Unions Classes 150, 250, and 300.
10. ASME B31.1, Power Piping.
11. ASME B31.9, Building Services Piping.
12. ASME BPVC, Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
13. ASTM A 53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
14. ASTM A 105, Standard Specification for Carbon Steel Forgings for Pipe Applications.
15. ASTM A 106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
16. ASTM A 126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
17. ASTM A 181, Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
18. ASTM A 183, Standard Specification for Carbon Steel Track Bolts and Nuts.
19. ASTM A 197, Standard Specification for Cupola Malleable Iron.
20. ASTM A 536, Standard Specification for Ductile Iron Castings.
21. ASTM B 32, Standard Specification for Solder Material.
22. ASTM B 75, Standard Specification for Seamless Copper Tube.
23. ASTM B 88, Standard Specification for Seamless Copper Water Tube.
24. ASTM B 633, Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

25. ASTM B 813, Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
26. ASTM B 828, Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings.
27. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
28. ASTM F 402, Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
29. ASTM F 438, Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
30. ASTM F 439, Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
31. ASTM F 441, Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
32. ASTM F 493, Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
33. ASTM F 656, Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
34. AWS A5.8, Specification for Brazing Filler Metals for Brazing and Braze Welding.
35. AWS D10.12, Guide for Welding Mild Steel Pipe.
36. CSA B137.11, Polypropylene (PP-R) Pipe and Fittings for Pressure Applications
37. NFPA 13, Standard for the Installation of Sprinkler Systems.
38. NFPA 99, Standard for Health Care Facilities.
39. NSF 14, Plastic Piping System Components and Related Materials
40. NSF 61, Drinking Water Systems Components – Health Effects.
41. NSF 372, Drinking Water Systems Components –Lead Content.

C. Installer Qualifications for Copper Press Fitting Couplings: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

D. Welding: Qualify processes and operators according to ASME BPVC.

E. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."

F. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

G. Domestic Water Systems: Products carrying and dispensing water for consumption through drinking and cooking shall be certified by an independent, ANSI-accredited, third party certification organization to the requirements of NSF 61 and NSF 372 for 0.25 per cent maximum lead content for the wetted component base material.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Steel piping
2. Copper tubing including solder and flux.
3. Polyvinyl Chloride (PVC) piping
4. Chlorinated polyvinyl (CPVC) piping
5. Polypropylene - Random (PP-R) and PP-RCT piping

C. Welding certificates.

D. Installer Qualification Data for Copper Press Fitting Couplings.

E. Testing Reports: Pressure testing records.

PART 2 PRODUCTS

2.1 GENERAL

A. Pressure Ratings: Provide components with minimum pressure rating of 150 psig working pressure.

2.2 MANUFACTURERS

A. Copper Tubing: Cerro, Mueller, Wolverine, Cambridge Lee Brass.

B. Copper Tubing Fittings: NIBCO®, Mueller, Elkhart.

C. Gaskets: Crane, Garlock, U. S. Rubber, Anchor, Flexitallic.

D. Shaped Nipples: Allied, Bonney Forge.

E. Origin: Items shall be manufactured in the United States.

2.3 COPPER TUBING

A. Tubing, Above Ground: Type L copper water tube, hard-drawn, ASTM B 88.

B. Tubing, Underground: Type K copper water tube, soft-drawn, ASTM B 88.

C. Fittings: Wrought copper fittings and screwed adapters for soldered and brazed joints, ASME B16.22; cast bronze fittings and screwed adapters for soldered and brazed joints, ASME B16.18.

D. Copper Press Fitting Couplings:

1. Suitable for Types K and L hard drawn copper tubing for sizes 1/2 through 2-1/2 inch and soft drawn copper tubing for sizes 1/2 through 1-1/4 inch. Press-to-connect joint made with pressing tool and jaw sets recommended by fitting manufacturer. NIBCO® Press SystemTM, Viega ProPress System, or Elkhart XPress. No substitutions.
2. Approved by NSF International, IAPMO, UL and compliant with UPC.
3. Wrought copper fittings per ASTM B 75 conforming to ASME B16.18 or ASME B16.22. Rated to maximum 200 psig non-shock working pressure for temperature range between minus 20 to 250 F.

E. Unions: Wrought copper solder joint unions, ASME B16.22; cast bronze solder joint fittings, ASME B16.18.

F. Flanges and Flanged Fittings: Cast bronze, 125 pound Class, ASME Standards.

G. Gaskets: 1/16 inch thick compressed non-asbestos material selected for applicable temperature and pressure of systems installed. Full face gaskets for flat faced flanges.

H. Joint Compound: Teflon tape.

I. Solder Material: 95 percent tin, 5 percent antimony solder or 96 percent tin 4 percent silver conforming to ASTM B 372 and NFS 61. Lead free (not more than 0.25 percent lead). Flux water soluble conforming to ASTM B 813. J.W. Harris

"Bridgit", Rectorseal, Oatey, Superior Flux, Worthington Cylinders, BerzOmatic, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 PIPING INSTALLATION

A. Install piping, fittings, and appurtenances in accordance with recognized industry practices which will achieve permanently leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions or flanges for disassembly and maintenance replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Bushings not acceptable. Align piping accurately at connections, with 1/16 inch misalignment tolerance. Refer to Section 15080 for pipe hangers and supports.

B. Install pipe generally sloped to permit drainage at low points, free from sags, bends, and traps, and in a manner to conserve space for other work. Refer to other sections for specific installation requirements.

C. Location of Piping:

1. Piping plans, sections, details, and diagrams are diagrammatic indicating general arrangement of piping installation. Locate piping and include offsets to avoid interference with building structural members, equipment, building openings, light fixtures, ductwork, electrical work, and other obstructions.
2. Arrange piping to allow access for operation, service, disconnection, and removal and replacement of valves, fixtures, and equipment.
3. In general, maintain the maximum possible headroom in ways of egress, including pedestrian walkways and maintenance aisles, minimum headroom of 6'-8" from floor to bottom of any component.
4. Within buildings, conceal piping in walls and chases and above ceilings except where indicated in the Contract Documents to remain exposed. Do not cover or enclose work until completely inspected and approved. Should Work be covered or enclosed prior to inspections and approvals, uncover work as directed by the A/E. After Work has been inspected and approved, make repairs and

replacements with materials as necessary to obtain approval of A/E at no additional cost to Owner.

5. Route piping parallel to column lines and perpendicular to floor unless indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install fittings for changes in direction and branch connections.

F. Install piping to allow application of insulation.

G. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

H. Clean interior of piping before making joints and placing in position by blowing clean with steam or compressed air. Maintain cleanliness of piping throughout installation. Install caps or plugs on open ends of cleaned piping.

I. Install isolation valves specified in Section 15100 and drain existing piping to accommodate installation of new Work.

3.5 SOLDERED JOINTS

A. Comply with applicable provisions of ASTM B 828 or "Copper Tube Handbook" by CDA for soldered joints.

B. Cut ends square and remove fins and burrs. Replace dents and damaged tubing with new tubing.

C. Remove grease and oil from joints by wiping with clean cloth saturated with suitable chemical solvent. Clean with emery cloth.

D. After cleaning, apply non-corrosive flux, apply heat and material and hold joint rigidly until hardened.

E. Wipe excess material from exterior of joint before hardening.

F. Before soldering remove stems and washers of valves.

G. 2-1/2 inch and larger piping, copper press fitting couplings shall be used.

3.6 WELDED JOINTS

A. Weld 3 inch and larger steel piping, (and shaped nipples to existing piping for connection of new piping). Construct joints according to AWS D10.12.

B. Bevel piping ends mechanically or by flame cutting. Where beveling is done by flame cutting, thoroughly clean surfaces of scale and oxidation just prior to welding.

C. Do not split, bend, flatten or otherwise deform piping before, during, or after installation. During erection, take care to remove dirt, scale, and other foreign matter from inside piping by use of pipe swab or pipe "pig" before connecting sections, valves, equipment, and fittings. Where pipe temperature falls to 32 F or lower, heat pipe to approximately 100 F for distance of 1 foot each side of weld before welding, and finish weld before pipe cools to 32 F.

D. Replace defective welds at no additional cost to the Owner. Do not repair by adding weld material over defect or by peening.

3.7 COPPER PRESS FITTING COUPLINGS

A. Use manufacturer-recommended tool and procedure. Leave insertion marks on pipe after assembly.

3.8 FLANGED JOINTS

A. Match flanges within piping system, and at connections with valves and equipment.

B. Clean flange faces and install gaskets concentrically positioned.

C. Use suitable lubricants on bolt threads and tighten bolts to provide uniform compression of gaskets.

3.9 CLEANING AND INSPECTING

A. Clean exterior surfaces of installed piping systems of superfluous materials, and prepare for application of specified coatings (if any).

B. Inspect each run of each system for completion of joints, supports, and accessory items.

C. Inspect pressure piping in accordance with procedures of ASME B31.1 and ASME B31.9

3.10 FLUSHING

A. Flush piping with clean water prior to connecting to existing systems and pressure testing.

B. Isolate equipment from piping during flushing. Provide bypass piping and remove after flushing is completed. Provide cap, plug, or blind flange at pipe connections.

C. Remove strainer screens during flushing except those protecting control equipment. Clean screens protecting control equipment during flushing and after flushing is completed. Coordinate with controls system subcontractor to have automatic control valves fully open during flushing.

D. Flush designated piping systems by circulating water through 100 mesh screen at 7-1/2 feet per second for 1 hour minimum.

E. Flush heating water piping. Flushing and sterilization of domestic water piping is specified in Section 15400.

F. Following initial flushing but before the systems are refilled, reinstall strainer screens, coordinate with chemical treatment specialist specified in Section 15735 and provide assistance with chemical cleaning and addition of chemical treatment to the systems.

3.11 PRESSURE TESTING

A. Provide equipment and apparatus necessary for tests. Make tests in presence of the A/E. Notify the A/E at least 48 hours before expected tests.

B. Test piping systems after flushing, before insulation has been applied, and before backfilling.

C. Test Pressures and Duration: Test piping systems at pressure of 1-1/2 times design working pressure or at 100 psig, whichever is greater. Maintain test pressure for

sufficient time to permit complete inspection of system under test. Minimum 2 hour duration. Test in sections and test entire system when completely installed.

D. Test Procedure:

1. Before tests, remove or valve off from the system gages, traps, pressure reducing valves, pumps, and other apparatus which may be damaged by test pressure.
2. Install calibrated test pressure gage in system to observe any loss in pressure.
3. Open normally closed control valves.
4. Test piping at metal temperature greater than 35 F.
5. Open vents, and other connections which can serve as vents, during filling so that air is vented prior to applying test pressure to system.

E. Testing Media Requirements:

1. Use clean, fresh city water for hydrostatic testing of hydronic, condensate, and pumped condensate piping. Water temperature shall be not less than 60 F and not greater than 100 F.
2. Use oil-free clean dry compressed air for gaseous piping.
3. Drain water immediately after hydrostatic testing. Vent system while draining to avoid creating a vacuum. Blow out condensate piping with compressed air, including dead legs and low points.

F. Test Repairs:

1. Remove materials such as gaskets and bolts damaged during tests and flushing and provide new components.
2. Use new gaskets each time a flanged joint is made up.
3. Repair defects which develop during testing and retest piping systems until they show no defect or weakness and are tight. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
4. Repair welded joints that are defective in accordance with applicable requirements. Re-examine repaired components by original method to determine freedom from defects, and retest repaired joints.

G. Test Records: Make and submit records for each piping installation. Include copies in the Operation and Maintenance Manual. Include at a minimum, the following items:

1. Date of test.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Test duration.
6. Remarks, to include such items as: Leaks (type, location); repairs made on leaks.
7. Signature and date of person witnessing the test.
8. Certification by Contractor.

H. Systems Which Connect to Existing Piping: Isolate new piping system from existing system by the closest valve or valves to the existing system.

END OF SECTION

SECTION 15080 - PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes pipe specialties that apply to multiple systems. Specialty components specific to a single system are specified in that particular section.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME B31.1, Power Piping.
2. ASTM A 53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A 666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
4. ASTM B 650, Standard Specification for Electrodeposited Engineering Chromium Coatings on Ferrous Substrates.
5. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
6. MSS SP-58, Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation.
7. NFPA 255, Surface Burning Characteristics Building Materials.
8. UL 723, Tests for Surface Burning Characteristics of Building Materials.

C. Pipe hangers and clamps and related components installed in ceiling spaces used as a return air plenum shall have ratings per NFPA 255, ASTM E 84, and UL 723 with flame spread rating not greater than 25 and smoke developed rating not greater than 50.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following. Include MSS reference in product data for pipe hangers and supports.

1. Pipe hangers and supports
2. Engineered secondary pipe positions and support systems
3. Pipe supports on roof
4. Insulated pipe hangers
5. Low pressure Y-type strainers
6. Thermometers
7. Pressure gages
8. Temperature/pressure test ports

9. Thermal/seismic flexible loops – 1 1/2” and 4 inch movement
10. Thermal/seismic flexible loops – more than 1 1/2” inch movement
11. Alignment guides
12. Thermal expansion joints
13. Pipe anchors
14. Pipe wrap
15. Pipe escutcheons

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish factory-fabricated piping specialties recommended by manufacturers for use in services indicated. Furnish piping specialties of types and pressure ratings indicated but rated at not less than 125 psig WSP to comply with installation requirements. Furnish sizes as indicated with connections which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Contractor’s option.

B. Except as otherwise indicated, furnish factory-fabricated pipe hangers and supports complying with MSS SP-58, of one of the following MSS types listed, selected to suit piping systems, in accordance with MSS SP-58 and manufacturer’s published product information. Use only one type by one manufacturer for each piping service. Select size of hangers and supports to exactly fit around piping insulation with saddle and shield for insulated piping and where insulated pipe hangers are used.

C. Materials: Match piping material at point of contact with piping:

2.2 PIPE HANGERS AND SUPPORTS

A. Horizontal Piping:

1. Adjustable Steel Clevises: MSS SP-58 Type 1.
2. Yoke Type Pipe Clamps: MSS SP-58 Type 2.
3. Steel Pipe Clamps: MSS SP-58 Type 4.
4. J-Hangers: MSS SP-58 Type 5.
5. Adjustable Band Hangers: MSS SP-58 Type 9.
6. Split Pipe Rings: MSS SP-58 Type 11.
7. Pipe Slides and Slide Plates: MSS SP-58 Type 35, including glide type plate.
8. Adjustable Roller Hanger: MSS SP-58 Type 43.
9. Adjustable Pipe Roll and Base: MSS SP-58 Type 46.
10. Trapeze Hanger: MSS SP-58 Type 59, shop or field fabricated made from structural-steel shapes with hanger rods, nuts, saddles, and U-bolts. Comply with requirements in Section 200510 for formed steel channels.
11. Finish: Galvanized steel.

B. Hanger Rods: Hot rolled steel, ASTM A 36. Refer to Article “Hanger Rod Schedule” in this section.

C. Horizontal Underground Pipes Hung from Slab Above: Type 316 stainless steel.

D. Vertical Pipes at Walls and Columns: Supporting pipes from walls and columns not acceptable.

E. Riser Clamp for Vertical Pipes between Floors: MSS SP-58 Type 8 and Type 42.

F. Hanger Rod Attachments:

1. Steel Turnbuckles: MSS SP-58 Type 13.
2. Steel Clevises: MSS SP-58 Type 14.

G. Building Attachments:

1. Steel or Malleable Concrete Inserts: MSS SP-58 Type 18 or UL listed.
2. Top Beam C-Clamps: MSS SP-58 Type 19.
3. Side Beam or Channel Clamps: MSS SP-58 Type 20.
4. C-Clamps: MSS SP-58 Type 23.
5. Welded Steel Brackets.

H. Cushion Clamp for Un-Insulated Pipes:

1. Description: Steel clamp assembly with cushion insert for use with formed steel channels. Clamp with electro-galvanized finish. Cushion insert manufactured from thermoplastic elastomer for temperature range from 50 to 300 F. Unistrut Cush-A-Clamp or approved.

I. Manufacturers: Anvil International, Unistrut, Powerstrut, Superstrut, PHD, ERICO, Cooper B-Line, Tolco, Simpson Strong-Tie, or approved.

2.3 ENGINEERED SECONDARY PIPE POSITIONING AND SUPPORT SYSTEMS

A. General: Support of piping accomplished by engineered products specific to each application. Typical applications:

1. Vertical and horizontal branch piping serving plumbing fixtures.
2. Piping penetrations through wood and steel stud framing.
3. Trapeze hanger with horizontal piping either above or below the strut.
4. Manufacturers: Hubbard Enterprises/HOLDRITE or approved.

2.4 INSULATED PIPE HANGERS

A. Description: Hydrous calcium silicate or polyisocyanurate foam (urethane) insulation which covers 100 percent of the pipe and extends beyond overlapping full wrap galvanized steel or PVC jacket. Thickness of insulation same as specified in Section 15250 for specific pipe systems.

B. Manufacturers: Mechanical Pipe Shields Manufacturing for Snapp Itz for both hot and cold pipe applications or approved.

2.5 LOW PRESSURE Y-TYPE STRAINERS

A. Description: Line size of connecting piping with ends matching piping system materials. Select strainers for minimum 125 psi working pressure. Include ASTM A 666 Type 304 stainless steel screens, unless specified otherwise, with 3/64 inch perforations at 233 per sq. in. and blowout connection with ball valve and capped nipple or gate valve with plug.

1. Threaded Ends, 2 Inch and Smaller for Steel Pipe: Cast iron body.
2. Threaded or Solder Ends, 2 Inch and Smaller for Copper Pipe: Cast bronze body with brass screen.
3. Flanged Ends, 2-1/2 Inch and Larger: Cast-iron body.
4. For Domestic Water Service: FDA approved epoxy coating on interior and exterior surfaces.

5. Manufacturers: Armstrong Fluid Technology, Watts, Crane, Hoffman Specialty, Metraflex, Spirax Sarco, Nibco, or approved.

2.6 THERMOMETERS

A. Description: Industrial grade, cast metal case, separable socket construction; non-toxic, colored organic spirit filled glass tube; 9 inch scale length. Range 50 to 250 F with 2 F increments for heating water and condenser water piping.

B. Thermal Wells: Matched to thermometer stem. Brass, 3/4 inch NPT, extension neck length to extend 1 inch beyond the pipe insulation jacket. Well lengths shall cover a bulb insertion depth inside pipe across a minimum of 2/3 of pipe inside diameter.

C. Manufacturers: Weiss Instruments, Ashcroft, Palmer, Trerice, Weksler, Marsh, Taylor, Miljoco, or approved.

2.7 PRESSURE GAGES

A. Description: 4-1/2 inch size, stem mounting, cast metal case without back flange, cast metal threaded ring, phosphor bronze liquid filled bourdon tube, diaphragm seal, white face with black numerals, adjustable pointer. Plus or minus 1 percent accuracy over full scale range. Identify units of measurement by means of a factory-applied inscription on the faceplate of each gage such as pounds per square inch.

B. Needle (Gage) Valve: Brass needle valve, 600 psig WSP at 300 F, 1/4 inch NPT.

C. Appurtenances: 1/4 inch nipple, reducer, and snubber.

D. Pressure Ranges: Maximum gage pressure not greater than 150 percent nor less than 110 percent of the anticipated maximum pressure at point of installation. Select range so that normal operating point is near mid-scale of gage range. Gages 0 to 100 psig and vacuum 0 to 60 Hg: 1 psig maximum pressure increment per gage mark. Gages 1 to 200 psig: 2 psig. Gages 1 to 300 psig: 5 psig.

E. Manufacturers: Weiss Instruments, Lonergan, Weksler, Marsh, Taylor, U.S. Gauge, Ashcroft, International Register, Trerice, Miljoco, or approved.

2.8 TEMPERATURE/PRESSURE TEST PORTS (PETE'S PLUGS)

A. Description: Brass, 1/4 inch NPT with extension for insulated piping, length to suit insulation thickness.

B. Manufacturers: Peterson Equipment Company Type XL Pete's Plugs, MG P/T Plug, Sisco P/T Plug, or approved.

2.9 PIPE ANCHORS

A. Field Fabricated: Fabricated of same material as, or material compatible with, pipe being anchored.

B. Factory Assembled:

1. Description: Base mounted assembly with thrust plates and structural inserts for minus 20 F to 650 F temperature range, primed finish.
2. Manufacturers: Shaw Pipe Shields, Anvil International, Hyspan, or approved.

2.10 PIPE WRAP

A. Description: Ten mil thick vinyl, minimum three inches wide.

B. Manufacturer: Power Marketing Co., Transfer VID-10, or approved.

2.11 PIPE ESCUTCHEONS

A. Description: Select with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated, and to completely cover pipe penetration hole in floors, walls or ceilings including pipe sleeve extension. Nickel or chrome finish for occupied areas and prime paint finish for unoccupied areas.

1. Pipe Escutcheons for Moist Areas: For water-proof floors and areas where water and condensation can be expected to accumulate, cast brass or sheet brass escutcheons, solid or split hinged.
2. Pipe Escutcheons for Dry Areas: Sheet steel escutcheons, solid or split hinged.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 PIPE HANGERS AND SUPPORTS

A. General: Install building attachments at required locations for piping support. Install additional supports at concentrated loads, including valves, flanges, guides, strainers, expansion joint and at changes in direction of piping. Install insulated pipe hangers for insulated hot pipes 2 inch and larger and for all sizes of insulated cold pipes specified in Section 15250.

B. Install hangers, supports, clamps, attachments and engineered secondary pipe positioning and support systems to support piping securely from building structure. Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible, MSS SP-58 Type 59. Where piping of various sizes are supported by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Use of wire, perforated metal or scrap framing materials to support piping not acceptable.

C. Install hangers and supports complete with necessary insert, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.

D. Spacing of Hangers and Supports:

1. Maximum spacing between supports for straight runs of piping listed in Article "Spacing of Hanger and Supports Schedule" in this section.
2. Support polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) pipes at maximum 4 foot spacing for straight runs.

E. Pipe Ring Diameter:

1. Uninsulated Pipes: Ring diameter to suit pipe size.
2. Insulated Pipes: Ring diameter to suit outer diameter of insulated pipe hanger.

F. Anchoring, Guiding, and Supporting Piping:

1. Anchor and support piping so that expansion and contraction will take place in direction desired without stressing pipe, joints, and connected equipment.
2. Prevent vibration with vibration dampers and prevent undue strains on equipment served.
3. Fabricate hangers used for support of 2 inch nominal pipe size and larger to permit adequate adjustment after erection while still supporting the load.
4. Use wall brackets where pipes are adjacent to walls or other vertical surfaces which may be used for supports.
5. Fabricate supports to carry weight of piping and fluid and to maintain proper alignment.
6. Install inserts for supports in concrete. Powder-actuated inserts not allowed.
7. Install pipe rollers, alignment guides, and anchors at points where necessary to keep pipes in accurate alignment, to direct expansion movement, to prevent buckling, swaying and undue strain, and per expansion joint manufacturer's instructions.
8. Install hangers and supports for indicated pipe slope, and so that maximum pipe deflections allowed by ASME B31.1 are not exceeded.
9. Hang individual pipes and multiple pipes by trapeze hangers separately from roof structure and not from the roof deck itself and not from work of other trades. Hanging pipes from ducts and equipment not acceptable.
10. Install formed steel channel as specified in Section 15050 where required for pipe hangers and supports.
11. Install supports for horizontal pipe within 1-1/2 inches of each elbow.

3.5 PIPE HANGER AND SUPPORT APPLICATIONS

A. Horizontal Piping: Unless otherwise indicated, install the following types:

1. Adjustable Steel Clevis Hangers (MSS SP-58 Type 1): For suspension of noninsulated or insulated stationary pipes.
2. Yoke Type Pipe Clamps (MSS SP-58 Type 2): For suspension of 120 to 450 F pipes, 4 to 16 inch sizes, requiring up to 4 inches of insulation.
3. Steel Pipe Clamps (MSS SP-58 Type 4): For suspension of cold and hot pipes, 1/2 to 24 inch sizes, if little or no insulation is required.
4. J-Hangers (MSS SP-58 Type 5): For suspension of pipes, 1/2 to 4 inch sizes, to allow off-center closure for hanger installation before pipe erection.

5. Adjustable Band Hangers (MSS SP-58 Type 9): For suspension of noninsulated stationary pipes, 1/2 to 8 inch sizes.
6. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS SP-58 Type 11): For suspension of noninsulated stationary pipes, 3/8 to 8 inch sizes.
7. Adjustable Roller Hangers (MSS SP-58 Type 43): For suspension of pipes, 2-1/2 to 20 inch sizes, from single rod if horizontal movement caused by expansion and contraction might occur.
8. Adjustable Pipe Roll and Base Units (MSS SP-58 Type 46): For support of pipes, 2 to 30 inch sizes if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

B. Vertical-Piping Clamps: Unless otherwise indicated, install the following types:

1. Extension Pipe or Riser Clamps (MSS SP-58 Type 8): For support of pipe risers, 3/4 to 20 inch sizes.
2. Carbon- or Alloy-Steel Riser Clamps (MSS SP-58 Type 42): For support of pipe risers, 3/4 to NPS 20 inch sizes, if longer ends are required for riser clamps.
3. Hanger-Rod Attachments: Unless otherwise indicated, install the following types:
4. Steel Turnbuckles (MSS SP-58 Type 13): For adjustment up to 6 inches for heavy loads.
5. Steel Clevises (MSS SP-58 Type 14): For 120 to 450 F piping installations.

C. Building Attachments: Unless otherwise indicated, install the following types:

1. Steel or Malleable Concrete Inserts (MSS SP-58 Type 18 or UL listed): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS SP-58 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 SP-58 Type 20): For attaching to bottom flange of beams, channels, or angles.
4. C-Clamps (MSS SP-58 Type 23): For structural shapes.

3.6 LOW PRESSURE Y-TYPE STRAINERS

A. Install strainers full size of pipelines, in pipe ahead of the following items and equipment, and elsewhere as indicated, if integral strainer is not included:

1. Pumps, unless pump is equipped with a suction diffuser
2. Control valves
3. Pressure regulators

3.7 THERMOMETERS

A. Install at the Following Locations:

1. Inlet and outlet of equipment where fluid changes temperatures except where temperature/pressure test ports are indicated on the Drawings.
2. Other locations as indicated on the Drawings.

B. Thermal Wells: Install in piping so that thermometer scale is readable by personnel from a normal standing position on floor or grating. Fill thermal well with heat transfer medium approved by thermometer manufacturer.

3.8 PRESSURE GAGES

A. Install at the Following Locations:

1. On the suction and discharge of pumps except domestic hot water circulators. Inlet to pump suction diffuser or pump strainer. Install single pressure gage connected through gage valves to suction and discharge connections of each pump and to inlet of pump suction diffuser or pump strainer. Assembly consists of nipples at tappings, needle (gage) valves, couplings, snubbers and tee into gage.
2. Inlet to domestic water service.
3. Inlet and outlet of pressure reducing valves.
4. Inlet and outlet of reduced pressure backflow preventers.
5. Other locations as indicated on the Drawings.

B. Installation: Install (gage) needle valve, and snubber so gage dial is readable by personnel from a normal standing position on floor or grating.

3.9 TEMPERATURE/PRESSURE TEST PORTS (PETE'S PLUGS)

A. Installation: Install so that thermometer dial and pressure gage can be inserted and easily readable by personnel from a normal standing position on floor or grating. Where installed in insulated pipes, install with coupling to extend test port through insulation and jacket.

B. Installations at Equipment: Install immediately adjacent to the equipment such that there are no fittings between the Pete's Plug and the final equipment connection point.

C. Installation at Miscellaneous Devices: Install immediately adjacent to sensors, pressure gages, and thermometers.

D. Tag: 1-1/2 inch round tag, 19 gage brass with 1/4 inch letters, labeled "TEST TAP". Attach with brass chain.

3.10 PIPE WRAP

A. Double wrap underground steel piping and fittings, including riser, to a minimum of six inches above grade. Clean and prime before wrapping. Complete pressure testing prior to wrapping.

B. Factory Applications: Provide factory-applied wrapping for straight lengths of pipe, applied spirally wound with half-overlapping. Hold-back not less than 4 inch on each end for field welding.

C. Field Applications: Field wrap fittings and field joints. Initially stretch tape to conform with surface while spirally half-overlapping for total of 4 thicknesses. Overlap factory-wrapped pipe wrapping minimum of 6 inch.

D. Inspection:

1. Inspect wrapped surfaces for film thickness and uniformity of tape application.
2. Test wrapped surfaces in their entirety for presence of flaws with electrical flaw and holiday detector at crest voltage of 5000 Volts.
3. Provide calibrated instrument incapable of field adjustment, with calibration within previous 6 months certified by manufacturer or by acceptable testing laboratory (e.g., National Bureau of Standards).
4. Perform test before and after installation. Repair defects and repeat tests.

3.11 PIPE ESCUTCHEONS

A. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings. Escutcheons not required where sleeves project above floor.

3.12 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation.

3.13 HANGER ROD SCHEDULE

ROD DIAMETER (INCH)	PIPE SIZE (INCH)	LOAD AT 650 F (POUNDS)
3/8	2 and smaller	730
1/2	2-1/2 and 3-1/2	1,350

3.14 SPACING OF HANGERS AND SUPPORTS SCHEDULE

PIPE SIZE (INCH)	COPPER TUBING MAXIMUM SPAN (FEET)	
	WATER SERVICES	GAS AND AIR SERVICES
1/2 and smaller	5	6
3/4	5	7
1	6	8
1-1/4	7	9
1-1/2	8	10
2	8	11
2-1/2	9	13
3	10	14
4	12	16

END OF SECTION

SECTION 15100 - VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes valves and associated appurtenances for valves that apply to multiple systems. Valves specific to a single system are specified in that particular section.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME Z358.1, Emergency Eyewash and Shower Equipment.
2. ASSE 1017, Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems.
3. ASSE 1069, Performance Requirements for Automatic Temperature Control Mixing Valves.
4. ASSE 1070, Performance Requirements for Water Temperature Limiting Devices.
5. ASSE 1071, Performance Requirements for Temperature Actuated Mixing Valves for Plumbed Emergency Equipment.
6. ASME B31.1, Power Piping.
7. ASTM A 126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
8. ASTM A 536, Standard Specification for Ductile Iron Castings.
9. ASTM B 61, Standard Specification for Steam or Valve Bronze Castings.
10. ASTM B 62, Standard Specification for Composition Bronze or Ounce Metal Castings.
11. ASTM B 283, Standard Specification for Copper and Copper-Alloy Die Forgings (Hot Pressed).
12. ASTM B 584, Standard Specification for Copper Alloy Sand Castings for General Applications.
13. NSF 61, Drinking Water System Components – Health Effects.
14. NSF 372, Drinking Water Systems Components –Lead Content.

C. Domestic Water Systems: Products carrying and dispensing water for consumption through drinking and cooking shall be certified by an independent, ANSI-accredited, third party certification organization to requirements of NSF 61 and NSF 372 for 0.25 per cent maximum lead content for wetted component base material.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Gate valves
2. Ball valves
3. Globe valves
4. Swing check valves
5. Non-slam check valves
6. Butterfly valves
7. Drain valves
8. Balancing valves
9. Relief valves
10. Pressure reducing valves
11. Solenoid valves
12. Vacuum relief valves
13. Thermostatic mixing valves
14. Valve operators

C. Certificates: Compliance with NSF 61 and NSF 372 for no-lead/lead-free.

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish factory-fabricated valves recommended by manufacturer for use in service indicated. Furnish valves of types and pressure ratings indicated but rated at not less than 125 psig WSP to comply with installation requirements. Furnish sizes as indicated with connections which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Contractor's option. Refer to other sections for higher working steam pressures.

B. Press Joint Valves: Use with press joint copper piping systems as specified in Section 15060 for sizes 1/2 inch through 2 inches.

C. Manufacturers: Fairbanks, Hammond, Red-White, Jenkins, Milwaukee, NIBCO, Powell, Stockham, Walworth, Jomar Group, or Apollo/Conbraco.

2.2 GATE VALVES

A. General: Select valves designed for repacking under pressure when fully opened, equipped with packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened. Equip with gland follower. Comply with the following standards:

1. Bronze Valves: MSS SP-80.
2. Cast Iron Valves: MSS SP-70.

B. 2 Inch and Smaller: Bronze, solid bronze wedge disc, nonrising stem, screwed or soldered joint ends, union bonnet, ASTM B 62.

C. 2-1/2 Inch and Larger: Cast iron body, solid wedge disc, bronze trim, flanged, OS&Y, bolted bonnet, ASTM A 126.

2.3 BALL VALVES

A. General: Select with port area equal to or greater than connecting pipe area, include seat ring designed to hold sealing material. Comply with MSS SP-110.

B. Bronze body, 600 pound, chrome plated ball chromed plated stem for hydronic systems and stainless steel stem for domestic water systems, full port, screwed

or solder joint ends, 2 piece construction, lever handle, Teflon seat and seal, memory stop, ASTM B 61, ASTM B 62, or ASTM B 584. Include extended stem, protective sleeve, and fully adjustable memory stop after insulation is applied where valves are insulated.

2.4 GLOBE VALVES

A. General: Select valves designed for repacking under pressure when fully opened, equipped with packing suitable for intended service. Select valves designed so back seating protects packing and stem threads from fluid when valve is fully opened. Equip with gland follower. Include suitable composition disc material for intended service. For steam throttling service, fit composition disc valve with throttling nut. For metal seated valves, include hardened stainless steel disc and seat ring. Comply with the following standards:

1. Bronze Valves: MSS SP-80.
2. Cast Iron Valves: MSS SP-85.

B. 2 Inch and Smaller: Bronze, composition disc, 4-pattern, screwed or soldered joint ends, union bonnet, ASTM B 62.

C. 2-1/2 Inch and Larger: Cast iron body, bronze trim, screwed-in brass body seat ring, solid bronze disc, bronze stem, flanged, ASTM A 126.

2.5 SWING CHECK VALVES

A. General: Construct valves of pressure castings free of impregnation materials. Include stop plug as renewable stop for disc hanger. Construct disc and hanger as separate parts, with disc free to rotate. Support hanger pins on both ends by removable side plugs. Comply with the following standards for design, workmanship, material and testing:

1. Bronze Valves: MSS SP-80.
2. Cast Iron Valves: MSS SP-71.

B. 2 Inch and Smaller: Bronze, screwed cap, bronze or brass swing disc, Y-pattern, screwed or solder joint ends, ASTM B 62.

C. 2-1/2 Inch and Larger: Cast iron body, flanged, bolted cap, swing pattern, ASTM A 126, renewable cast iron disc with bronze disc face ring and seat to ASTM B 584 except valves larger than 4 inch may be furnished with cast iron disc to ASTM A 126.

2.6 NON-SLAM CHECK VALVES

A. For vertical upward fluid flow. Comply with the following standards:

1. Bronze Valves: MSS SP-80.
2. Cast Iron Valves: MSS SP-125.

B. 2 Inch and Smaller: Bronze, screwed or solder joint ends, bronze spring and disc holder, Buna-N disc, ring, ASTM B 61 or ASTM B 62. Cast iron valves, ASTM A 126, acceptable.

C. 2-1/2 Inch and Larger: Cast iron body, clear or full waterway, globe style, flanged, bronze trim, stainless steel spring and screw, ASTM A 126.

2.7 DRAIN VALVES

A. Bronze body, composition disc, 3/4 inch handwheel, screwed or solder joint ends hose thread outlet with cap. At Contractor's option, full port ball valve acceptable.

2.8 RELIEF VALVES

A. General: ASME Code rated water relief valves. Select for capacity to exceed rating of connected equipment. Watts No. 100XL for temperature and pressure applications and Watts No. 174A for pressure only applications, Cash Acme, or approved.

2.9 PRESSURE REDUCING VALVES

A. General: Water regulators with factory or field installed strainer, screwed or flanged ends, Buna-N diaphragm, and stainless steel internal components.

B. 3 Inch and Smaller: Brass body with screwed ends. Include factory strainer, built-in bypass feature, and EDPM valve disc, 300 psig maximum working pressure, 25 to 75 adjustable reduced pressure range. Watts No. LFN223BS, Cash Acme, Wilkins, or approved.

C. 4 Inch and Larger: Ductile iron body with flanged ends, ASTM A 536. Main valve with, stainless steel trim for sizes through 8 inch and bronze trim for 10 inch size, 250 psig operating pressure. Include pilot operated diaphragm valve with 20 to 175 psig reducing control pressure, and copper/brass tubing connections. Interior of body with NSF listed epoxy lining and coating. Watts No. F115 for globe pattern and F1115 for angle pattern, Cash Acme, Wilkins, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 INSTALLATION

A. Install valves where required for proper operation of piping and equipment, including valves in branch lines to isolate sections of piping. Locate valves in accessible locations. Install gate valves 6 inches and larger with separate support so that valve weight is not imposed on adjacent piping.

B. Valve Stem Position:

C. Gate, Globe, and Ball Valves: Install horizontal or above.

D. Check Valves:

1. Swing type check valves installed in vertical pipes not acceptable.
2. Install non-slam check valves in pump discharge pipes and in vertical pipes.

E. Install isolation valves where indicated on the Drawings and in the following locations:

1. Branch lines.
2. Branch mains.
3. At connections to equipment, including coils and control valves and similar items.

F. Install drain valves at low points of hydronic, plumbing, pumped return systems, and as indicated on the Drawings.

G. Install balancing valves with reducers upstream and downstream of valve connections. Install valves with straight pipe upstream and downstream as required by manufacturer's installation instructions.

H. Install pressure reducing valves with either factory furnished or field furnished low pressure Y-type strainer as specified in Section 15080.

END OF SECTION 15100

SECTION 15140 - PUMPS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes pumps and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASTM A 48, Standard Specification for Gray Cast Iron Castings.
2. UL 508, Industrial Control Equipment.
3. UL 778, Motor-Operated Water Pumps.
4. UL 2043, Fire Test for Heat and Visable Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following. Include each type of piping, fittings, and associated appurtenances.

1. In-line pumps
2. Pump discharge flexible connectors
3. Blank copy of start-up and test report form

C. Shop Drawings for Domestic Water Booster Assembly:

1. Template with dimensions for anchor bolts.
2. Assembly dimensions and general arrangements of components and specialties.
3. Control panel drawing with operator interfaces.
4. Electrical power and control wiring diagram.

D. Pump Curves: Submit head, efficiency, brake horsepower, and NPSH curves compared to capacity for each. Plot curves from zero to maximum flow. Indicate pump operating point. Identify pump equipment number, fluid pumped, specific gravity, pump speed, and impeller size. Submit family of impeller curves for selected pump size. A single pump curve not acceptable.

E. Test Reports:

1. Start-up and test reports.
2. Factory domestic water booster assembly pressure and control system tests report.
3. Site visit reports.
4. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

PART 2 PRODUCTS

2.1 SELECTION

A. Pumps are selected in mid-range of available impeller diameters for a given pump, at no less than 2/3 flow rate at maximum efficiency, and with a drive motor sized to operate non-overloading at any point on pump curve for impeller selected.

B. Pump casing shall be sized large enough to accommodate impeller at least 1 cataloged diameter larger than size of impeller to be furnished.

C. Pump shall have maximum 15 feet per second discharge velocity.

2.2 IN-LINE PUMPS

A. Description: Centrifugal, close coupled, in-line, bronze-fitted, single stage, electric motor-driven, horizontal or vertical mounting.

B. Construction: Cast iron casing, bronze impeller, carbon steel shaft, bronze sleeve, ball bearings, flanged connections.

C. Shaft Seals: Mechanical, ceramic/carbon faces, rated to minimum 225 F.

D. Drain Connection: Tapping and plug on bottom of casing.

E. Motor: NEMA Standard open drip proof, single speed. Comply with requirements in Section 15030.

F. Manufacturers: Bell & Gossett, Armstrong Fluid Technology, Grundfos, or approved.

2.3 PUMP DISCHARGE FLEXIBLE CONNECTORS

A. Description: Factory assembly with carbon steel vane within corrugated hose with stainless steel woven wire braid between 150 psig carbon steel flanges. Include carbon steel elbow for horizontal discharge pump.

B. Manufacturer: Metraflex Vane Flext™ or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation

instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 INSTALLATION OF PUMPS

A. General: Support pumps and piping separately so piping is not supported by pumps.

B. In-Line Pumps: Provide rod hangers to support independently from piping system with access to oil cups, service, and maintenance. Mount maximum of 5'-0" above floor. Comply with requirements in Section 15080 for rod hangers, Section 15200 for vibration isolators, and Section 15210 for seismic restraints.

3.5 START-UP SERVICES

A. Contractor shall provide start-up services of the pumps. Services shall include a check of proper installation, verification that pump suction diffuser start-up strainers have been removed, system check-out, adjustment, electrical service and motor grounding, and complete start-up.

B. Pump Impeller Trim: Refer to Section 15980 for impeller trim requirements to be performed by the pump manufacturer or authorized representative.

3.6 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996. Total of 0.5 hours.

3.7 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation.

END OF SECTION 15140

SECTION 15200 - VIBRATION ISOLATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes products to isolate building structure and occupied spaces from vibration transmi22ssion for mechanical equipment and distribution systems. Isolation work shall include, but not necessarily be limited to, the following:

1. Supported isolation of motor-driven equipment.
2. Isolation support of air-handling housings.
3. Isolation support of piping, piping risers, and ductwork.
4. Penetration isolation of pipes and ductwork through walls, floors, and ceilings.
5. Flexible connections of ductwork and piping to equipment.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards: ASTM C 94, Standard Specification for Ready-Mixed Concrete.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data for the following:

1. Vibration isolation mounts
2. Bases
3. Vibration isolation hangers
4. Miscellaneous supports
5. Acoustical wrap
6. Flexible connectors
7. Miscellaneous products
8. Thrust restraints

C. Shop Drawings:

1. Bases and vibration isolation installation, including sizes, type, and placement of isolators. Include total operating weight of each isolated piece of equipment.
2. Shop Drawings shall be stamped and signed by a professional engineer licensed in engineering in the state in which the Work is performed.
3. Calculations: Sizing and weight distribution for vibration isolators and bases. Calculations shall be stamped and signed by a professional structural engineer licensed in engineering in the state in which the Work is performed.

D. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slide rails, base weights, and equipment static loads.

E. Isolator Schedule List: List size, type, load, and static deflection of each isolator. Number and color code to show its location. Mark code number and color on Shop Drawings, on each isolator, and on each base to ensure that the Contractor will place them in the proper locations.

F. Procedures: Submit procedures and installation instructions for setting and adjusting vibration isolators and bases.

G. Final Inspection Report: Vibration isolation manufacturer shall prepare and submit written report documenting final inspection and certifying that vibration isolators are properly installed and adjusted.

1.4 CONTRACTOR RESPONSIBILITY FOR VIBRATION ISOLATION

A. General: A single supplier shall furnish isolation mounts, pads, sway braces, related hardware, and fabricate isolation bases for the project unless otherwise specified.

B. Responsibility: This supplier shall be responsible for selection and installation supervision of vibration isolators. Prepare engineering drawings and details and submit to the A/E. Perform installation supervision and provide adjustment instructions.

1.5 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 15710 – Hydronic Piping Systems: Flexible connectors.

B. Section 15840 – Air Distribution: Flexible connectors.

1.6 VIBRATION ISOLATION, GENERAL

A. Description:

1. Balanced set of vibration isolators for each item of equipment listed in Article “Vibration Isolation Schedule” in this section.
2. Vibration isolation of piping and ducts as indicated in the Contract Documents and listed in Article “Vibration Isolation Schedule” in this section.
3. Provide components or materials not specifically mentioned herein, but necessary for proper vibration isolation of equipment.

B. Rotating Equipment Criteria: Maximum vibration levels at each bearing, while in operation not to exceed 0.08 in./sec. If operating vibration velocities exceed this criteria, repair or replace equipment at no expense to the Owner until approval of equipment is given by the A/E.

PART 2 PRODUCTS

2.1 GENERAL

A. Manufacturers: Mason Industries, Amber/Booth, Kinetics Noise Control, Vibration Mountings & Controls, Vibro-Acoustics, California Dynamics Corp (Caldyn), Tolco, or approved. Mason Industries model numbers are listed.

2.2 VIBRATION ISOLATION HANGERS

A. Hanger H-1, Spring Hanger:

1. Description: Combination of steel spring and fiberglass or neoprene isolator placed in series and encased in welded steel bracket.

2. Criteria:

   a. Spring diameter no less than 0.8 of compressed height of spring at rated load with minimum additional travel to solid equal to 50 percent of rated deflection.
   b. Select hanger to carry 5 times overload without failure and to allow up to 15 degrees of rod misalignment in all directions without metal-to-metal contact or other short circuit.

3. Manufacturer and Model: Mason Industries 30N.

B. Hanger H-2, Neoprene Hanger:

1. Description: Neoprene-in-shear or fiberglass isolator encased in welded steel bracket.
2. Criteria: Minimum 0.35 inch operating static deflection.
3. Manufacturer and Model: Mason Industries HD.

2.3 MISCELLANEOUS SUPPORTS

A. Type IP-1, Isolation Pad:

1. Description: Neoprene waffle pads, with 2 layers of 3/4 inch thick neoprene separated by 16 gage galvanized sheet metal shim and load distribution plates. Size to limit surface pressure to 45 pounds per square inch. Where bolts are used to secure equipment, isolate bolts from equipment with neoprene washers and grommets. Allow no metal-to-metal contact between bolt and equipment.
2. Manufacturer and Model: Mason Industries Super W.

B. Type WB-1, Neoprene Washers and Bushings:

1. Washer-bushing manufactured of bridge bearing neoprene.
2. Washer-bushing maximum loading not to exceed 1000 psi.
3. Washer-bushing to be used such that direct contact between bolt and equipment is eliminated.
4. Manufacturer and Model: Mason Industries HG.

2.4 FLEXIBLE CONNECTORS

A. Ducts:

1. Indoor Applications:

   a. Description: Flexible, woven fiberglass with neoprene coating, resistant to alkalies and gasoline and unaffected by mildew, 22 oz. per sq. yd, temperature range from minus 40 to 200 F.
   b. Manufacturers: Duro Dyne Neoprene (Specification Grade), Vent Fabrics, or approved.

2. Outdoor Applications:

   a. Description: Woven polyester with vinyl coating, non-porous, double layered, R value of 4.2, temperature range from minus 40 to 180 F.
   b. Manufacturers: Duro Dyne Insulflex or approved.

B. Piping:

1. Braided Type for Pipe Sizes 2 Inch and Smaller:

a. Description: Corrugated stainless steel core covered with high tensile stainless steel woven wire braiding, minimum lateral deflection 1/2 inch.
b. Manufacturers: Keflex, Microflex, Metraflex, Mercer, Garlock, American Boa.

C. Refer to Section 15140 for pump discharge flexible connectors.

2.5 MISCELLANEOUS PRODUCTS

1. Fiberglass Acoustical Insulation:
2. General: One half to 6 inch thick, 3 pounds per cubic foot, density, unfaced fiberglass batts.
3. Manufacturers: Owens Corning, Tremco, or approved.

B. Resilient Sealant:

1. General: Paintable, non-hardening, non-bleeding, non-drying, resilient calk.
2. Manufacturers and Models: U.S. Gypsum Co. Acoustical Sealant, Pecora Corp. Acoustical Sealant BA-98, Gloucester Corp. Penoseal Surpass (clear color only), or approved.

2.6 THRUST RESTRAINTS

A. Description: Spring in series with neoprene pad. Restraint assembly designed to be field adjusted to allow maximum 3/8 inch movement at equipment start and stop. Restraint assembly designed to sustain overload force equal to 5 times design force without failure. Include attachment hardware.

B. Manufacturer and Model: Mason Industries WBI and WBD.

2.7 FACTORY FINISHES

A. Apply manufacturer's standard paint to factory-assembled and tested equipment before shipping.

1. Powder coating on springs and housings.
2. Mechanically galvanized hardware. Hot dipped galvanize metal components where installed outdoors.
3. Baked enamel for metal components where installed indoors.
4. Color-code or otherwise mark vibration isolator devices to indicate capacity range.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. Description: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Assistance: Vibration isolation supplier shall provide assistance to Contractor to ensure correct installation and adjustment of vibration isolators and seismic restraints.

C. Prior to Startup: Clean foreign matter between base, isolator, equipment, and mounting surfaces. Verify that there are no rigid connections between equipment and building structure that degrade vibration isolation systems specified in this section.

3.4 EQUIPMENT

A. Spring Mounts:

B. Mark vibration isolators to show undeflected height to verify proper isolation after installation. Install isolators for single piece of equipment with approximately equal deflection. Mount equipment level.

C. Coordinate with general contractor and structural engineer to ensure proper mounting attachment points.

D. Install with Type WB-1 isolators.

E. Spring Hanger Rods: Align isolator to clear isolator housing. Install housing as close as possible to structure.

F. Bases:

G. Install floor-mounted bases with 1 inch clearance between floor or housekeeping pad and base.

H. Install concrete inertia bases with minimum 2 inch clearance between floor or housekeeping pad and base. Fill base with 3000 psi concrete conforming to ASTM C 94.

I. Attach curb mounted isolation base and rigid roof curb to roof structure and attach rooftop HVAC unit to curb in accordance with engineer or specialty consultant's design.

3.5 DUCTWORK

A. Duct Clearance: Install vibration-isolated ducts to allow minimum 2 inch gap between top of duct and underside of floor structure above.

B. Vibration Isolator Housing: Install as close as possible structure.

3.6 PIPING

A. Equipment Supports: Coordinate piping supports with equipment supports to maintain uniformly efficient isolation, expansion and contraction, without creating excessive stresses at equipment connection or in portion of piping. Adjust vibration isolators after piping systems have been filled and equipment is at operating weight.

B. Piping 2 inch and Larger: Isolate within mechanical rooms or for first 50 feet from vibrating equipment, whichever is greater.

C. Vibration Isolator Housing: Install as close as possible to structure.

D. Risers: Isolate at point of contact with floor structure.

3.7 THRUST RESTRAINTS

A. Fans: Install across flexible connection on fan discharge.

3.8 ELECTRICAL CONNECTIONS TO VIBRATION ISOLATED EQUIPMENT

A. Comply with requirements in Section 15030.

B. Do not install conduit clamps or hangers between flexible raceway termination and equipment connection.

C. Recommended minimum flexible raceway length is 6 feet.

3.9 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation.

3.10 VIBRATION ISOLATION SCHEDULE

A. Vibration isolator designations are keyed to items specified in this section.

EQUIPMENT	ISOLATOR	STATIC DEFLECTION (INCH)	BASE
FANS			
Centrifugal Fans, Cabinet Type, Suspended (HRU)	H-1	2.0	B-3
Centrifugal Fans, In-Line, Suspended	H-1	1.0	B-3
PUMPS			
Centrifugal, In-Line, Pipe-Mounted	H-2	0.35	-- --
PIPING			
Suspended Piping, 2 Inch and Smaller	H-2	0.35	--
Pipe Risers	IP-1 and WB-1	--	--

EQUIPMENT	ISOLATOR	STATIC DEFLECTION (INCH)	BASE
DUCTS			
Suspended Ducts	H-1	1.0	--

END OF SECTION

SECTION 15210 - SEISMIC CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes seismic restraints for mechanical equipment and distribution systems

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data for the following:

1. Seismic restraints
2. Miscellaneous supports

C. Shop Drawings:

1. Seismic restraint installations, including calculations.
2. Shop Drawings shall be shall be stamped and signed by a professional engineer licensed in engineering in the state in which the Work is performed.

D. Calculations: Sizing and weight distribution for seismic restraints. Calculations shall be stamped and signed by a professional structural engineer licensed in engineering in the state in which the Work is performed.

E. Seismic Restraint Details: Detail fabrication and attachment of seismic restraints. Include the following:

1. Anchorage details and indicate quantity, diameter, and depth of penetration of anchors.
2. Overturning force calculations and other design calculations.
3. Seismic brace layouts indicating locations of seismic bracing.
4. Details for seismic restraints and attachment to structure.
5. Additional design information as required by IBC and ASCE 7-05.

F. Procedures: Submit procedures and installation instructions for setting and adjusting seismic restraints.

G. Final Inspection Report: Seismic restraint manufacturer shall prepare and submit written report documenting final inspection and certifying that seismic restraints are properly installed and adjusted.

1.4 CONTRACTOR RESPONSIBILITY FOR SEISMIC RESTRAINTS

A. General: A single supplier shall furnish seismic restraints, sway braces, and related hardware for the project unless otherwise specified.

B. Responsibility: This supplier shall be responsible for selection and installation supervision of seismic restraints. Prepare engineering drawings and details and submit to the A/E. Perform installation supervision and provide adjustment instructions.

C. Seismic Restraints:

1. Design and select restraint devices for ducts, pipes, and equipment to meet seismic requirements defined in IBC and ASCE 7-05. Prepare calculations based on coefficients included on the structural drawings. Refer to the structural drawings for allowable methods and loads.
2. Design and select restraint devices for ducts, pipes, and equipment to meet seismic requirements in IBC and ASCE 7-05. Retain a structural engineer to determine the following coefficients as listed in IBC and ASCE 7-05 as they pertain to this project. Pay structural engineering service fees.

    a. Seismic Design Category.
    b. Component Importance Factor, IP.
    c. Occupancy Category.
    d. Design Spectral Response Acceleration at Short Periods, SDS.
    e. In-Structure Component Amplification Factor, AP.
    f. Component Response Modification Factor, RP.
    g. Mapped Spectral Acceleration for Short Periods, SS.
    h. Site Coefficient, FA.
    i. Site Class.]

D. Retain an engineer, specialty consultant, or seismic restraint device manufacturer to design and develop seismic restraint systems and perform calculations based on actual equipment data.

E. Engineer, specialty consultant, or seismic restraint device manufacturer shall coordinate attachments to structure to verify that attachment points on equipment and structure can accept seismic, weight, and other loads imposed. Pay any additional structural engineering services fee.

F. Shop Drawings, details, and calculations shall be stamped and signed by a professional engineer licensed in engineering in the state in which the Work is performed.

1.5 SEISMIC RESTRAINTS, GENERAL

A. Description:

B. Seismic restraint of equipment as indicated in the Contract Documents and as listed in Article “Seismic Restraint Schedule” in this section.

C. Seismic restraint of piping and ducts as indicated in the Contract Documents and listed in Article “Seismic Restraint Schedule” in this section.

D. Provide components or materials not specifically mentioned herein, but necessary for proper seismic control of equipment.

PART 2 PRODUCTS

2.1 GENERAL

A. Manufacturers: Mason Industries, Amber/Booth, Kinetics Noise Control, Vibration Mountings & Controls, Vibro-Acoustics, California Dynamics Corp (Caldyn), Tolco, or approved. Mason Industries model numbers are listed.

2.2 MISCELLANEOUS SUPPORTS

A. Type WB-1, Neoprene Washers and Bushings:

1. Washer-bushing manufactured of bridge bearing neoprene.
2. Washer-bushing maximum loading not to exceed 1000 psi.
3. Washer-bushing to be used such that direct contact between bolt and equipment is eliminated.
4. Manufacturer and Model: Mason Industries HG.

2.3 SEISMIC RESTRAINTS

A. General:

1. Restraints capable of safely accepting external forces as defined in IBC and applicable state and local codes without failure to maintain mechanical equipment, piping, and duct in captive position.
2. Seismic devices not to interfere with vibration isolators during normal operation.
3. Seismic mounts shall have State of California OPA number verifying maximum certified horizontal and vertical load ratings.

B. Seismic Restraint E-1:

1. Description: Interlocking steel members restrained by shock absorbent rubber materials compounded to bridge-bearing specifications.
2. Construction:
    a. Elastomeric materials replaceable, minimum 1/4 inch thick molded bushing.
    b. Air gap between hard and resilient material of not less than 1/8 inch, nor more than 1/4 inch.
    c. Application: Locate and size snubbers to suit application. Furnish sufficient quantity such that restraint load rating will not be exceeded. Minimum of 4 snubbers required.
    d. Manufacturer and Model: Mason Industries Z-1225.

C. Seismic Restraint E-2:

1. Description: Pre-stretched galvanized steel cable assembly with swivel end connections using 2 clamping bolts. Vertical rods at seismic brace locations braced with and rod clamp assembly to accept compressive loads.
2. Application: Cables sized to accommodate loads with minimum safety factor of 2.
3. Manufacturer and Model: Mason Industries SCB with SSB rod clamp assembly.

2.4 FACTORY FINISHES

A. Apply manufacturer's standard paint to factory-assembled and tested equipment before shipping.

1. Mechanically galvanized hardware. Hot dipped galvanize metal components where installed outdoors.
2. Baked enamel for metal components where installed indoors.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. Description: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Assistance: Seismic restraint supplier shall provide assistance to Contractor to ensure correct installation and adjustment of seismic restraints.

3.4 EQUIPMENT, PIPING, AND DUCT SEISMIC RESTRAINTS

A. General: Comply with requirements in IBC and ASCE 7-05 unless otherwise indicated in the Contract Documents.

B. Coordination: Coordinate with submittals and Shop Drawings of mechanical equipment such as pumps, air handling units, fans, and similar items. Coordinate with general contractor and structural engineer to ensure correct mounting attachment points.

C. Vibration-Isolated Equipment, Piping, and Ducts:

1. Install seismic restraints with factory set clearances. Install seismic restraint to avoid short circuiting of vibration isolators.
2. Isolate bolts from direct contact with structure with Type WB-1 isolators.

3.5 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation.

3.6 SEISMIC RESTRAINT SCHEDULE

A. Seismic restraint designations are keyed to items specified in this section.

EQUIPMENT	SEISMIC RESTRAINT
FANS	

EQUIPMENT	SEISMIC RESTRAINT
Centrifugal Fans, Cabinet Type, Suspended (HRU)	E-2
Centrifugal Fans, In-Line, Suspended	E-2
PUMPS	
Centrifugal, In-Line, Pipe-Mounted	E-2
PIPING	
Suspended Piping Inside Mechanical Rooms, 2 Inch and Smaller	IBC
Pipe Risers	IBC
DUCTS	
Suspended Ducts	IBC

END OF SECTION 15210

SECTION 15250 - MECHANICAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes insulation for plumbing and HVAC piping, ductwork, and equipment.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary conditions, and Division 1 sections apply to the Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. Applicable energy code.
2. ASHRAE 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings.
3. ASTM B 209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
4. ASTM C 533, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
5. ASTM C 534, Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
6. ASTM C 535, Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
7. ASTM C 547, Standard Specification for Mineral Fiber Pipe Insulation.
8. ASTM C 552, Standard Specification for Cellular Glass Thermal Insulation.
9. ASTM C 553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
10. ASTM C 1136, Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
11. ASTM C 1139, Standard Specification for Fibrous Glass Thermal Insulation and Sound Absorbing Blanket and Board for Military Applications.
12. ASTM C 1290, Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
13. ASTM D 1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Components.
14. ASTM D 5590, Standard Test Methods for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay.
15. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
16. ASTM E 96, Standard Test Methods for Water Vapor Transmission of Materials.
17. ASTM E 814, Standard Test Method for Fire Tests of Penetration Firestop Systems.
18. ASTM F 1249, Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

19. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
20. NFPA 255, Surface Burning Characteristics Building Materials.
21. UL 723, Tests for Surface Burning Characteristics of Building Materials.

Insulation Subcontractor's Qualifications: Specialty contractor normally engaged using products from manufacturers specified in this section.

GREENGUARD Environmental Institute™ Certification: Include for pipe insulation and duct wrap and rigid board duct insulation.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data, installation data, maintenance data and certifications for the following:

1. Piping system insulation
2. Duct system insulation
3. Equipment insulation
4. Inserts
5. Insulation Shields
6. Jacketing

1.4 DEFINITIONS AND ABBREVIATIONS

A. Definitions:

1. "Exposed" is work exposed to view of occupants in normally occupied areas and in mechanical, electrical, and equipment rooms.
2. "Concealed" is work located in ceiling spaces, chases, behind cabinets, and other locations not exposed to view.
3. "Cold Plumbing Piping" includes the following down to 0 F:
   a. Domestic cold water.
   b. Make-up water.
   c. Indirect condensate drain.
4. "Hot HVAC Piping" includes the following up to 850 F:
   a. Heating water supply and return.

B. "Duct Within Conditioned Space" is duct for air that is located inside the building envelope including outdoor air duct and relief duct on the building side of motor operated and backdraft dampers.

C. "Duct Within Conditioned Space Functioning as part of Building Envelope" is duct for air that is located in the building but on the outdoor side of motor operated and backdraft dampers.

D. "Equipment" includes the following:

1. Hot Equipment:
   Heating water pump housings.

   Expansion tanks.

   Air separators.

E. "Piping" includes pipe, fittings, valves, and appurtenances.

F. Abbreviations:

G. ASJ: All-service jacket.

H. FSK: Foil-scrim-kraft jacket.

I. PCF: Pound per cubic foot density.

J. Perm: Water vapor transmission rate (permeability).

K. SSL: Self-sealing lap.

1.5 SURFACE BURNING CHARACTERISTICS

A. Provide composite or component ratings per NFPA 255, ASTM E 84, and UL 723 as follows: Flame spread rating not greater than 25 and smoke developed rating not greater than 50.

B. Composite includes insulation, jacketing, and adhesive used to secure jacketing or facing.

C. Components include PVC jacketing and fittings, adhesive, coating, mastic, cement, tape, and cloth.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fiberglass Pipe Insulation: ASTM C 547, Type 1. Include factory applied ASJ/SSL. K-value not greater than 0.23 at 75 F mean temperature.

B. Fiberglass Pipe Fitting Insulation: Thermal blanket, ASTM C 553, Type I or II. K-value not greater than 0.26 at 75 F mean temperature.

C. Elastomeric Pipe Insulation: ASTM C 534, Type I for tubular materials, Grade 1. K-value not greater than 0.27 at 75 F mean temperature. 3 to 6 PCF.

D. Calcium Silicate Pipe Insulation: ASTM C 533, Type 1. Include factory corrugated aluminum jacket, 0.016 inch thick, and isolation felt. K-value not greater than 0.68 at 700 F mean temperature. 14.5 PCF.

E. Cellular Glass Pipe Insulation: ASTM C 552. K-value not greater than 0.29 at 75 F mean temperature. 7.5 PCF.

F. Fiberglass Duct Insulation: ASTM C 553, Type I, II, or III, ASTM C 1290, ASTM C 1139, Type III (faced), ASTM E 84, and ASTM C 1136, Type II for FSK jacket. 0.75 PCF for duct wrap and 3 PCF for concealed and 6 PCF for exposed rigid board.

G. Staples, Bands, and Wires: As recommended by insulation manufacturer for applications indicated.

H. Adhesives, Sealants, Coatings, Mastics, and Protective Finishes:

I. Joint Sealants for Below-Ambient Cellular Glass Insulation: Childers CP-76/CP-70, Foster 30-45/95-50, or Pittsburgh Corning Corporation Pittseal 444.

J. FSK and Metal Jacket Flashing Sealants: Childers CP-76, Foster 95-44, or Pittsburgh Corning Corporation Pittseal 444.

K. Vapor Barrier Coatings: Water based suitable for indoor use on below-ambient services. Childers CP-34, or Vimasco Corporation 749. Water vapor permeance per ASTM F 1249, 0.08 perms or less at 45 mil dry. White color. Foster 30-65,

L. Vapor Barrier Coatings: Water based suitable for indoor use on below-ambient services. ASTM D 5590 with 0 growth rating. Water vapor permeance per ASTM F 1249, 0.08 perms or less at 45 mil dry. White color. Foster 30-80 AF,

M. Weather Barrier Breather Mastic: Water based suitable for indoor and outdoor use on above-ambient services. Water vapor permeance: ASTM F 1249, 1.8 perms at 0.0625 inch dry film thickness. White color. Childers CP-10/CP-11, Foster 46-50, or Vimasco WC-1/WC-5.

N. Elastomeric Insulation Coating: Water based polyacrylate copolymer emulsion finish. Foster 30-64, Armacell WB finish, or K-Flex R-374 finish.

O. Elastomeric Insulation Adhesive: Foster 85-75, Childers CP-82, or Armacell 520.

P. Lagging Adhesive: For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Childers CP-50 AMV1, Foster 30-36, or Vimasco Corporation 713/714.

Q. Lagging Adhesive: For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Childers CP-137 AF or Foster 30-36 AF.

2.2 MANUFACTURERS

A. Fiberglass Pipe and Duct Insulation: CertainTeed, Knauf Insulation Earthwool, Manson Insulation Alley-K, Johns Manville, Owens-Corning, or approved.

B. Elastomeric Insulation: Aeroflex USA Aerocel-SSPT (Stay-Seal® with Protape), Nomaco K-Flex, Armacell LLC, or approved.

C. Calcium Silicate Insulation: Industrial Insulation Group, LLC Thermal 12 Gold®.

D. Cellular Glass Insulation: Pittsburg Corning Foamglas® or approved.

E. Coatings, Sealants, Mastics, Adhesives: Foster, Childers, Pittsburgh Corning, Vimasco, Armacell, K-Flex, or approved.

2.3 PIPING SYSTEM INSULATION

A. Insulation materials and thicknesses shall meet or exceed insulation requirements of applicable energy code. Where insulation thickness indicated on the Drawings or specified in this section is thicker than that listed in applicable energy code, use thicker values. Refer to Article “Extent of Piping Insulation” in this section.

B. Insulate cold plumbing and cold HVAC piping with fiberglass including polyethylene tubing.

C. Insulate cold plumbing and HVAC piping at wall supports with elastomeric, same thickness as adjacent fiberglass pipe insulation. At Contractor’s option, insulated pipe hangers specified in Section 15080 acceptable.

D. Include factory applied ASJ/SSL on fiberglass piping insulation. For below ambient piping, seal seams with vapor barrier coating.

E. Fittings, Flanges.

F. General: Thickness equal to adjacent pipe insulation.

G. Indoor: Preformed fiberglass, mitered sections of pipe insulation, or fiberglass blanket. For below ambient piping, coat insulated elbows and fittings with vapor barrier coating and reinforcing mesh. Finish with one-piece premolded PVC fitting covers.

H. Outdoor Jacketing: Preformed fiberglass, mitered sections of pipe insulation, or contoured fiberglass inserts. On below ambient piping, coat all insulated elbows and fittings with vapor barrier coating and reinforcing mesh. Finish with preformed outdoor grade ultraviolet-resistant PVC jacket identical in composition to adjacent jacketing.

I. Valves, Specialties, and Pumps:

J. Removable pad type flexible blanket sandwich section of fiberglass, equal thickness as adjacent insulation, enclosed in silicone impregnated glass cloth cover machine sewed at ends.

K. Include stainless steel “D” ring straps with Velcro tabs or full length Velcro at longitudinal seam.

L. Length of blanket sufficient for removal of bolts without damaging adjacent insulation.

M. Manufacturer: Shannon Enterprises INSULTECH® or approved.

N. Adhesives, Mastics, and Cements: Compatible with piping insulation.

2.4 DUCT SYSTEM INSULATION

A. Insulation materials and thicknesses shall meet or exceed insulation requirements of the applicable energy code. Where insulation thickness specified is larger than those listed in the applicable energy code, use the larger values. Refer to Article “Extent of Duct Insulation” in this section.

B. Duct Wrap: Flexible fiberglass duct wrap insulation with factory applied FSK facing (vapor barrier) consisting of aluminum foil reinforced with fiberglass scrim laminated to UL rated kraft. Coat duct insulation seams with tape and vapor barrier coating.

C. Rigid Board: ASJ R-value not less than 4.2.

D. Adhesives, Mastics, Coatings, Sealants and Cements: As specified in Paragraph 2.1. Compatible with duct and plenum insulation.

2.5 EQUIPMENT INSULATION

A. Insulate equipment with fiberglass, 2 inches thick. Fiberglass board, maximum 0.02 perm vapor transmission rate. K-value not greater than 0.23 at 75 F mean temperature.

B. Exposed:

1. 6 PCF, ASJ or FSKfacing.
2. 6 PCF, ASJ, glass cloth and mastic finish with corner beads.

C. Concealed and Exposed Irregular Surfaces:

1. 3 PCF, ASJ or FSK facing.
2. 3 PCF, ASJ, glass cloth and mastic finish with corner beads.

2.6 INSERTS BETWEEN PIPES AND PIPE HANGERS

A. Material: Hydrous calcium silicate insulation or other heavy density insulating material, minimum 12 inch long inserts, thickness equal to adjoining insulation. Insulating material suitable for required temperature range.

2.7 INSULATION SHIELDS

A. Material: Minimum 12 inch long, galvanized steel, 18 gage for pipe sizes 4 inch and smaller and 14 gage for pipe sizes 6 inch and larger. Anvil International, Fee & Mason, Elcen, or approved.

2.8 JACKETING

A. PVC: 0.020 inch thick ultraviolet-resistant, limited to maximum 20 inch outside diameter of insulation. ASTM D 1784.

B. Elastomeric Insulation: Factory applied aluminum, aluminized glass cloth, or hypalon sheet with moisture, weather, and ultraviolent resistant finishes.

C. Standard Duty Factory Assembly: At Contractor's option for PVC jacket described above, multi-ply, 7 mil thick, flexible, self-adhering assembly as a protective jacket, vapor barrier and weather proof membrane with acrylic adhesive on inside surface and white exterior finish. Jacket material with 0.000 water vapor permeance rating per ASTM E 96 Procedure B, and UV resistant. VentureClad Type 1577 CW, Foster Vapor-Fas™ 62-05, MFM Building Products FlexClad-250™, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 TIME OF APPLICATION

A. General: Apply insulation only after piping and ducts have been pressure tested and certified by the A/E as ready for insulation. If insulation is applied prior to

pressure testing, necessary removals, repairs, and modifications to insulation due to leaks that may occur shall be made at no additional cost to the Owner.

B. Manufacturer's Instructions: Follow with regard to ambient temperature requirements and special techniques.

3.5 EXTENT OF INSULATION

A. Insulate piping, conditioned air ductwork, and equipment, except as indicated in the Contract Documents.

B. Do Not Insulate the Following:

C. Piping:

1. Valve handwheels and operators.
2. Temperature/pressure test ports (Pete's Plugs).

D. Ducts:

1. Transfer, exhaust and relief ducts except as specified in this section.
2. Return ducts in suspended ceiling spaces located within building insulation envelope.
3. Return ducts exposed in conditioned space.
4. Factory-insulated flexible ducts.
5. Supply ducts exposed within a space that serves that space only.
6. Duct flexible connections.

E. Equipment:

1. Items with factory-applied insulation meeting the requirements of this section.
2. Nameplates and ASME labels.

3.6 INSTALLATION, GENERAL

A. Apply in a workmanlike manner by skilled workmen regularly engaged in this type of work.

B. Apply to clean and dry surfaces.

C. On cold piping and duct surfaces, apply with continuous, unbroken vapor barrier. Vapor seal seams with vapor barrier coating. Insulate and seal supports, anchors, and other projections and penetrations that are secured to cold surfaces with vapor barrier coating. Apply vapor seals at butt joints at every fourth pipe section joint and at each fitting.

D. Install insulation for hot pipes 2 inch and larger and cold pipes for all pipe sizes with insulation insert at pipe hanger ring and insulation shield between insulation insert and pipe hanger ring. At Contractor's option, install insulated pipe hangers as specified in Section 15840.

E. Install insulation through pipe ring for hot pipes 1-1/2 inch and smaller. Insulated pipe hanger not required. Connect to insulated pipe hanger as specified in Section 15080 for hot pipes 2 inch and larger or install insulation insert and insulation shield between pipe and pipe hanger ring.

F. Extend surface finishes to protect raw edges, ends, and surfaces of insulation.

G. Install piping and duct insulation continuous through walls, ceilings, and floor openings and sleeves, except where firestop materials are required.

H. Install with joints tightly butted or adhered per manufacturer's requirements.

I. Install insulation to allow access to equipment for inspection and repairs.

J. Bevel and seal insulation around equipment nameplates and ASME labels.

K. Do not allow fiberglass insulation to get wet or absorb moisture. Remove and dispose of wetted and moist fiberglass insulation and replace with new, dry material. Drying out wetted fiberglass insulation not acceptable.

L. Select inside diameter of piping insulation to accommodate thickness of electric heat tracing cable specified in Section 15030.

3.7 PIPING SYSTEM INSULATION

A. PVC Covers for Fittings and Valves: Seal circumferential edges by 2 inch minimum overlap onto adjacent pipe insulation using PVC tape or ASJ/SSL butt strip material.

B. Glass Fabric and Vapor Barrier Finish for Below Ambient, Insulated Fittings and Valves: Lap 2 inches onto adjacent pipe insulation.

C. Cold Piping:

D. Secure fiberglass ends with SSL butt strips, minimum 3 inches wide. Vapor seal ASJ seams with vapor barrier coating. Adhere elastomeric butt joints per manufacturer's requirements.

E. Secure joints and exposed ends at fittings, valves, and equipment with vapor barrier coating.

F. Vapor seal joint connections to insulated pipe hangers specified in Section 15080.

G. Install 4 inch long elastomeric insulation insert between wall support clamp and pipe or use insulated pipe hanger. Vapor seal joint connections to adjacent fiberglass insulation.

H. Install insulation on waste conveying condensate pipes which receive condensate from ice machines, condensate drain pans, and similar applications from floor drains, floor sinks, and roof receptors. Insulate from underside of drain to a point 5 feet downstream of trap or to connection to another waste pipe.

I. Hot Piping:

J. Secure fiberglass ends with ASJ/SSL butt strips, minimum 3 inches wide. Secure ASJ laps and butt strips with outward clinch staples at 4 inch spacing, or with suitable lap adhesive.

K. Secure PVC covers with tacks, PVC tape, outward clinch staples, or solvent type PVC adhesive.

L. Buried Piping Insulation:

M. General: Stagger and seal seams and joints for specified thickness.

N. Bedding: Install in 4 inch thick sand bed.

O. General: Install cellular glass insulation per manufacturer's instructions.

P. Insulation Joint Sealant: Apply to edge surfaces of insulation, butt tightly, and seal.

Q. Jacketing: Install per manufacturer's instructions. Install butt strip and metal bands at butt joints and bands in center of each 2 foot long section of insulation.]

R. General: Install per manufacturer's instructions. Secure in place with wire or metal bands. Factory triple and double wall stack systems do not require field applied insulation.

S. Fittings: Insulate with segments of molded insulation. Secure with 20 gage galvanized steel wire. Finish with glass cloth embedded between 2 layers of insulating cement, each 1/8 inch thick.]

3.8 DUCT SYSTEM INSULATION

A. Cut insulation slightly longer than circumference of duct to insure full thickness at corners. Apply insulation with edges tightly stitched with staples. Tape stitched seam with 3 inch wide pressure sensitive aluminum foil tape or seal joints with 2 coats of vapor barrier mastic reinforced with one layer of open weave glass fabric.

B. Secure insulation to bottom of rectangular and square ducts 18 inches and wider with welded pins and speed clips on 18 inch centers. Cut off protruding ends of the pins flush after speed clips have been installed. Seal vapor barrier facing where pins have pierced through with tape of same material by applying vapor barrier adhesive to both surfaces as recommended by the manufacturer.

C. Install duct wrap with maximum 25 percent compression.

D. Insulate exhaust ducts from exterior louver, roof cap, or similar termination, to a point 10'-0" into building or to backdraft or motor operated damper, whichever distance is less. Remaining exhaust ducts uninsulated.

E. Seal other joints and penetrations of vapor barrier facing with 3 inch wide pressure sensitive aluminum foil tape and vapor barrier coating. Seal cuts and tears with strips of aluminum foil tape and apply vapor barrier coating.

F. Where louvers are blanked off, insulate blank off as specified for outside air ducts.

G. Rectangular transfer ducts will be fabricated with 1 layer of soundlining as specified in Section 15840.

3.9 EQUIPMENT INSULATION

A. General:

B. Form or fabricate insulation to fit equipment. Groove or score as required to closely conform to round surfaces. Bevel edges and tightly butt and stagger joints.

C. Apply smooth coat of insulating cement over irregular surfaces.

D. Install removable insulation on heads of heat exchangers and other equipment requiring access for maintenance, repair, and cleaning. Fabricate removable section joints using a male-female shiplap type joint. Finish entire surface of removable section as specified in this section.

E. Indoor to 450 F:

F. Secure with adhesive, fasteners, or bands. Locate fasteners maximum 3 inch from edges and spaced maximum 12 inches on center.

G. Overlap vapor barriers minimum of 2 inches at seams and seal with pressure sensitive tape or weather barrier breather mastic.

H. Cover penetrations, facing damage, and mechanical fasteners with minimum 2 inch overlap of tape or weather barrier breather mastic.

I. When glass cloth and mastic is used, stretch glass cloth snugly to form smooth finished surface.

3.10 EXTENT OF EQUIPMENT INSULATION

A. Insulate the following cold plumbing and HVAC equipment:

1. Pipe unions.
2. Strainers.
3. Valves.
4. Flanged joints.

B. Insulate the following hot HVAC equipment:

1. Heating water pump housings.
2. Air separators.
3. Pipe unions.
4. Strainers.
5. Expansion joints.
6. Valves.
7. Flanged joints.
8. Tanks.

3.11 JACKETING

A. Jacketing Application: Install over insulation in the following locations:

1. Exposed piping and ducts in finished spaces and normally occupied areas. Locate jacket seams in least visible locations.
2. Piping and ducts located outdoors.
3. Over calcium silicate insulation.

B. PVC:

1. Overlap adjacent jacketing minimum 2 inch on down side to shed water. Weather seal using solvent type sealer.
2. Install 6 to 10 inch unsealed slide joint every 25 to 30 lineal feet for thermal expansion of piping and jacketing. Install slide joint between fittings where distance exceeds 8 lineal feet.
3. Seal riser long laps completely with solvent adhesive.
4. Vapor seal cold insulation prior to application and sealing of PVC jacketing. Seal seam edges and overlapping surfaces with vapor barrier coating. Overlap tape minimum 2 inch.
5. For hot pipe fittings, install layer of aluminum foil over first fiberglass insert, extending foil over adjacent pipe insulation. Vapor seal foil edges. Apply second fiberglass insert over foil. Install PVC fitting cover over fiberglass inserts and seal with solvent adhesive along edges.]

6. Factory Assembly: Apply to pipe and duct insulation per manufacturer's installation instructions.

3.12 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation.

3.13 EXTENT OF PIPE INSULATION

A. Insulate piping in the Contract Documents per the following table:

TYPE OF PIPE	INSTALLATION LOCATION	INSULATION TYPE	PIPE SIZE (INCHES)	INSULATION THICKNESS (INCHES)	NOTES
Cold Plumbing Piping	Inside Building Envelope	Fiberglass	All Sizes	1 Inch Thick	1
	Outside Building Envelope and Buried	Elastomeric	All Sizes	1 Inch Thick or Multiple Layers for 1-1/2 Inch Total Thickness	1,3
Hot HVAC Piping with Temp less than 140 F	Inside Building Envelope	Fiberglass	1-1/4 Inch and Smaller	1 Inch Thick	
			1-1/2 Inch and Larger	1-1/2 Inch Thick	

Notes:

1. Including polyethylene and polypropylene tubing.
2. Include multi-ply laminate jacket.
3. Include factory applied weatherable jacket or manufacturer recommended coating.

EXTENT OF DUCT INSULATION

Insulate ductwork in the Contract Documents per the following table:

LOCATION OF DUCT	DUCT SYSTEM TYPE	DUCT CONFIGURATION	INSULATION TYPE	MINIMUM R-VALUE, INSULATION THICKNESS	NOTES
Ducts Within Conditioned Space Functioning as Part of Building Envelope	All Duct Types	Rectangular	Rigid Board	R-Value Equal to Building Envelope, Thickness as Required	1
		Round and Oval	Duct Wrap	R-Value Equal to Building Envelope, Thickness as Required	1

Notes:

Insulate outside, exhaust, and relief air ducts from building envelope to motorized and backdraft dampers with R-value equal to building envelope thickness.

END OF SECTION

SECTION 15400 - DOMESTIC WATER SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes domestic water piping for potable system and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. Applicable plumbing code pertaining to materials, products, and installation of domestic water piping.
2. ASME B1.20, Hose Coupling Screw Threads – Inch.
3. ASSE 1010, Performance Requirements for Water Hammer Arrestors.
4. ASSE 1011, Performance Requirements for Hose Connection Vacuum Breakers.
5. ASSE 1012, Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent.
6. ASSE 1013, Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers.
7. ASSE 1015, Performance Requirements for Double Check Backflow Prevention Assemblies and Fire Protection Backflow Prevention Assemblies.
8. ASSE 1018, Performance Requirements for Trap Seal Primer Valves – Potable Water Supply.
9. ASSE 1044, Performance Requirements for Trap Seal Primer Devices - Drainage Types and Electronic Design Types.
10. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
11. AWWA C 104/A 21.4, Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.
12. AWWA C 110/A 21.10, Standard for Ductile-Iron and Gray Fittings for Water.
13. AWWA C 111/A 21.11, Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
14. AWWA C 151/A 21.51, Standard for Ductile-Iron Pipe, Centrifugally Cast.
15. AWWA C 153/A21.53, Standard for Ductile-Iron Pipe Compact Fittings for Water Service.
16. AWWA C700, Standard for Cold-Water Meters – Displacement Type, Bronze Case.
17. AWWA C701, Standard for Cold-Water Meters – Turbine Type, for Customer Service.
18. AWWA C702, Standard for Cold-Water Meters – Compound Type.
19. NSF 61, Drinking Water System Components – Health Effects
20. NSF 372, Drinking Water Systems Components – Lead Content.
21. PDI-WH 201, Water Hammer Arrestors.

C. Installer's Qualifications for Copper Press Fitting Couplings: Installers shall be certified by the pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

D. Domestic Water Systems: Products carrying and dispensing water for consumption through drinking and cooking shall be certified by an independent, ANSI-accredited, third party certification organization to requirements NSF 61 and NSF 372 for 0.25 percent maximum lead content for wetted component base material.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Water piping
2. Backflow preventers
3. Basket strainer
4. Water meters
5. Trap primers
6. Water hammer arresters
7. Blank copy of test report form

C. Shop Drawings:

1. Comply with requirements in Section 15010 regarding 3D Shop Drawings.
2. Pre-Insulated, Underground, Direct Buried Hot Plumbing Piping

D. Certificates:

1. Certificates of Inspection by Authorities Having Jurisdiction (AHJ)
2. Certificates of Satisfactory Bacteriological Test. Include copy in the Operations and Maintenance Manual.
3. Certificates of flushing and sterilization with approval by the AHJ.
4. Certification to NSF 61 and NSF 372 for no-lead/low lead products
5. Certificates of installers for copper press fittings.

E. List of names of installers trained by pre-insulated, underground, direct buried hot plumbing pipe system manufacturer in installation of system. Only those named on list will be allowed to install system. List shall not be more than 1 year old.

F. Test Reports:

1. Field test reports.
2. Site visit reports.
3. Submit completed copy of reports and certifications and include copy in the Operation and Maintenance Manual.

1.4 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 15750 – Humidifiers: Water filter for atomizing type humidifiers.

B. Section 15900 – Automatic Temperature Controls: Thermal wells, flow switches, and similar components.

PART 2 PRODUCTS

2.1 GENERAL

A. Basic piping materials and products required for work of this section are specified in Sections 15050, 15060, 15080, and 15100. Furnish products of sizes, ratings, and characteristics indicated, which comply with manufacturer's standard materials, design, and construction in accordance with published product information. Furnish quantity of piping and appurtenances required for complete installation.

2.2 POTABLE AND NON-POTABLE WATER PIPING

A. All Sizes, Underground and Inside Building: Comply with requirements in Section 15060. Copper tubing only. Sweat, press fittings or flanged joint connections only.

B. 3 Inch and Larger, Outside Building (Buried) and Underground, Inside Building: Cement-lined ductile iron. Joints with rubber gaskets and rod ties. AWWA C 104, AWWA C 110, AWWA C 111, AWWA C 151, and AWWA C 153.

2.3 BACKFLOW PREVENTERS

A. Reduced Pressure Backflow Assembly: ASSE 1013, 175 psig working pressure, bronze body and working parts for 2 inch and smaller and cast iron body with FDA epoxy coated internal surfaces or Type 300 stainless steel for 2-1/2 inch and larger, stainless steel springs, with drain funnel. Include ball valves for 2 inch size and smaller and outside screw and yoke gate valves for 2-1/2 inch and larger on inlet and outlet, strainer on inlet, test cocks, and relief valve.

B. Double Check Valve Assembly: ASSE 1015, 175 psig working pressure, bronze body for 2 inch and smaller and cast iron body with FDA epoxy coated internal surfaces or Type 304 stainless steel for 2-1/2 inch and larger, 2 spring-loaded check valves, 2 OS&Y gate valves, and 4 test cocks. Serviceable without removal from piping.

C. Hose Connection Vacuum Breakers: ASSE 1011, nickel plated, nonremovable, with manual drain and garden-hose threads on outlet complying with ASME B1.20.7. Units attached to rough-bronze-finish hose connections may be rough bronze.

D. Intermediate Atmospheric Vent Type: ASSE 1012, suitable for continuous pressure application. Include inlet screen and 2 independent check valves with intermediate atmospheric vent. Chrome plated where located in finished spaces.

E. Manufacturers: As listed in “Backflow Prevention Assemblies Approved for Installation in Washington State.”

2.4 BASKET STRAINER

A. Description: Cast iron body with bolted cover, flanged connections, and drain plug. Select strainer for 125 psi working pressure. Include Type 304 stainless steel screen with 3/64 inch perforations for 2 and 3 inch sizes and 1/8 inch perforations for 4 inch and larger sizes. Interior of body with FDA approved epoxy coating.

B. Manufacturers: Watts No. 97FB-CI, Spirax Sarco, Metraflex, or approved.

2.5 WATER METERS

A. Positive Displacement Type, 2-1/2 Inch and Smaller: Electrical contact type with nutating disc, and non-resettable mechanical totalizing register. Bronze casing with Ryton disc and ball for 150 psig working pressure. AWWA C700. Accuracy plus or minus 0.5 percent of flow rate. Repeatability plus or minus 0.25 percent of flow rate. Registration in gallons. Screwed end connections.

2.6 PIPING SPECIALTIES

A. Pipe Sleeves: Comply with requirements in Section 15050.

B. Supports and Anchors: Comply with requirements in Section 15080.

C. Thermometers and Pressure Gages: Comply with requirements in Section 15080.

D. Pipe Escutcheons: Comply with requirements in Section 15080.

E. Pipe Wrap: Comply with requirements in Section 15080.

F. Low Pressure Y-Type Strainers: Comply with requirements in Section 15080.

G. Water Hammer Arresters: Factory-sealed shock arresters with direct action bellows, rated in accordance with Plumbing Drainage Institute Standard P.D.I. WH-201 Standard or ASSE 1010. Jay R. Smith, Hydrotrol, Josam, Zurn, or approved.

H. Non-Potable Water Signage:

1. Comply with requirements of UPC for non-potable water piping systems and fixtures.
2. Signage shall state: CAUTION: NON-POTABLE WATER. DO NOT DRINK.
3. Obtain approval of signage shape, size, and location from AHJ prior to installation.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article “Quality Assurance” provisions, specifications, and manufacturer’s installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to Owner.

3.4 PIPING INSTALLATION

A. Comply with requirements in Section 15060.

B. Install pipe supports in accordance with MSS SP-69 and Section 15080, whichever is more stringent.

C. Install hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by applicable plumbing code. Connect hot water circulating system within 5 feet of fixture and bank of fixtures.

D. Install isolation valves at major toilet groups and as indicated on the Drawings.

E. Install balancing valves specified in Section 15100 on domestic hot water and non-potable hot water recirculating systems at branch connections to mains.

F. Install water meter on hydronic piping system water make-up pipe.

G. Install water hammer arresters in accordance with Plumbing Drainage Institute Standard P.D.I. WH-201 or ASSE 1010 recommendations. Install at ends of hot and cold water pipes serving 2 or more fixtures and at solenoid valves, dishwashers, clothes washers, and other equipment having quick closing valves.

H. Install non-potable water signage.

3.5 MECHANICAL EQUIPMENT CONNECTION

A. Connect hot and cold water piping to mechanical equipment as indicated on the Drawings. Comply with equipment manufacturer's installation instructions. Install shutoff valve and union for each connection and drain valve on drain connection. Locate unions to allow removal of equipment without piping disassembly beyond union.

B. Install supplies, stops, pressure reducing valves, drains, traps, and similar devices as required between kitchen plumbing fixtures, faucets and equipment, and rough-in plumbing as required for a complete and operational installation. Install faucets, drains and accessories furnished by Division 11. Refer to Division 11 and kitchen drawings for additional requirements.

3.6 BACKFLOW PREVENTERS

A. Install in accordance with “Backflow Prevention assemblies Approved for Installation in Washington State”. Install maximum 5 feet above finished floor.

B. Route drain from funnel drain to nearest floor receptor, mop sink, or other approved point of termination. Avoid trip running pipe across walkways.

3.7 PRESSURE TESTING

A. Test piping at full working pressure in accordance with applicable plumbing code. Comply with requirements in Section 15060. Include test results in Operation and Maintenance Manuals.

3.8 EXTERIOR PIPING INSTALLATION

A. Install exterior water service piping in compliance with local governing regulations.

3.9 STERILIZATION AND FLUSHING OF WATER PIPING

A. After completion of water piping installation, but prior to connection to existing mains, flush system. Take sample of water from system to determine compliance with Health Department standards. Obtain necessary tests from governing Health Department. If sample is not in compliance, perform sterilization.

B. Sterilize for eight hour contact time with 50 parts per million chlorine concentration. Open valves several times. Follow by flushing with clean water until residual chlorine is less than 0.2 parts per million. Sterilizing non-potable water piping not required.

C. After flushing and sterilization are complete, conduct tests to determine compliance with Health Department standards for sterilization results. If pipe system is found to be contaminated, correct defects and perform additional flushing and sterilization until satisfactory results are obtained.

D. Submit written certification of flushing and sterilization with approval by the local AHJ.

END OF SECTION

SECTION 15410 - PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes plumbing fixtures and fittings, installation of and connections to Owner furnished plumbing fixtures and fixtures furnished under other specification divisions and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer. If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

C. Codes and Standards:

1. Applicable plumbing code pertaining to materials, products, and installation of plumbing fixtures.
2. ANSI Z358.1, Emergency Eyewash and Shower Equipment.
3. ASSE 1011, Performance Requirements for Hose Connection Vacuum Breakers.
4. ASSE 1016, Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.
5. ASSE 1019, Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance.
6. ASSE 1052, Performance Requirements for Hose Connection Backflow Preventers.
7. ICC A117.1, Accessible and Usable Buildings and Facilities.
8. NSF 61, Drinking Water System Components-Health Effects.
9. NSF 372, Drinking Water Systems Components – Lead Content.
10. Public Law 102-486, Energy Policy Act.

D. Domestic Water Systems: Products carrying and dispensing water for consumption through drinking and cooking shall be certified by an independent, ANSI-accredited, third party certification organization to the requirements of NSF 61 and NSF 372 for 0.25 per cent maximum lead content for the wetted component base material.

E. Combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following. Indicate accessories where required for complete system Verify as to the locations of plumbing fixture accessories such as sink bubbler,

glass fillers, ADA compliant shower seats, and similar items with the Architectural drawings before submittals are prepared.

1. Plumbing fixtures and trim
2. Fixture supports
3. Thermostatic mixing valves
4. Wall and floor sealant

1.4 DEFINITIONS

A. Accessible Fixture (ADA compliant): Plumbing fixture that can be approached, entered, and used by people with disabilities.

B. Fittings and Trim: Fittings specified in this section include supplies and stops, faucets and spouts, shower heads, drains and tailpieces, and traps and waste pipes.

1.5 COORDINATION

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

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Hose Bibbs and Wall Hydrants: Acorn, Chicago Faucets, J.R. Smith, Wade, Woodford, or approved.

2.2 PLUMBING FIXTURES AND TRIM, GENERAL

A. Fixture Color: White unless otherwise indicated in the Contract Documents.

B. Exposed Metal Parts: Polished chrome plated finish.

C. Stop Valves: Provide in water connections to fixtures, except where fitting has integral stops. Loose key angle pattern with lock shield, polished chrome plated finish.

D. Exposed Supplies: 1/2 inch outside diameter, polished finish, vertical braided flexible or rigid risers as specified.

E. Pipe Escutcheons: Include where pipe or other fitting enters wall at fixture. Comply with requirements in Section 15080.

F. Vacuum Breaker: Include on water supply to each fixture which has a water connection located below the rim and for fixtures with faucets with threaded outlets for hose attachment, flow-through pattern.

2.3 HOSE BIBBS AND HYDRANTS

A. HB-1 Interior Hose Bibb, Exposed:

1. Description: Chicago Faucets Model 387-CP, exposed, polished chrome brass body with hose end metal tee handle, 3/4 inch inlet and outlet. Include hose end anti-siphon vacuum breaker.

2.4 WALL AND FLOOR SEALANT

A. Manufacturer and Type: Color to match fixture. General Electric No. 1200 Silicone Building Sealant, Dow Corning No. 780 Construction Sealant, or approved.

PART 3 EXECUTION

3.1 PRE-INSTALLATION REVIEW

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

B. Before plumbing fixture installation, review in accordance with manufacturer's rough-in instructions for water, soil, and waste piping systems and supports to verify actual locations and sizes of piping connections and that locations and types of supports match those indicated. Use manufacturer's rough-in data.

C. Examine walls, floors, and cabinets for suitable conditions where fixtures will be installed.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved by AHJ. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to the Owner.

3.4 PLUMBING FIXTURE INSTALLATION

A. Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions.

3.5 PLUMBING FIXTURES, FITTINGS, AND TRIM CONNECTIONS

A. Piping installation requirements are specified in Sections 15060, 15400, and 15405. Drawings indicate general arrangement of piping, fittings, and specialties.

3.6 FIELD QUALITY CONTROL

A. Verify that installed fixtures are categories and types specified for locations where installed.

B. Check that fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.7 ADJUSTING

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

B. Replace washers and seals of leaking and dripping faucets and stops.

3.8 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Perform the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.
3. Remove labels.

3.9 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996. Total of 0.5 hours.

3.10 COMMISSIONING

A. Equipment and systems referenced in this section shall be commissioned per Section 15995. Contractor has specific responsibilities for scheduling, coordination, test development, testing and documentation. Coordinate commissioning activities with the Commissioning Authority.

END OF SECTION

SECTION 15465 - COMPRESSED AIR PIPING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes compressed air piping systems and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
2. ASME B16.3, Malleable Iron Threaded Fittings: Classes 150 and 300.
3. ASME B16.5, Pipe Flanges and Flanged Fittings NPS 1/2 through 24 Inch Standard.
4. ASME B16.9, Factory-Made Wrought Steel Buttwelding Fittings
5. ASME B16.11, Forged Fittings, Socket-Welding and Threaded.
6. ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
7. ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
8. ASME B16.39, Malleable Iron Threaded Pipe Unions Classes 150, 250, and 300.
9. ASME B31.1, Power Piping, for compressed air piping operating at more than 150 psig.
10. ASME B31.9, Building Services Piping, for compressed air piping operating at 150 psig or less.
11. ASTM A 53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
12. ASTM A 105, Standard Specification for Carbon Steel Forgings for Pipe Applications.
13. ASTM A 106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
14. ASTM A 126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
15. ASTM A 181, Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
16. ASTM A 197, Standard Specification for Cupola Malleable Iron.
17. ASTM B 32, Standard Specification for Solder Material.
18. ASTM B 88, Standard Specification for Seamless Copper Water Tube.
19. ASTM B 813, Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube.
20. UL 94 HB, Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances Testing.

C. Welding: Qualify processes and operators according to ASME BPVC.

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."

2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

1.3 SUBMITTALS

A. Comply with requirements in Division 01 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following. Include blank copy of test report form.

1. Indoor and outdoor compressed air piping
2. Air compressor
3. Combination filter/regulator
4. Automatic electronic drain
5. Quick disconnect couplings
6. Hose reels
7. Compressed air hose
8. Piping specialties

C. Shop Drawings: Comply with requirements in Section 15010.

D. Welding Certificates.

E. Test Reports:

1. Field start-up and test reports.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

PART 2 PRODUCTS

2.1 GENERAL

A. Furnish products of sizes, ratings, and characteristics indicated which comply with manufacturer's standard materials, design, and construction in accordance with published product information. Furnish quantity of piping and appurtenances required for complete installation.

B. Pressure Ratings: Provide components with minimum pressure rating of 150 psig working pressure.

2.2 MANUFACTURERS

A. Copper Tubing: Cerro, Mueller, Wolverine, Cambridge Lee Brass.

B. Copper Tubing Fittings: NIBCO®, Mueller, Elkhart.

C. Gaskets: Crane, Garlock, U. S. Rubber, Anchor, Flexitallic.

D. Shaped Nipples: Allied, Bonney Forge.

E. Origin: Items shall be manufactured in the United States.

2.3 INDOOR AND OUTDOOR COMPRESSED AIR PIPING

A. Pipe and Fittings for 2-1/2 Inch and Smaller:

1. Black steel, Schedule 40, Standard weight, ASTM A 53, Grade A or B, or ASTM A 106, Grade A, B, or C.

B. Fittings: 150 pound WSP, black malleable iron, screwed, ASME B16.3 and ASTM A 197.**]** Steel Piping for 3 Inch and Larger and for Systems Operating at 55 psig and Higher:

1. Pipe and Fittings: Black steel, Schedule 40, standard weight, ASTM A 106, Grade A, B, or C.
2. Fittings: Standard weight, seamless, butt welding, ASME B16.9, Grade WPB.
3. Pipe Nipples: Close nipples not acceptable.
4. Flanges:

   a. 150 pound forged steel weld neck or slip on. ASME B16.5 and ASTM A 181, Grade 1. Flanges facing flat faced cast iron flanges with flat face finish.
   b. Gaskets: 1/16 inch thick compressed non-asbestos material selected for applicable temperature and pressure of systems installed. Full face gaskets for flat faced flanges.

2.4 AIR COMPRESSOR

A. Description: Factory assembled package with compressor mounted on a vertical receiver.

B. Air Compressor: Pressure lubricated, two stage, air cooled, belt driven motor supported on a vertical receiver. Compression main bearings either roller or ball type. Include open drip proof motor mounted on adjustable slide rails. Include pressure gage, gage cock, pulsation dampener, intake air filter, and enclosed belt guard.

C. Start-up Kits: Include for each compressor.

D. Receiver: Integral, Vertical, designed for 200 psig and constructed to ASME. Factory air test to 1-1/2 times working pressure. Include safety valve, pressure gage, and automatic electronic drain.

E. Electrical and Controls: Include magnetic motor starter and high and low pressure switches for single point electrical connection.

F. Manufacturers: Ingersoll-Rand, Quincy, Atlas Copco, or approved.

2.5 COMBINATION FILTER/REGULATOR

A. Description: Filter element sintered polypropylene for filtration to 5 microns. Filter with zinc metal bowl. Nitrite seals. Maximum operating condition 200 psig and 150 F. Include gage on regulator for range from 0 to 160 psig. Adjustable pressure setpoint over entire gage range. Wilkerson Combination Unit C Series or approved.

2.6 FILTERS

A. Intake Air Filter: Combination intake air filter and silencer within housing for dry type filter element and silencer tubes with minimum 99 per cent efficiency of particulates 10 micrometer and larger.

B. Prefilter: Particulate type with minimum 98 per cent retention efficiency of particulates 1 micrometer and larger.

C. Final Filter: Coalescing type with minimum 99.9 per cent retention efficiency of particulates 0.3 micrometer and smaller.

2.7 AUTOMATIC ELECTRONIC DRAIN

A. Description: Automatic electronic drain, floating seal solenoid, adjustable drain cycle time, adjustable valve open period, 200 psig rated valve, wall mount tabs, 110 Volt. Quincy Northwest Posi-Drain or approved.

2.8 QUICK DISCONNECT COUPLINGS

A. Description: Brass, 125 psig working pressure. Female side of coupling (fixed end) with male thread connection and automatic shutoff. Male side with hose stem and ball check.

2.9 HOSE REELS

A. Description: Brass, compatible hose, clamps, couplings, and splicers suitable for compressed air service, 1/2 inch nominal diameter rated for 200 psig minimum working pressure, 50 foot length.

B. Hose: Reinforced single wire braid, CR-covered hose for compressed air service.

C. Hose Clamps: Stainless steel clamps or bands.

2.10 COMPRESSED AIR HOSE

A. Description: Multipurpose compressed air hose for use with pneumatic hand tools, 1/2 inch nominal diameter, 50 foot length. Include end fittings for connecting to quick disconnect couplings and to hand tools. Furnish 2 rolls of hose for Owner's use.

2.11 PIPING SPECIALTIES

A. Pipe Sleeves: Comply with requirements in Section 15050 .

B. Flexible Connectors: Comply with requirements in Section 15200.

C. Pipe Hangers and Supports: Comply with requirements in Section 15080.

D. Pressure Gages: Comply with requirements in Section 15080.

E. Pipe Escutcheons: Comply with requirements in Section 15080.

F. Valves: Comply with requirements in Section 15100.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to Owner.

3.4 INDOOR AND OUTDOOR PIPING INSTALLATION

A. Install with minimum uniform pitch of 1/8 inch per foot towards drain.

B. Install 6 inch long capped and valved drip leg at bottom of each air drop and at end of each main and branch main.

C. Install piping adjacent to equipment and specialties to allow service and maintenance.

D. Install branch connections to compressed air mains from top of main.

E. Install pressure gage on discharge piping from each air compressor and on each receiver.

F. Install piping free of sags and bends.

G. Connect compressed air piping to air compressors and to compressed air outlets and equipment requiring compressed air service.

H. Install unions adjacent to each valve and at final connection to each piece of equipment, machine and specialty.

I. Apply pipe wrap specified in Section 15080 on underground steel piping and fittings.

3.5 INSTALLATION OF COMPRESSED AIR EQUIPMENT AND COMPONENTS

A. Install equipment with clearances for service and maintenance.

B. Floor Mounted Equipment:

1. Install on level surface.
2. Anchor bolt to housekeeping pads.

C. Comply with requirements in Section 15200 for vibration isolators and Section 15210 for seismic restraints.

3.6 EQUIPMENT CONNECTIONS

A. Connect compressed air piping to mechanical equipment as indicated on the Drawings. Comply with equipment manufacturer's installation instructions. Install shutoff valve and union for each connection and drain valve on drain connection. Locate unions to allow removal of equipment without piping disassembly beyond union.

3.7 FLUSHING OF COMPRESSED AIR PIPING

A. After completion of compressed air piping installation and prior to pressure testing, flush interior surfaces by injecting dry nitrogen into open ends of piping just prior to making final connections to equipment.

3.8 PRESSURE TESTING

A. Comply with requirements in Section 15050. Include test results in Operation and Maintenance Manual.

3.9 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996. Total of 1 hour.

END OF SECTION

SECTION 15600 - BOILERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes boilers and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME BPVC, Boiler Pressure and Vessel Code, Section I, Power Boilers.
2. ASME BPVC, Boiler Pressure and Vessel Code, Section IV, Rules for Construction of Heating Boilers.
3. ASME CSD-1, Controls and Safety Devices for Automatically Fired Boilers.

C. Obtain boiler operation permit from Puget Sound Air Pollution Control Agency (PSAPCA), (1-800-552-3565).

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Hot water boiler, electric
2. Blank copy of start-up and test report forms.
3. Shop Drawings

C. Shop Drawings: Submit boiler system and hydronic loop pumps control wiring diagram and including wiring diagram of boiler control panel.

D. Test Reports:

1. Factory start-up and test reports.
2. Field start-up and test reports.
3. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

1.4 WARRANTY

A. General: Warrant boiler components for 1 year after final acceptance date. Warranty shall cover material, labor, and travel time. Make available replacement within 48 hours of initial notification.

B. Burner Warranty: Warrant burner for 5 years after final acceptance date. Warranty shall cover material only.

C. Pressure Vessel Warranty: Warrant the following items for 10 years after final acceptance date. Warranty shall cover material only.

1. Pressure vessel.
2. Furnace.
3. Tubes.
4. Tube sheets.
5. Shell.

PART 2 PRODUCTS

2.1 HEATING WATER, ELECTRIC

A. Description: Factory fabricated, assembled, and tested electric boiler with safety and operating controls, insulated enclosure, automatic blowdown system, and appurtenances. Boiler ASME stamped for 75 psig working pressure. Boiler factory wired requiring only connection to power and system piping to be ready for operation.

B. Standards: UL listed and labeled. ASME “H” stamp. CSA certified.

C. Construction: Electrical: Factory wired with junction box and 24 Volt control transformer. Single point electrical connection. Fuses, fuse block, power magnetic contactors, and similar items enclosed within jacket enclosure assembly with hinged access door.

D. Controls: Factory installed automatic liquid level control with low water cut-off, operating pressure control, manual reset high limit pressure control, and solid state electronic progressive sequencer with relays to energize and de-energize heating elements.

E. Appurtenances: ASME safety relief valve, drain/blowdown valves.

F. Individual Boiler Control System:

1. On-off switch.
2. Indicating power-on pilot light.

G. Boiler Controls: Comply with Article “Boiler Controls” in this section.

H. Manufacturers: Lochinvar or approved.

2.2 BOILER CONTROLS

A. Individual Boiler Control System: UL labeled control complete with following features:

1. Indicating lights for power on, limits closed, low water failure.
2. Control system to adjust heating water temperature in response to outdoor temperature.
3. Furnish appurtenances to monitor heating water setpoint, and enable and disable operations.
4. Operating lights and switches.

2.3 SOURCE QUALITY CONTROL

A. Test and inspect factory assembled boilers, before shipping, according to ASME BPVC.

B. Include test report in the Operation and Maintenance Manual.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Coordinate required electrical and control installation work with Division 16.

3.4 WORK PRIOR TO INSTALLATION

A. Equipment manufacturer's authorized representative shall maintain personnel within a 50 mile radius of job site. Representative capable of troubleshooting boiler, and boiler control faults.

1. Include 1 man day to meet with the mechanical, electrical and control subcontractors and the mechanical engineer at the job site. Schedule this meeting within 1 week after equipment is delivered to final location at job site but prior to installation. Purpose is to assure that all parties understand what interconnections are required.
2. After equipment installation, include 1 man day to assist control and electrical subcontractors in the termination of the interconnecting wires in boiler mounted controls. This service shall also verify the proper connection and polarity of the wires.

3.5 INSTALLATION OF BOILERS

A. General: Support boilers and piping separately so piping is not supported by boilers.

B. Anchor bolt boiler to housekeeping pad. Comply with requirements in Section 15200 for seismic restraints.

C. Wiring for appurtenances exterior to boiler including remote shutdown switch, low water cut-off switch, isolation valves, and similar components for complete boiler system operation.

3.6 START-UP SERVICES

A. Equipment manufacturer's authorized representative shall perform start-up services of boilers and related appurtenances. Services shall include a check of proper installation, system check-out, adjustment, and complete start-up. Start-up by Contractor not acceptable.

B. Coordinate start-up services with heating water system operation as specified in Division 1 and Section 15010 and TAB work specified in Section 15980.

C. Include minimum of 3 working days during which time include at least 2 observations each of morning programmed start-up, mid-day operation, and programmed night shut down to verify proper operation of controls relating to boiler operation.

3.7 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996.

B. Representative shall conduct two 1 hour training sessions to demonstrate that equipment operates as indicated in the Contract Documents and in accordance with manufacturer's recommendations. First session shall cover operation of boilers and associated combustion control equipment. Second session shall cover detailed system operation and trouble shooting. Give minimum one week notice prior to demonstration. Furnish instruments and personnel required to conduct the demonstration.

C. Starting time (during any normal operating shift) of training sessions will be determined by the Owner to minimize overtime required for his maintenance personnel.

D. Demonstrate proper performance of operating and safety controls, as well as stable equipment performance over entire operating range to satisfaction of the Owner prior to Substantial Completion.

E. Include instruction session to identify locations of servicing points and required maintenance requirements to Owner's personnel.

F. Include preliminary discussion and presentation of information from instruction manuals, with appropriate references to the Contract Documents, followed by tour explaining maintenance requirements, access methods, servicing and maintenance procedures, equipment cleaning procedures, control settings and available adjustments.

G. After 30 days of normal operation, schedule a meeting with the Owner's maintenance personnel responsible for boiler operation and the supplier's software technician to outline software changes to meet specific system requirements. Job specific software changes agreed upon at this meeting shall be made at no extra cost to the Owner.

END OF SECTION

SECTION 15710 - HYDRONIC PIPING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes HVAC hydronic piping and associated appurtenances for the heating water systems.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME B31.9, Building Services Piping.
2. ASTM D 380, Standard Test Methods for Rubber Hose.
3. ASME BPVC, Boiler and Pressure Vessel Code, Section VIII, Division 1.
4. ASTM B 372, Standard Specification for Seamless Copper and Copper-Alloy Rectangular Waveguide Tube.
5. NFS 61, Drinking Water Systems Components – Health Effects.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for each type of piping, fittings, and associated appurtenances for the following.

1. Hydronic piping
2. Dielectric unions
3. Expansion tanks
4. Air separators
5. Flow control valve assemblies
6. Pressure independent flow control valve assemblies
7. Pressure independent flow control valves
8. Cold water fill assemblies
9. Automatic air vents
10. Manual air vents
11. Sight flow indicators
12. Piping specialties
13. Blank copy of test report form

C. List of names of installers trained by pre-insulated, underground, direct buried hydronic pipe system manufacturer in installation of system. Only those named on list will be allowed to install system. List shall not be more than 1 year old.

D. Test Reports:

1. Field test reports.
2. Site visit reports.

3. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

1.4 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 15140 – Pumps: Pump discharge flexible connectors.

B. Section 15200 – Vibration Isolation: Flexible connectors.

C. Section 15735 – Water Treatment: Water treatment equipment and associated components.

1.5 BASIC PIPING REQUIREMENTS

A. Description: Comply with requirements in Section 15060.

PART 2 PRODUCTS

2.1 GENERAL

A. Basic piping materials and products required for work of this section are specified in Sections 15050, 15060, 15080, and 15100. Furnish products of sizes, ratings, and characteristics indicated which comply with manufacturer's standard materials, design, and construction in accordance with published product information. Furnish quantity of piping and appurtenances required for complete installation.

2.2 HYDRONIC PIPING

A. Description: Black steel or copper piping only. Comply with requirements in Section 15060 and 15080.

B. Dielectric Unions:

1. Union Style: Grooved, threaded, or plain end, ASTM F 1545. Capital Series CS; Epco Dielectric Unions, PPP Clearflow® Dielectric Waterway, or Victaulic Clearflow Dielectric Waterway.
2. Flange for 2-1/2 Inch and Larger: ASTM F 1545, insulating flange union per companion, 1/2 flange union with bolt insulators, dielectric gasket, bolts and nuts. Capital Series F, Epco, or Victaulic Clearflow Dielectric Waterway.
3. Ratings: Select temperature and pressure applicable for the systems in which they are installed.

C. Additional Requirements and Exceptions:

1. Unless noted otherwise, copper piping required for sizes 2-1/2 inch and smaller and black steel piping for sizes 3 inch and larger with welded joints and fittings. Copper piping acceptable for sizes 3 inch and larger with brazed joints and fittings.

2.3 EXPANSION TANKS

A. Description: Pre-pressurized replaceable bladder type for hydronic system pressure reference.

B. Construction: Welded steel, ASME BPVC tested and stamped, supplied with National Board Form U-1, rated for working pressure of 125 psig, flexible bladder sealed into tank, steel legs or integral ring mount base for vertical units or saddles for horizontal units.

C. Bladder: Sealed into tank, butyl for systems containing water.

D. Accessories: Pressure gage and air-charging fitting, tank drain. Precharge to pressure indicated on the Drawings.

E. Manufacturers: Amtrol, Armstrong, Bell & Gossett, or approved.

2.4 AIR SEPARATORS

A. Coalescing Type Air Eliminator:

1. Description: Turbulence suppressive type microbubble air eliminator, 150 psig maximum working pressure, 270 F maximum working temperature. ASME BPVC tested and stamped.
2. 2 Inch and Smaller: Brass body with centered inlet and outlet, brass vent head, non-ferrous float, Viton seat and O-ring, copper coalescing medium, NPT piping connections, full port NPT blowdown valve. Spirotherm Spirovent Junior Model VJR with Spirotherm Spirotop Air Release Valve Model VTP.

2.5 FLOW CONTROL VALVE ASSEMBLIES

A. Assembly Components:

1. Supply Connection: Ball valve, strainer with hose end blow down valve and cap, pressure/temperature test port, flexible hose, and union with pressure/temperature test port at coil connection.
2. Return Connection: Union with pressure/temperature test port at coil connection, flexible hose, union with manual air vent valve, and automatic flow control valve with cartridge, integral ball valve, and 2 pressure/temperature test ports. Automatic control valve and actuator furnished for factory installation.

B. Construction:

1. Ball Valves: Brass alloy body rated no less than 300 psig and 250 F.
2. Strainers: Y-type, bronze body, rated for 300 psig with 20 mesh stainless steel screen.
3. Unions: Forged brass body, bronze alloy end connections, EPDM O-ring, union seal, 600 WOG.
4. Automatic Flow Control Valve: Forged brass valve body with removable spring- loaded stainless steel flow control cartridge assembly.
5. Actuated Ball Valve: Forged brass housing, reinforced Teflon and EPDM O-ring stem seals, chrome plated bronze ball, and blow out proof brass stem. Equal percentage flow characteristic. Mounting plate includes shaft and mounting hardware.

C. Pressure Range: 2 to 32 psig unless otherwise noted.

D. Temperature/Pressure Test Ports: Comply with requirements in Section 15080.

E. Flexible Hoses: Braided stainless steel over synthetic polymer liner, swivel end connections at coils, ASTM D 380, minimum 175 psig, flame retardant, 18 inch length.

F. Exceptions:

1. Coils with Capacities Greater Than 57 gpm: Separate automatic flow control valve, ball valve, and automatic control valve.

2. Pipe Sizes Exceeding Manufacturer's Available Sizes: Separate valves, automatic flow control valve, strainers, unions, automatic control valves, pressure/temperature test ports, and other components for a complete installation.

G. Tags: Bronze engraved plate or laminated plastic securely chained to devices, with manufacturer and model number, rated flow gpm, pressure range, and project system/zone identification.

H. Applications: Unit heaters, cabinet unit heaters, panel radiators, fan coil units, VAV unit and FTU coils, duct mounted coils, and air handling unit coils with capacity less than 57 gpm.

I. Manufacturers: Bell & Gossett, or approved.

2.6 COLD WATER FILL ASSEMBLIES

A. Description: Automatic fill and make-up water assembly for hydronic system charging and pressure maintenance.

B. Pressure Reducing Valve: Self-contained super capacity regulator, bronze body with screwed ends, replaceable stainless steel seat, replaceable composition disk, 150 psig working pressure, integral strainer with 32 mesh screen, 25 to 75 psig adjustable pressure range, maximum 10 psig pressure drop through the valve and strainer. Watts No. 223S or equivalent.

C. Pressure Relief Valve: Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labeled. Select for capacity greater than pressure reducing valve capacity. Watts No. 174A Series or equivalent.

D. Manufacturers: Watts, Mueller, Armstrong Fluid Technology, or approved.

2.7 AUTOMATIC AIR VENTS

A. Description: Cast brass, rated for 150 psig WSP and 270 F operating temperature. Units with non-ferrous floats, stainless steel linkage, and Viton® seal and brass spring operated seat.

B. Manufacturers: Spirotherm Spirotop Air Release Valve or approved.

2.8 MANUAL AIR VENTS

A. Description: Needle valve, 1/2 inch, with 2 feet of soft drawn copper tubing.

2.9 SIGHT FLOW INDICATORS

A. Description: Paddlewheel indicator for flow in any direction.

B. Constructions: Bronze rated for 180 psig at 300 F for pipe sizes 2 inch and smaller and carbon steel rated for 230 psig at 300 F for pipe sizes 2-1/2 inch and larger. Include flanged ends tempered glass window, Neoprene seals, and Teflon© rotator.

C. Manufacturer: John C. Ernst Co. Model 241 for pipe sizes 2 inch and smaller and Model 201 for pipe sizes 2-1/2 inch and larger or approved.

2.10 PIPING SPECIALTIES

A. Pipe Sleeves: Comply with requirements in Section 15050.

B. Pipe Hangers and Supports: Comply with requirements in Section 15080.

C. Thermometers and Pressure Gages: Comply with requirements in Section 15080.

D. Pipe Escutcheons: Comply with requirements in Section 15080.

E. Valves: Comply with requirements in Section 15100.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to Owner.

3.4 PIPING INSTALLATION

A. Comply with requirements in Section 15060, minimum 3/4 inch pipe size.

B. Install pipe supports in accordance with MSS SP-69 and Section 15080, whichever is more stringent.

C. Branch Connections to Mains: Connect with tee fitting to top of pipe mains.

D. Coil Connections: Connect counterflow and to allow coils to vent and drain.

E. Pump Connections: Support piping adjacent to pump so that no weight is carried on pump casing.

F. Flexible Connectors: Install flexible connectors furnished under Section 15200 at connections to vibration-isolated (spring and rubber isolator-mounted), chillers, cooling towers, and similar equipment. Install pump discharge flexible connectors furnished under Section 15140 at connections to vibration-isolated (spring and rubber isolator-mounted) pumps.

G. Control Components: Install control and differential pressure valves, water pressure and differential pressure taps, valve manifolds, flow switches, thermal wells, and similar components furnished under Section 15900.

H. Air Vents:

1. Automatic Air Vents: Install at high points of hydronic systems unless otherwise indicated on the Drawings. Connect inlet through gate or ball valve. Install 1/4 inch copper discharge pipe from threaded outlet and terminate over floor drain, service sink, or other safe point of disposal.
2. Manual Air Vents: Install as indicated on the Drawings.

I. Valves: Install at branch connections in addition to valves at flow control valve assemblies.

3.5 MECHANICAL EQUIPMENT CONNECTIONS

A. Connect hydronic piping to mechanical equipment coils, traps, control valves, and other components as indicated on the Drawings. Comply with equipment manufacturer's installation instructions. Install shutoff valve and union or flanges for each connection and drain valve on drain connection. Locate unions to allow removal of equipment without piping disassembly beyond union.

3.6 FLUSHING AND PRESSURE TESTING

A. Comply with requirements in Section 15060. Include test results in Operation and Maintenance Manuals.

3.7 WATER TREATMENT EQUIPMENT

A. General: Install equipment and associated components furnished under Section 15735 in accordance with water treatment specialist’s directions and recommendations.

3.8 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996. Total of 4 hours.

END OF SECTION

SECTION 15735 - WATER TREATMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes chemical cleaning and chemical water treatment for heating water piping systems.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASME B31.1, Power Piping.
2. ASTM D 1784, Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Components.
3. Local environmental regulations.

C. Treatment Specialist Qualifications:

1. Local representative with minimum 5 years experience in chemical cleaning and chemical treatment of piping systems for projects of similar size to this project. Company in the business of selling chemicals and equipment for chemical flushing and chemical treatment of piping systems for at least 5 years with staff for technical services and on-site consulting and trouble-shooting capabilities.
2. Water treatment company shall have, as a part of its direct organization or at its disposal, a recognized water treatment research and analytical laboratory with capability of analyzing and interpreting water, deposit, biological and metallographic samples.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for each chemical and appurtenance as follows. Include MSDS sheets for each chemical used for water treatment chemicals and chemical treatment equipment. Include blank copy start-up and test report form.
   1. Chemical treatment
   2. MSDS sheets
   3. Blank copy start-up and test report form
   4. Certifications:
      a. Treatment specialist qualifications.

C. Test Reports:
   1. Water analysis.
   2. Chemical cleaning and chemical treatment operations.
   3. Field start-up and test reports.

4. Submit completed copy of report and include copy in the Operation and Maintenance Manual.

1.4 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 15710 – Hydronic Piping Systems: Water treatment equipment and associated components.

PART 2 PRODUCTS

2.1 CHEMICAL TREATMENT

A. Description: Chemical cleaning of heating water piping after initial flushing and pressure testing have been performed per requirements in Section 15060. Work also includes chemical treatment following cleaning of piping. Work performed under supervision of water treatment specialist. Estimated hydronic system volumes are:
1. Heating Water: 150 gallons.

B. Water Analysis: Perform water analysis for locally available water. Make recommendations as to required chemicals and quantities based on water analysis. Include copy in the Operation and Maintenance Manual.

C. Chemicals:
1. Standards: Chemical treatment in accordance with currently accepted standards for the Environmental Protection Agency (EPA). Chemicals EPA registered and labeled in accordance with EPA Standards. Comply with local codes, statutes, and requirements for addition of non-potable chemicals to building systems and for discharge to public sewers.
2. Chemical Cleaning of Piping: Biodegradable, equal to Hydrochem 280 for flushing with hot water and Hydrochem 281 for flushing with cold water to remove pipe protective coatings and oil.
3. Chemicals for Boiler Boilout: Chemicals one of the following:
   a. 0.05 percent by weight sodium hydroxide.
   b. 0.09 percent by weight potassium hydroxide.
   c. 0.1 percent by weight trisodium phosphate.
   d. Water treatment specialist's cleaning solution as a blend of hydroxides, passivators, and surfactants.**]**
4. Closed System Chemical Treatment:
   a. Sequestering agent to reduce deposits and adjust pH.
   b. Corrosion and scale inhibitors with sodium nitrite, moly molybdenum, or molydate base.

D. Test Kit: Necessary reagents and supplies packed inside a high-impact plastic carrying case with directions for the following:
1. Corrosion and scale inhibitor formulation and conductivity for closed systems.
2. Corrosion and scale inhibitor formulation and conductivity for open systems.
3. Bleed-off for open systems.
4. Glycol test for glycol solution systems.

5. Corrosion and scale inhibitor formulation for steam and boiler feedwater systems.

E. Manufacturers: CH_2O Inc., Chem-Aqua, RealChem Northwest, DeBois, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. Description: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 WATER ANALYSIS

A. Perform a water analysis to determine quality of water available.

3.5 CHEMICAL TREATMENT

A. Chemical Cleaning of Piping:
1. Following initial flushing as specified in Section 15060, chemically clean designated piping systems with flushing agent solution to remove pipe protective coatings and oil.
2. Coordinate with mechanical contractor and controls system subcontractor for their assistance and be responsible to have manual and automatic control valves fully open.
3. Measure system volume with water meter, when filling, and record volume. Use this value to determine amount of flushing agent to use. Install separate water meters in make-up water pipes to chilled and heating water systems. Provide flushing agent quantity in solution in accordance with manufacturer’s recommendations.
4. Circulate mixture for a time period as recommended by manufacturer.
5. Drain system and flush with water until water is clear, conductivity is within 50 micromhos/cm of makeup water, and has pH no greater than 8.3. Dispose of effluent in a manner acceptable to the AHJ.
6. Clean and flush traps and strainer screens of debris and foreign matter.

B. Reports: Prepare reports of chemical cleaning of piping, boilout of boilers, and chemical treatment operations and submit to A/E. Include reports in Operation and Maintenance Manual.

C. Install test kit on wall near water chemical application equipment or at a location as directed by the Owner.

3.6 START-UP SERVICES

A. Equipment manufacturer's authorized representative shall perform start-up services of non-chemical water treatment system and related appurtenances. Services shall include a check of proper installation of field assembled components, system check-out, adjustment, and complete start-up. Start-up by Contractor not acceptable.

B. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational.

C. Coordinate start-up services with heating water, piping system operation as specified in Division 1 and Section.

D. System Labeling: Upon completion of chemical flushing and chemical treatment, label each system same as for identification of piping specified in Section 15050 as follows: "THIS SYSTEM HAS BEEN CLEANED AND CHEMICALLY TREATED. DO NOT DISTURB UNLESS AUTHORIZED". Locate labels to be plainly visible.

E. Report: Prepare reports of cleaning and chemical treatment operations and submit copies to A/E. Include reports in Operation and Maintenance Manual.

END OF SECTION

SECTION 15770 - RADIANT FLOOR HEATING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes radiant floor heating system using crosslinked polyethylene (PEX-a) tubing and related appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E 119, Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E 814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM F 876, Standard Specification for Crosslinked Polyethylene (PEX) Tubing.
5. ASTM F 877, Standard Specification for Crosslinked Polyethylene (PEX) Plastic Hot-and Cold-Water Distribution Systems.
6. ASTM F 1960, Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) Tubing.
7. Plastics Pipe Institute (PPI), Technical Report TR-3, Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
8. Plastics Pipe Institute (PPI), Technical Report TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds.
9. UL 263, Fire Tests of Building Construction and Materials.
10. Uponor Wirsbo, Complete Design Assistance Manual (CDAM).
11. Uponor Wirsbo, Radiant Floor Installation Handbook.
12. Uponor Wirsbo, Advanced Design Suite Software.

C. System Installer Qualifications: Minimum 10 years experience on projects of similar size and complexity and possessing documentation proving successful completion of radiant floor heating training by PEX tubing manufacturer.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer’s technical product data and maintenance data for the following:

1. Radiant floor heating system
2. Piping specialties
3. Shop drawings
4. Certifications

C. Shop Drawings:

1. Installation drawings indicating tubing layout, manifold locations, zoning requirements, and manifold schedules with details required for system installation.
2. Mechanical schematic indicating heat source, mechanical piping, and accessories from heat source to manifolds, circulators, water tempering, and zone controls. Indicate supply water temperatures and flow rates to manifolds.

D. Certifications:

1. Manufacturer's certificate indicating products comply with specified requirements.
2. Installer is trained by PEX tubing manufacturer to install radiant floor heating systems.
3. Installer uses skilled workers holding trade qualification license or equivalent or apprentices under supervision of licensed trade person.

E. Test Reports:

1. Field test reports.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

1.4 WARRANTY

A. General: Warrant controls, electrical components, and other appurtenances for 2 years after final acceptance date. Warranty shall cover parts, labor, and travel time. Make available replacement within 48 hours of initial notification.

B. PEX Tubing: Non-prorated warranty against failure due to defect in material or workmanship for 30 years after final acceptance date. Warranty shall cover materials only.

C. Manifolds and Fittings: Non-prorated warranty against failure due to defect in material or workmanship for 5 years after final acceptance date. Warranty shall cover materials only.

D. Controls and Electrical Components: Non-prorated warranty against failure due to defect in material or workmanship for 2 years final acceptance date. Warranty shall cover materials only.

PART 2 PRODUCTS

2.1 RADIANT FLOOR HEATING SYSTEM

A. Description: Under floor system including tubing, fittings, manifolds, controls, and accessories for complete and operating system.

B. Ratings:

1. Standard grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-4. Required standard grade ratings as follows:
    a. 200 F at 80 psi.
    b. 180 F at 100 psi.
    c. 73.4 F at 160 psi.
2. Flame spread rating not greater than 25 and smoke developed rating not greater than 50 in accordance with ASTM E 84 for 5/16 through 2 inch PEX tubing sizes

when encased with 1/2 inch fiberglass insulation at tube spacing not less than 4 inches apart.

C. Performance Requirements: Hydronic radiant floor heating system manufactured, fabricated, and installed to comply with regulatory agencies and AHJs, and maintain performance criteria stated by the PEX tubing manufacturer without defects, damage or failure. Comply with requirements in ASTM F 877.

D. Tubing:

1. Material: Crosslinked polyethylene (PEX) manufactured by PEX-a (Engle method).
2. Material Standard: Manufactured in accordance with ASTM F 876 and ASTM F 877 and tested for compliance by an independent third party agency.
3. Pressure Ratings: Standard grade hydrostatic design and pressure ratings as issued by the Plastic Pipe Institute (PPI), Division of Society of the Plastics Industry (SPI).
4. Minimum Bend Radius (Cold Bending): No less than 6 times outside diameter. Use PEX tubing manufacturer bend supports if radius is less then stated.
5. Barrier Tubing Type:
    a. Uponor Wirsbo hePEX™ plus tubing with oxygen diffusion barrier.
    b. Nominal Inside Diameter: Tubing with nominal inside diameter in accordance with ASTM F 876. Sizes from 5/16 inch to 1 inch.

E. Fittings:

1. Furnished by PEX tubing manufacturer. Comply with requirements in ASTM F 877.
2. Compression Fittings:
    a. Fitting assembly manufactured from brass material.
    b. Fitting assembly consisting of barbed insert, compression ring, and compression nut. Barbed insert manufactured with O-ring to facilitate air pressure testing.
3. PEX Fittings:
    a. Fittings manufactured in accordance with and from materials listed in ASTM F 1960.
    b. Fitting assembly consisting of barbed adapter and applicable sized PEX ring. Barbed insert manufactured with O-ring to facilitate pressure testing with air.

F. Manifolds:

1. Type: Commercial, valved copper manifolds manufactured from Type L copper tubing. Comply with requirements in Section 15060.
2. Application: Wall-hung or boxed.
3. Isolation: Ball valve on each supply and balancing valve on each return.
4. End Cap: Include with tapping for 1/8 inch FNPT and 1/2 inch FNPT for vent and drain.
5. Piping Configuration: Supply and return piping to manifold in reverse return configuration.

G. Supply and Return Piping to Manifolds: Type L copper tubing. Comply with requirements in Section 15060. PEX tubing not acceptable.

H. Controls:

1. Room Temperature Control:

    a. Setpoint Controller: Radiant thermostat (heat only) with digital display and remote temperature sensor for installation within concrete floor slab.

    b. Accuracy: Thermostat operation within 1 degree F differential temperature incorporating pulse-width modulation action.

    c. Zone Control Module: Assembly to supply 24 VAC to thermostat and actuator with end-switch capability to allow activation of other relays and controls as required by system control strategy.

2. Supply Water Temperature Control (Single Temperature with Floating Action):

    a. Description: Mixing and control panel with supply water temperature controls and sensors.

    b. Supply Water Temperature Controller: Designed to maintain tempered supply water temperature to radiant floor heating system via modulation of 3-way floating action control valve. Uponor Wirsbo proMIX 101.

    c. Control Valves: 125 psig working pressure rating, 230 F maximum temperature rating, brass or cast-bronze body, and EPDM seals with threaded or flanged connections.

    d. Circulating Pump: Centrifugal, bronze-fitted, single-stage, close-coupled, in-line, electric motor driven pressure gauge connection tapped in pump suction and discharge, with threaded or flanged connections.

    e. Sensors: System supply water temperature sensor and system return water temperature sensor as necessary for proper operation of control system.

    f. Control: Reset supply water temperature to radiant floor heating system based on outdoor air temperature. Utilize outdoor air temperature signal from DDC system specified in Section 15900. Coordinate signal requirements to result in compatibility.

    g. Pump Interlock: Include interlock for controller to energize system circulating pump upon initial heating demand.

    h. Zone Control Module Interlock: Include interlock and 24 VAC transformer to power circuit between zone control module end switch and mix demand terminal of controller.

    i. Identification Plate: Secured to manifold with chain. Identify room served and other pertinent information.

I. Manufactures: Uponor Wirsbo, REHAU North America, or approved.

2.2 PIPING SPECIALTIES

A. Automatic Air Vents: Comply with Section 15060.

B. Manual Air Vents: Comply with requirements in Section 15710.

C. Valves: Comply with requirements in Section 15100.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work to commencing work if this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by PEX tubing manufacturer.

1. Store PEX tubing in cartons or under cover to avoid dirt or foreign material from entering tubing.
2. Do not expose PEX tubing to direct sunlight for more than 30 days. If construction delays are encountered, cover tubing that is exposed to direct sunlight.

C. Slab-On-Grade Installation:

1. Arrangement: Install supply and return piping to manifold in reverse return configuration to ensure self-balancing.
2. Coordination: Coordinate layout and installation of radiant floor heating system with building and structural components.
3. Tubing Lengths: Install tubing downstream of manifolds without joints.
4. Tubing Supports: Fasten tubing to structural flat mesh or reinforcing bar in accordance with PEX tubing manufacturer's installation instructions.
5. Tubing On-Center Spacing: Use closer tubing on-center distances along perimeter of extent of radiant floor heating system. Increase tubing on-center distances as installation moves away from perimeter.
    a. Do not exceed 9 inch on-center for painted concrete floors, tile-covered concrete floors, or linoleum-covered concrete floors.
    b. Do not install tubing within 6 inch of walls.
6. Tubing Depth: Install tubing at consistent depth below surface elevation as determined by radiant floor heating system manufacturer's requirements. Ensure sufficient clearance to avoid control joint cuts.
7. Under-Slab Insulation: Coordinate tubing installation with under-slab insulation installation specified in Division 7.
8. Floor Penetrations: For tubing that exits slab in 90-degree bend, use hot dip galvanized steel or PVC bend supports.

D. Protection: Protect installed Work from damage that may be caused by subsequent construction activity

E. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to Owner.

3.4 FLUSHING AND PRESSURE TESTING

A. Comply with requirements in Section 15060. Pressure test system before covering tubing in concrete. Include test results in the Operation and Maintenance Manual.

3.5 ADJUSTING

A. Description: Prior to operating system, test system for proper operation by opening valves to full open position, closing bypass valves, checking operation of automatic valves, and setting temperature controls so that all zones call for full flow.

3.6 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996. Total of 4 hours.

END OF SECTION

SECTION 15820 - AIR DISTRIBUTION EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes air handling units, heat recovery units, fans, fan drives, and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. AHRI 1060, Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment.
2. AMCA Publication 99, Standards Handbook.
3. AMCA Standard 204, Balance Quality and Vibration Levels for Fans.
4. AMCA Standard 210, Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
5. AMCA Publication 211, Certified Ratings Program – Product Rating Manual for Fan Air Performance.
6. AMCA Standard 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data, as tested to AMCA 300, Reverberant Room Method for Sound Testing of Fans.
7. AMCA Publication 311, Certified Ratings Program – Product Rating Manual for Fan Sound Performance.
8. AMCA Standard 320, Laboratory Methods of Sound Testing of Fans Using Sound Intensity.
9. AMCA Publication 511, Certified Ratings Program for Air Control Devices.
10. ARI 260, Sound Rating of Ducted Air Moving and Conditioning Equipment.
11. ARI 430, Central Station Air-Handling Units.
12. ASHRAE 84, Method of Testing Air-to-Air Heat Exchangers.
13. ASTM B 117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
14. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
15. UL 705, Power Ventilators.
16. UL 762, Power Roof Ventilators for Restaurant Exhaust Applications.
17. UL 1995, Safety Heating and Cooling Equipment.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data, ladder-type wiring diagrams differentiating between portions of wiring that are factory installed and portions to be field-installed, and maintenance data for each air handling unit as follows: Include dimensions, weights, capacities, certifications, component

performance, electrical characteristics, casing construction details, wiring interconnections, gages, and finishes of materials.

1. Heat recovery units, enthalpy exchanger
2. In-line centrifugal fans
3. Blank copy of start-up and test report form

C. Performance Data: Submit fan performance curve for each air handling unit, heat recovery unit, and fan. Indicate on separate graph for each fan, static pressure versus volume flow, efficiency, and brake horsepower, with scheduled design point shown and labeled. Performance certified in accordance with AMCA 210. A single fan curve not acceptable. Include coil selection worksheets, showing consideration for altitude, air density, fluid characteristics, and fouling factor.

D. Test Reports:

1. Field start-up test reports.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

1.4 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

PART 2 PRODUCTS

2.1 HEAT RECOVERY UNITS, ENTHALPY EXCHANGER, INDOOR

A. General: Factory built, indoor horizontal heat recovery units with enthalpy exchanger as indicated on the Drawings, Unit operation at outside air temperature above minus 10 Deg F and exhaust inlet relative humidity below 40 percent without forming frost or condensate. AHRI certified and listed in the AHRI 1060 Directory of Certified Air-to-Air Energy Recovery Ventilation Equipment for 0 per cent exhaust air transfer ratio (EATR) for positive, negative, and neutral pressures.

B. Casings:

1. General: Sections, dimensions, and service access spaces as indicated on the Drawings.
2. Construction:
   a. Steel or aluminum fully insulated case.
3. Access Doors and Removable Panels:
   a. Access doors and removable panels. with insulation and lining to match casing. Minimum 2 latches on each side of access door operable from either side of door. Access door and removable panel openings fully gasketed.
   b. Locate for access to internal equipment.
   c. Access doors swing against air pressure. If doors do not open against pressure, include safety latches that allow access doors to partially open after first handle movement and fully open after second handle movement.
   d. Removable panels with safety kill switch to disable equipment when removed. No tools required to open removable panel.
4. Duct Connections: Include factory installed rectangular collars.

C. Fan Sections:

1. Selection: Select fans for point of design at maximum possible mechanical efficiency. At this point of design, fan characteristic curve shall continuously slope for at least 10 percent of fan static pressure, both above and below point of design.
2. Fans: Forward curved centrifugal type fan assembly. Dynamically balanced
3. Motors: Totally enclosed fan cooled (TEFC) with thermal overload protection. Comply with requirements in Section 15030.
4. Fan Drive: Comply with Article “Fan Drives” in this section.

D. Enthalpy Exchanger: Fixed plate type for sensible and latent transfer between air streams for both summer and winter operation without forming frost or condensate.

E. Filter Section: Pleated media type, 2 inches thick, rear access housings in outside air and exhaust air upstream of enthalpy exchanger. Comply with requirements in Section 15880.

F. Dampers: Include 2 position motorized dampers and spring return analog type actuators for outside and exhaust air streams as integral part of heat recovery units. Actuators interlocked to fan motor start contactors with time delay.

G. Electrical Panel:

1. Description:

   a. UL or ETL listed and labeled.
   b. Factory wired and tested prior to shipment.
   c. NEMA 1 construction mounted on unit fan casing with separate power and secondary 120 Volt compartments.
   d. Fused disconnect, controls, and other electrical components within casing.

2. Code Required Accessories: Include factory mounted electrical and mechanical code required accessories and as follows:

   a. Horsepower and full load current rated disconnecting means.
   b. Overcurrent protection (main and internal subcomponent).
   c. Motor control with running overload protection.
   d. Electrical installation instructions.

3. Components and Wiring: Comply with NEC and requirements in Division 16. Number coded per wiring diagrams. Label electrical components per wiring diagrams.
4. Terminals: Include terminal block for main power connection, and terminal board for low voltage control wiring. Include knockouts in bottom of main control panel for field wiring entrance.
5. Fan Branch Circuits: Individually fused. Final electrical connection to fan motors made with flexible conduit sufficiently long for vibration isolation.
6. Control Circuit: Integral 24 Volt, transformer with circuit breaker, powered from main power connection.
7. Disconnect: Lockable door-interlocked main disconnect to isolate components.

H. Outside Air Intake and Exhaust Air Discharge Openings: Include weather hoods and 1/2 inch mesh galvanized steel wire or aluminum bird screens mounted in removable frames.

I. Controls: Include factory installed, wired, and tested sensors and controllers.

J. Manufacturers: Soler & Palau, or approved

2.2 IN-LINE CENTRIFUGAL FANS

A. Description: Belt and direct drive in-line centrifugal fan as indicated on the Drawings. Arrangement, accessories, and motor as indicated in the Contract Documents. UL listed and labeled.

B. Construction:

1. Housing: Galvanized steel, internally lined with 1 inch thick fiberglass neoprene coated duct liner with exposed edges sealed with adhesive. Include access panel, self-contained removable drive door, adjustable motor base, belt tunnel, support brackets, automatic belt tensioner, and inlet and outlet duct connections. Baked enamel finish.
2. Wheel: Aluminum, backward inclined, statically and dynamically balanced.
3. Bearings: Self-aligning, relubricable ball type with cast iron flanges and locking collars, L-50 life at 200,000 hours.

C. Motor: Comply with requirements in Section 15030.

D. Fan Drives: Comply with Article "Fan Drives" in this section.

E. Electrical:

1. Factory wired from junction box mounted on exterior of unit to motor. Electrical connection to fan motor made with flexible conduit sufficiently long for vibration isolation.
2. Variable Speed Controller: Factory or field installed and connected on junction box cover.

F. Manufacturers: Greenheck Model SQ, Loren Cook, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION AND PERFORMANCE

A. Description: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Coordinate with ductwork and piping as necessary to interface installation of air handling equipment and access to components.

C. Coordination: Coordinate required electrical and control installation work with Division 16 and Section 15900.

3.4 WORK PRIOR TO INSTALLATION

A. Equipment manufacturer's authorized representative shall maintain personnel within a 50 mile radius of job site. Representative capable of troubleshooting air handling unit faults.

1. Include 1 man day to meet with the mechanical, electrical and control subcontractors and the mechanical engineer at the job site. Schedule this meeting within 1 week after equipment is delivered to final location at job site but prior to equipment operation. Purpose is to assure that all parties understand what interconnections are required.
2. After equipment installation, include 1 man day to assist control and electrical subcontractors in termination of interconnecting wires in unit mounted control panels. This service shall also verify proper connection and polarity of wires.

3.5 INSTALLATION OF AIR HANDLING EQUIPMENT AND COMPONENTS

A. Install equipment with clearances for service and maintenance.

B. Suspended Fans: Provide hanger rods to support fan unit from slab above or from roof structure. Comply with requirements in Section 15050 for formed steel channels and supplementary steel framing, Section 15200 for vibration isolators, and Section 15210 for seismic restraints.

3.6 START-UP SERVICES

A. Equipment manufacturer's authorized representative shall perform start-up services of air handling units and related appurtenances. Services shall include a check of proper installation, system check-out, adjustment, and complete start-up. Start-up by Contractor not acceptable.

B. Coordinate start-up services with air distribution system operation as specified in Division 1 and Section 15010 and TAB work specified in Section 15980.

3.7 ADJUSTING

A. Tighten belts to proper tension. Adjust fans and provide drive changes to deliver design airflow. Comply with requirements in Section 15980.

B. Lubricate bearings with oil or grease as recommended by manufacturer.

C. Adjust damper linkages for proper damper operation.

3.8 MECHANICAL SYSTEMS TRAINING

A. Comply with requirements in Section 15996.

B. Representative shall conduct two 4 hour training sessions to demonstrate that equipment operates as indicated in the Contract Documents and in accordance with manufacturer's recommendations. First session shall cover operation of air handling equipment. Second session shall cover detailed system operation and trouble shooting. Give minimum one week notice prior to demonstration. Furnish instruments and personnel required to conduct the demonstration.

C. Starting time (during any normal operating shift) of training sessions will be determined by the Owner to minimize overtime required for his maintenance personnel.

D. Demonstrate proper performance of operating and safety controls, as well as stable equipment performance over entire operating range to satisfaction of the Owner prior to Substantial Completion.

E. Include instruction session to identify locations of servicing points and required maintenance requirements to Owner's personnel.

F. Include preliminary discussion and presentation of information from instruction manuals, with appropriate references to the Contract Documents, followed by tour explaining maintenance requirements, access methods, servicing and maintenance procedures, equipment cleaning procedures, control settings and available adjustments.

END OF SECTION

SECTION 15828 - ELECTRICAL HEAT TRACE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes electrical heat trace and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Electrical heat trace for insulated pipes
2. Electrical heat trace for snow melting systems

PART 2 PRODUCTS

2.1 ELECTRICAL HEAT TRACE FOR INSULATED PIPES

A. General: Self-regulating with two 16 gage tinned copper bus wires imbedded in self-regulating polymer core that varies its power output to respond to temperature along its length, allowing heat tracing to be crossed over itself without overheating. UL listed and labeled. Heater with minimum self regulation factor of minimum 90 percent. Select for 5 watts per foot at 50 F with 1 inch thick fiberglass insulation.

B. Freeze Protection: Select length of element per foot of pipe and number of valves in accordance with manufacturer’s recommendation based on thickness of fiberglass insulation specified in Section 15250, 30 F temperature difference, and 35 F pipe maintenance temperature.

C. Pipeline Sensing Thermostat: Include under insulation, set at 35 F to directly control heat tracing system.

D. Accessories: Include power connection kit, splice and tee kits, end seals, end cable ties, to suit pipe installation requirements. Include power indicator light.

E. Manufacturers: Raychem XL-Trace, Chromolox, Thermon, or approved.

F. Digital Controller:

1. Enclosure: Fiberglass reinforced plastic (FRP), NEMA 4X.
2. Protection: Internal adjustable ground fault protection device (GFPD) with ground fault sensing, alarm, and trip functions. Include built-in self test to verify system functionality.

3. Monitoring: Include alarm relay and dry contact relay and gateway to communicate to DDC system specified in Section 15900 to monitor temperature, ground fault, current draw, and power consumption and associated alarms.
4. Manufacturer: DigiTrace Model C910, Environmental Technology, or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until any unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Coordinate required electrical and control installation work with Division 26.

3.4 EQUIPMENT CONNECTIONS

A. Refer to Division 16 sections for installation requirements. Division 15 shall provide work not indicated in Division 16 for a complete and operating system. Where a conflict occurs between Division 15 and Division 16, Division 15 contractor shall provide work, including installation by licensed electrician, for a complete and operating system.

3.5 ELECTRICAL HEAT TRACE FOR INSULATED PIPES

A. General: Install on piping located outdoors and as indicated on the Drawings between pipe and insulation in accordance with manufacturer's instructions after pipes have been pressure tested.

B. Tests: After installation of heat tracing, and before and after installing insulation, test using a 2500 VDC megger. Minimum insulation resistance shall be 20 to 1,000 megohms regardless of length. Test both heating cable wires to verify connection of splices and tees. Submit test report to the A/E and include copy in the Operation and Maintenance Manuals.

C. Labels: Install "ELECTRICAL HEAT TRACED" labels on outside of jacket at 10 foot intervals.

END OF SECTION

SECTION 15840 - AIR DISTRIBUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes sheet metal work and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ASTM A 480, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
2. ASTM A 653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A 1008, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low-Alloy, High-Strength, Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
4. ASTM B 209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
5. ASTM C 177, Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
6. ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
7. ASTM C 423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
8. ASTM C 518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
9. ASTM C 916, Standard Specification for Adhesives for Duct Thermal Insulation.
10. ASTM C 1071, Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
11. ASTM C 1338, Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
12. ASTM C 1524, Standard Test Method for Water-Extractable Chloride in Aggregate (Soxhlet Method).
13. ASTM C 1534, Standard Specification for Flexible Polymeric Foam Sheet Insulation Used as a Thermal and Sound Absorbing Liner for Duct Systems.
14. ASTM D 1622, Standard Test Method for Apparent Density of Rigid Cellular Plastics.
15. ASTM D 1667, Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
16. ASTM D 2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
17. ASTM D 3574, Standard Test Methods for Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams.

18. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
19. ASTM E 90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
20. ASTM G 21, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
21. NAIMA Duct Liner Installation Standards.
22. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
23. NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.
24. SMACNA HVAC Air Duct Leakage Test Manual, (SMACNA Leakage), First Edition, 1985.
25. SMACNA HVAC Duct Construction Standards, Metal and Flexible (SMACNA), Third Edition, 2005.
26. SMACNA Rectangular Industrial Construction Standards, (SMACNA Rectangular), Second Edition, 2004.
27. SMACNA Round Industrial Construction Standards, (SMACNA Round), Second Edition, 1999.
28. UL 181, Factory-Made Air Ducts and Air Connectors.
29. UL 181B, Closure System for Use with Flexible Air Ducts and Air Connectors.
30. UL 723, Test for Surface Burning Characteristics of Building Materials.
31. UL 1978, Grease Ducts.
32. UL 2221, Tests of Fire Resistive Grease Duct Enclosure Assemblies.

C. Duct Cleanliness Requirements:

1. Prevent damage to ducts during transportation and off loading. Deliver only when ducts can be stored under permanent cover. Plastic tarp covering of ducts on jobsite not acceptable.
2. Keep site storage areas clean and dry with minimal exposure to dust.
3. Keep working area clean and dry and protected from weather elements.
4. Prior to installation of individual duct sections, inspect to ensure they are free from debris and wipe internal metal surfaces.
5. Cover duct risers to prevent entry of debris.
6. Cover open ends of ducts and downward facing and horizontal duct openings.
7. If, in the opinion of the A/E, ducts and fittings are not kept clean or completely dry, replace ducts and fittings or clean interior of affected ducts and fittings to satisfaction of the A/E at no additional cost to the Owner.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Sheet metal work, general
2. Four-bolt or corner-clip duct connection system
3. Fasteners
4. Hangers for sheet metal work
5. Miscellaneous duct accessories

C. Shop Drawings: Comply with requirements in Section 15010.

D. Test Reports:

1. Pressure testing for leakage.
2. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

E. PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

F. Section 15200 – Vibration Isolation: Flexible connectors.

PART 2 PRODUCTS

2.1 SHEET METAL WORK, GENERAL

A. Duct Construction:

1. Comply with SMACNA. Standing seams not acceptable for exposed ducts.
2. Galvanized steel in general with G-90 zinc coating, ASTM A 653, minimum 26 gage.

B. Pressure Classifications:

1. Return and Exhaust Ducts: Plus 2 inch downstream of fans and minus 2 inch w.g. upstream of fans for fan design static pressure scheduled on the Drawings at 1.0 inch w.g. and above.
2. Return, Relief, and Exhaust Ducts: Plus 1 inch downstream of fans and minus 1 inch w.g. upstream of fans for fan design static pressure scheduled on the Drawings at less than 1.0 inch w.g. Plus 1 inch w.g. for relief ducts.
3. Outside Air Ducts: Minus 2 inch w.g.
4. Supply Ducts: 2 inch w.g.

C. Round Ducts: Spiral seam with beaded sleeve at transverse joints.

D. Fittings:

1. Comply with SMACNA as follows:
    a. Round Elbows: Full radius (R/D=1.5), spiral seam for 6 inch w.g. ducts and 5 piece segmented or stamped per SMACNA Figure 3-4 for 2 inch w.g. ducts.
    b. Rectangular Elbows: Full radius (R/W=1.5) where minimum 5 duct widths is available downstream of elbow fitting prior to branch take off. If straight length not available, use square throat elbow with turning vanes.
    c. Round Tees and Laterals: Conical fitting or tap per SMACNA Figure 3-6, 90 degree tee with oval to round tap, 45 degree lateral fitting, tap, or saddle tap, or 45 degree rectangular lead-in per SMACNA Figure 3-5. 90 degree tee not acceptable. Saddle tap connections for exposed ducts in finished spaces not acceptable.
    d. Spin-in Fittings: Conical type, with volume damper, quadrant, and accessories. Include closed outside end bearing, insulation guard for installation in duct with soundlining, and standoff bracket for installation in duct with insulation.
    e. Rectangular Laterals: 45 degree entry fittings per SMACNA Figure 4-6.
    f. Offsets: Full radius (R/D=1.5 for round and R/W=1.5 for rectangular) where space allows. Mitered offset (Type 2) with 30 degree maximum offset angle per SMACNA Figure 4-7. Angle offset (Type 1) not acceptable.

g. Divided flow fittings acceptable per SMACNA Figure 4-5 except for branch connections to outlets and inlets.

2. Bellmouth Fittings: 18 gage spun sheet metal, formed into uniform radius bellmouth. Minimum radius of bell equal to 0.2 times neck diameter.
3. Screened Openings: 1/2 inch mesh screen, 14 gage galvanized steel wire. Enclose mesh screen with 20 gage galvanized removable sheet metal frame around perimeter.
4. Duct Collars: 2 inch wide galvanized steel for galvanized ducts, 20 gage. Mitered corners for square and rectangular ducts. Escutcheon type for round ducts.

E. Turning Vanes:

1. Description: Airfoil design, smoothly-rounded entry nose, extended trailing edge, continuous internal tubes for stiffening and rigidity of section, adaptable to duct sizes. Maximum generated sound power level 54 decibels in octave band 4 at 2000 fpm velocity in 24 inch by 24 inch duct size.
2. Assembly Fabrication: Side rails by same manufacturer as turning vanes. Vanes installed on 2.4 inch centers across full diagonal dimension of elbow per SMACNA Figure 4-3. Rail systems with non-standard tab spacing not acceptable.
3. Unequal Elbows: Fabricate and adjust to set vanes in assembly at correct angle of attack, resulting in leading and trailing edges in parallel to duct surfaces.
4. Manufacturer: H.E.P. - High Efficiency Profile - as manufactured by Aero/Dyne Co. (1-800-522-2423) or approved.
5. At Contractor's option, double wall turning vanes fabricated from same material as adjacent duct acceptable. Include mounting rails with friction insert tabs that align vanes automatically.

F. Duct Sealant:

1. Indoor Locations: UL 181 listed and labeled. Low odor, non-toxic vapors, surface burning characteristics for maximum flame spread of 25 and maximum smoke developed of 50 when in a dry state. Rated for air temperature range of minus 20 F to plus 150 F. Rated to 10 inches w.g., minimum 65 percent solid content. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex, McGill Airflow LLC, AirSeal United Duct Sealer (Water Based), Biddle Aqua-Crylic HVAC, Hardcast Irongrip 601, Design Polymerics DP1010, Ductmate Industries Proseal or EZ-Seal, or approved.
2. Outdoor Locations: UL 181 listed and labeled. 3 inch minimum width. Surface burning characteristics of 25 maximum flame spread and 50 maximum smoke developed. Rated for air temperature range of minus 40 F to plus 200 F. Sealer with UV inhibitors. Foster 32-19 Duct Fas, Childers CP-146 Chil Flex, McGill Airflow LLC, AirSeal UNI-WEATHER, Ductmate Industries Proseal or approved.

2.2 FOUR-BOLT OR CORNER-CLIP DUCT CONNECTION SYSTEM

A. General: System used for sheet metal work at Contractor's option.

B. Components: Roll-formed 20 gage galvanized steel flanges with integral mastic sealer, embossed corner pieces, UL listed and labeled metal cleats, duct sealer, closed cell neoprene gaskets, and cadmium plated bolts and nuts.

C. Lined Ducts: Fabricate with no gaps, bulges, or other discontinuities between adjacent sections of duct lining after assembly.

D. Manufacturers: Ductmate Industries, Nexus, Ward Industries, or approved. Fabricate in strict conformance to manufacturer's instruction.

2.3 FASTENERS

A. Description: Use blind rivets, sheet metal screws, or bolted connections where required by SMACNA for attachment purposes for sheet metal. Sheet metal screws and rivets minimum length required for secure fastening. Where rivets are specifically called for in this section, sheet metal screws may be used.

B. Locations: For ducts, grilles, and accessories exposed to view in finished rooms, include finish-type fasteners.

1. Permanent Work: Blind stainless steel pop rivets.
2. Removable Items and Grilles: Cadmium-plated pan head or countersunk tapping screws.

2.4 HANGERS FOR SHEET METAL WORK

A. Description: Hangers, supports, and anchor bolts for sheet metal work and equipment, same material as for duct construction.

B. Building Attachments: Concrete inserts and structural-steel fasteners appropriate for construction materials to which hangers are being attached. Comply with requirements in Section 15050.

C. Duct Sizes: Refer to maximum cross-section dimension at location of hangers.

D. Horizontal Rectangular and Round Ducts: Comply with SMACNA Standards. Wire hangers not acceptable.

E. Vertical Ducts: Angles attached to sides in pairs. Comply with SMACNA. In shafts, include supplementary steel angles, formed steel channels, or saddles at each floor to distribute loads from bracing angles, channels, or saddles to the structure.

2.5 MISCELLANEOUS DUCT ACCESSORIES

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.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance", provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to the Owner.

3.4 DUCT INSTALLATION

A. General:

1. Install in workmanlike manner. Fabrications, fittings, joints, take-offs, attachments, turning vanes, dampers, and sealing in accordance with requirements of SMACNA as specified in this section and as indicated on the Drawings. If used as part of duct fabrication process, install duct labels on outside of ductwork. Installation of duct labels on inside of duct not acceptable.
2. Comply with requirements in Section 15200 for seismic restraints of ducts and for penetrations through mechanical room walls and floors and acoustical walls.
3. Hang ducts from roof structure and not from the roof deck itself. Provide formed steel channels or supplementary steel framing as specified in Section 15050 to span between roof structural members.
4. Locate ducts with sufficient clearance around equipment to allow for inspection, repair, replacement, and service.
5. Cap incompleted duct ends with temporary closures of taped polyethylene to prevent construction dust from entering ducts.
6. Install duct collars where exposed ducts pass through non-fire rated walls and ceilings. Fasten tight to ducts.
7. Duct sizes may be changed as long as the new dimensions are equivalent to those indicated and do not exceed 4 to 1 aspect ratio.
8. Transitions:
    a. Fabricate and install duct transitions for connections to equipment, such as fans, coils, motor operated dampers where the connection sizes are different from duct sizes indicated on the Drawings.
    b. Where transitions are required to fit into available space, fabricate to maintain equivalent free area of duct sizes with angle less than 15 degrees.
9. Drawings do not show offsets which may be required. Make offsets with fittings with as small an angle of offset as possible. Install turning vanes in square corner elbows.
10. Install acoustical turning vanes in return air square throat elbows.
11. Install flanged connections to equipment with neoprene gaskets.
12. Install ducts through roof to be watertight. Coordinate with any details on the Drawings as to flashings and curbs.
13. Install ducts within shafts without contact with walls.
14. Install ducts, unless otherwise indicated on the Drawings, vertically and horizontally and parallel and perpendicular to building lines.

15. Install test holes at fan inlets and outlets and elsewhere as indicated on the Drawings. Locate where required for testing and balancing purposes as directed by the TAB subcontractor specified in Section 15980.
16. Install return air and transfer air openings above ceilings with minimum 2'-0" clearance to obstructions.
17. Where existing louvers are shown on the Drawings to be blanked off, cover backside of unused portion of louver with galvanized sheet metal and caulk weathertight. Paint outside surface of blank off material flat black prior to installation.

B. Duct and Plenum Sealing: SMACNA Seal Class A. Apply duct sealer to transverse joints, longitudinal seams, fitting connections, corners of four-bolt or corner clip duct connection system, and fitting seams except continuous welded type. Spiral seams, continuous welded seams, and transverse joints for 4-bolt or corner clip duct connection system are not required to be sealed unless visible and audible leaks exist or duct leakage exceeds that allowed by leakage test specified in this section. Comply with manufacturer's recommendations.

END OF SECTION

SECTION 15845 - AIR DISTRIBUTION ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes accessories for air distribution systems and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. AMCA 500-D, Laboratory Methods of Testing Dampers for Rating.
2. AMCA 511, Certified Ratings Program for Air Control Devices.
3. ARI 410, Forced-Circulation Air-Cooling and Air-Heating Coils.
4. ARI 880, Air Terminals.
5. ARI 885, Procedure for Estimating Occupied Space Sound Levels in the Application of Air Terminals and Air Outlets.
6. ASTM C 1071, Standard Specification for Fibrous Duct Lining Insulation (Thermal and Sound Absorbing Material).
7. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ASTM E 477, Standard Test Method for Measuring Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers.
9. NFPA 80, Standard for Fire Doors and Other Opening Protectives.
10. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
11. NFPA 92A, Recommended Practice for Smoke-Control Systems.
12. NFPA 92B, Guide for Smoke Management Systems in Malls, Atria, and Large Areas.
13. NFPA 105, Standard for Smoke Door Assemblies and Other Opening Protectives.
14. NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.
15. SMACNA Fire, Smoke and Radiation Damper Installation Guide.
16. SMACNA HVAC Duct Construction Standards, Metal and Flexible (SMACNA), Third Edition, 2005.
17. UL 181, Factory-Made Air Ducts and Air Connectors.
18. UL 555, Fire Dampers.
19. Ul 555C Ceiling Dampers.
20. UL 555S, Smoke Dampers.
21. UL 723, Test for Surface Burning Characteristics of Building Materials.
22. UL 1995, Heating and Cooling Equipment.
23. UL 1996, Electric Duct Heaters.
24. UL 1978, Standard for Grease Ducts.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for the following:

1. Backdraft dampers
2. Access doors and frames

C. Shop Drawings: Comply with requirements in Section 15010.

D. Test Reports:

1. Fire Damper Log: Prior to air handling system startup, submit fire damper log. Log shall consist of an Excel spreadsheet listing each fire damper, ceiling radiation damper, smoke damper, and combination fire/smoke damper installed, type of damper, location, size, electrical connection information and date tested. Include additional comments for miscellaneous information.
2. Factory test reports for duct silencers (sound traps).
3. Submit completed copy of reports and include copy in the Operation and Maintenance Manual.

1.4 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 15880 – Filters: Duct mounted filter housings and filters during construction.

1.5 PRE-INSTALLATION MEETING

A. Prior to installing fire dampers, ceiling radiation dampers, smoke dampers, and combination fire/smoke dampers, sheet metal subcontractor shall arrange for and conduct a pre-installation meeting to review installation requirements. Meeting participants shall include at a minimum representatives from the general contractor, sheet metal, electrical and fire alarm subcontractors, Fire Marshal, A/E, Mechanical Engineer and Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. Comply with SMACNA

2.2 BACKDRAFT DAMPERS

A. Description: Extruded aluminum frame and blades, extruded vinyl edge seals mechanically locked into blade edge. Blades with field adjustable, zinc plated steel counterbalance weights to allow pressure relief to start opening at 0.01 inch w.g. and be fully open at 0.06 inch w.g. Corrosion resistant bearings, synthetic type. Linkage concealed in frame. Dampers designed for maximum 1500 fpm spot velocities and up to 4 inch w.g. back pressure.

B. Manufacturers: Ruskin Model CBD2, Greenheck, American Warming & Ventilating, Air Balance, Duro Dyne, Pacific Air Products, or approved.

2.3 ACCESS DOORS AND FRAMES

A. General: Include access doors wherever access to ducts is necessary for reaching equipment. Double construction, hemmed edges (no sharp edges),

tight fitting with gasket, hinged, with latch, and insulation or soundlining equivalent to that of adjacent duct. Steel angle frame. Access panels with sheet metal fasteners not acceptable.

B. Access Door Sizes:

1. One-Hand or Inspection Access: 8 inches by 5 inches.
2. Two-Hand Access: 12 inches by 6 inches.
3. Head and Hand Access: 18 inches by 10 inches.
4. Head and Shoulders Access: 21 inches by 14 inches.
5. Body Access: 25 inches by 14 inches.
6. Body plus Ladder Access: 25 inches by 17 inches.

C. Latches: Die-cast, Ventfabrics No. 100 for doors 2'-0" high and smaller. Cat. No. 260 for doors up to 3'-0" high. Cat. No. 310 for doors higher than 3'-0". Use 2 for each door. Cam latches acceptable.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance", provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Do not cover up or enclose work until inspected and approved. If in non-compliance, uncover work, remove, and provide new to satisfaction of A/E at no additional cost to the Owner.

3.4 BACKDRAFT DAMPERS

A. General: Install at exhaust and relief air duct terminations to atmosphere that do not have motor operated dampers.

3.5 ACCESS DOORS

A. General: Install at backdraft dampers, and motorized dampers. Arrange door swings so that access doors open against air pressure.

3.6 FILTERS

A. Duct Mounted Filter Housings: Install housings specified in Section 15880 as indicated on the Drawings. Locate and arrange to allow easy access to replace filters.

B. Filters during Construction: Install filters specified in Section 15880 over return air grilles and other return air openings for air handling systems that are operated during construction. Size filters to exceed the grille and opening sizes. Install to be airtight. Remove at end of construction prior to building flush-out mode.

END OF SECTION

SECTION 15870 - AIR DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes grilles and diffusers, louvers and associated appurtenances.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. ADC 1062R4, Air Diffusing Equipment Certification, Rating and Test Manual.
2. AMCA 500-L, Laboratory Methods of Testing Louvers for Ratings.
3. AMCA 511, Certified Ratings Program for Air Control Devices.
4. ASHRAE 70, Method of Testing for Rating the Performance of Air Outlets and Inlets.
5. ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
6. ASTM D 523, Standard Test Method for Specular Gloss.
7. ASTM D 2244, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
8. ASTM D 4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
9. ICC Evaluation Service AC 167, Acceptance Criteria for Fabric Air Dispersion Systems.
10. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
11. Ul 2518, Air Dispersion Systems Materials.

1.3 SUBMITTALS

A. Comply with requirements in Division 1 and Section 15010.

B. Product Data: Submit manufacturer's technical product data and maintenance data for each type of the following:

1. Louvers

C. Color chart for louvers.

PART 2 PRODUCTS

2.1 LOUVERS

A. General: Four inches deep, extruded aluminum with drainable blade design and jamb mounted downspouts. Include birdscreen and with the following coatings.

1. Coating: Manufacturer's standard three-coat, thermo-cured, full-strength polyvinylidene fluoropolymer (PVDF) coating consisting of 0.8 mil thick primer

and finished with 0.8 mil thick, 70 percent Hylar 5000 (by Solvay Solexis), Kynar 500 (by Atofina Chemical), or Duranar (by PPG) PVDF coating and 0.8 mil clear coat. Thickness and flat sheen of 10 percent at 85 F reflective gloss when tested in accordance with ASTM D 523.

2. Coating Durability: Field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of No. 8 ASTM D 4318; and without fading in excess of 5 NBS units per ASTM D 2244.

B. Performance: Maximum free area and minimum pressure drop for each type as listed in manufacturer's current data.

C. Substrate Compatibility: Include frame and sill styles compatible with adjacent substrate specifically manufactured to fit into construction openings with accurate fit and adequate support for weather-proof installation. Refer to architectural drawings and specifications for types of substrate where louvers will be installed.

D. Materials: Aluminum extrusions, ASTM B 221, Alloy 6063-T52. Weld units or use stainless steel fasteners. Comply with NAAMM "Metal Finishes Manual" to provide uniformly finished products. Custom colors are required.

E. Louver Screens: On inside face of exterior louvers, 1/2 inch square mesh, 16 gage, anodized aluminum wire mounted in removable extruded aluminum frames.

F. Manufacturers: Ruskin ELF375DX, Greenheck Airolite, American Warming and Ventilating, Louvers and Dampers, Construction Specialties, Inc., or approved.

PART 3 EXECUTION

3.1 INSPECTION

A. General: Verify installation conditions as satisfactory to receive work of this section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

B. PREPARATION

C. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

D. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.2 INSTALLATION, APPLICATION, ERECTION, AND PERFORMANCE

A. General: Install, apply, erect, and perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

B. Coordinate with other work, including ductwork and duct accessories, as necessary to interface installation of grilles and diffusers with other work.

C. Connect ducts to louvers as indicated on the Drawings. Apply sealant to make installation watertight.

3.3 ADJUSTING

A. After installation, adjust grilles and diffusers to air patterns indicated on the Drawings, or as directed by the A/E before starting air balancing.

3.4 CLEANING

A. After installation of grilles and diffusers, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Remove and provide new grilles and diffusers that have damaged finishes.

END OF SECTION

SECTION 15980 - TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes testing, adjusting, and balancing (TAB) of mechanical systems.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable city, county, and state codes and ordinances.

B. Codes and Standards:

1. AABC, National Standards for Total Systems Balance.
2. ASHRAE 111, Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-Conditioning and Refrigeration Systems.
3. NEEB, Procedural Standards for Testing Adjusting and Balancing of Environmental Systems.
4. UL 873, Standard for Temperature – Indicating and Temperature-Regulating Equipment.

C. TAB Subcontractor:

1. General: TAB work performed by an independent subcontractor, not affiliated with the Contractor.
2. Qualifications: Certified by National Environmental Balancing Bureau (NEBB) or Associated Air Balance Council (AABC).
3. Experience: Minimum 5 years on projects of similar scope and complexity.
4. TAB Subcontractors: Air Balance Associates, National Indoor Air Care, Hardin and Sons, Airtest Co., GB Systems, American Air Measurement, TAC Systems LLC, Penn Air Control, United Test and Balance or Neudorfer Engineers. No substitutions.
5. Obtain associated Product Data and Shop Drawings required to determine design-to-actual operating data (coil pressure drops, fan curves and similar data).

1.3 SUBMITTALS

A. General: Comply with requirements in Division 1 and Section 15010.

B. Preliminary Data: Submit the following within 30 days after award of contract:

1. Name of TAB subcontractor.
2. Individual qualifications of persons responsible for supervising and performing the work of this project.
3. TAB agenda listing methods and procedures, and including blank forms applicable to this project. Include blank system readiness checklists for air systems, hydronic systems, and controls. Include sample field reports and corrective action log.
4. List of projects completed by TAB subcontractor of similar size, scope and equipment. Include name of Contractor and Owner contacts.

5. List of test instruments.
6. System flow diagrams with pertinent data (flow, pressure, velocity design) for each system to be balanced.
7. Proposed final report table of contents.
8. Sample executive summary that will be included in final report.

C. Pre-Balance System Check-Out Report: Prior to commencement of TAB work, Contractor shall confirm in writing to TAB subcontractor, with copies of notice to the A/E and the Owner, that equipment and system check-out has been performed as described in Article “Work by Mechanical Contractor”.

D. Balancing Report:

1. Provide complete balancing report in accordance with NEBB or AABC requirements, including the following:

   a. System flow diagrams and floor plans.
   b. Pump curves.
   c. Fan curves.
   d. Manufacturers’ start-up and test data.
   e. Field start-up and test reports prepared by system and equipment installers.
   f. List of test instruments and dates of last calibrated.
   g. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.

E. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:

   a. Title page.
   b. Name and address of testing, adjusting, and balancing Agent.
   c. Project name.
   d. Project location.
   e. Architect's name and address.
   f. Engineer's name and address.
   g. Contractor's name and address.
   h. Report date.
   i. Signature of testing, adjusting, and balancing supervisor who certifies the report.
   j. Summary of contents, including the following:

      1) Design versus final performance.
      2) Notable characteristics of systems.
      3) Description of system operation sequence if it varies from the Contract Documents.

   k. Nomenclature sheets for each item of equipment.
   l. Data for terminal units, including manufacturer, type size, and fittings.
   m. Test conditions for fans and pump performance forms, including the following:

      1) Settings for outdoor, return, and exhaust air dampers.
      2) Conditions of filters.
      3) Cooling coil, wet- and dry-bulb conditions.

4) Fan drive settings, including settings and percentage of maximum pitch diameter.
5) Settings for supply air static pressure controller.
6) Other system operating conditions that affect performance.

1.4 JOB CONDITIONS

A. Do not proceed with TAB work until work has been completed and is operable. Ensure that there is no latent residual work still to be completed.

B. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during TAB operations to minimize conflicts with the Owner's operations.

1.5 COORDINATION

A. Coordinate efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Give 7 days' advance notice to parties needing to be present or to participate with the tests and to the A/E for each test. Include scheduled test dates and times.

C. Perform TAB work after leakage and pressure tests on air and water distribution systems have been satisfactorily completed. Refer to Section 15840 for allowable duct leakage requirements.

1.6 SEQUENCING/SCHEDULING

A. General: Phase in properly with A/E reviewed/accepted Construction Schedule with respect to ceiling installation, final building cleaning, and similar activities that would affect TAB work.

PART 2 PRODUCTS

2.1 INSTRUMENTS

A. General: Furnish materials and equipment necessary to measure system capacities, electrical voltage and current, fan speeds, static pressures, air velocities, water pressure drops, and other readings necessary to evaluate system performance and adjust quantities to those indicated. Materials and equipment shall remain in possession of TAB subcontractor after project is completed.

B. Instrumentation: Use in accordance with manufacturer's instructions.

C. Calibration: At least every 12 months.

PART 3 EXECUTION

3.1 INSPECTION

A. Description: Verify installation conditions as satisfactory to receive work of this section. Beginning work constitutes acceptance of conditions as satisfactory.

3.2 PREPARATION

A. Field Measurements: Field verify locations of new and existing work prior to commencing work of this section.

B. Protection: Protect surrounding areas and surfaces to preclude damage from work of this section.

3.3 PERFORMANCE

A. Description: Perform the work in accordance with Article "Quality Assurance" provisions, specifications, and manufacturer's installation instructions and directions. Where these may be in conflict, the more stringent requirements govern.

3.4 SYSTEM READINESS PRIOR TO TAB WORK

A. System Performance: Contractor is responsible for performance of equipment and systems. Do not assume that supplier will ship equipment adjusted to meet project requirements.

B. Equipment Operation:

1. Check equipment for proper operation as soon as electrical power is available. Perform adjustments required for proper operation.
2. Report malfunctions to manufacturer and take corrective action immediately to prevent delay of work.
3. Check-out equipment for electrical problems, check rotation of motors, read voltage and current in each leg of each motor, heater, and similar devices, and check readings against nameplate. Lubricate per manufacturer's recommendations.
4. Before testing, adjusting, and balancing commences, operate (test run) equipment for minimum 1 week.

C. Air Distribution System Inspection: Check out air distribution system to ensure that fans are connected to ducts, that outlets are connected to branch ducts, and that a volume damper exists for each outlet (supply, return, and exhaust) and is in the wide-open position. Verify installation and function of branch volume dampers.

D. Hydronic Systems: Check out hydronic systems to ensure that piping has been completed, flushed, and filled. Ensure that properly operating air vents are installed at system high points and that systems are free of air. Ensure that temperature/pressure test ports are installed across system components including but are not limited to, pumps, coils, heat exchangers, or similar items and as required for balancing.

E. Controls Operation: Check out and calibrate control components under equipment and system operation service. These components include, but are not limited to, thermostats and temperature sensors to ensure they are connected to appropriate devices, respond to temperature changes, and perform correct action compatible with controlled devices.

F. Strainers and Filters: After equipment and system check-out work has been completed, and prior to commencement of TAB work, perform the following:

1. Clean strainers in hydronic systems.
2. Remove air filters in air distribution equipment and systems and provide new filters.

G. Access: Provide scaffolds, staging, and accessories required to allow TAB subcontractor to gain access to equipment, dampers, valves, and other devices located beyond range of 6 foot stepladder.

H. Fan Adjustment and Drive Changes: Perform necessary drive changes as directed by TAB subcontractor, including furnishing required sheaves and belts. Coordinate with Sections 15740, 15826, and 15820.

I. Pump Impeller Trim: For constant volume systems that use pump discharge valves to reduce pump head by more than 10 percent of design to achieve balanced conditions, remove impeller and based on TAB subcontractor requirements for proper impeller diameter, arrange for impeller trim and statically and dynamically balance after trim by the pump manufacturer or authorized representative, reinstall, and replace nameplate tag that reflects the as-built condition.

J. Instrument Test Holes: Install at locations as directed by TAB subcontractor. Refer to Section 15840.

K. Cleaning: Clean equipment and devices after check-out and test run period prior to TAB work.

3.5 WORK BY TAB SUBCONTRACTOR

A. General: Adjust quantities to within percent of design values as follows:

1.	Supply air outlets and fans	0 to plus 10 percent
2.	Return and exhaust fans	0 to plus 10 percent
3.	Return and exhaust air inlets	0 to minus 10 percent
4.	Heating flows	0 to minus 10 percent
5.	Supply air outlets	0 to minus 10 percent
6.	Return and exhaust air inlets	0 to minus 10 percent]

B. Systems: Include, but are not limited to, the following:

1. Exhaust air systems.
2. Ventilation systems.
3. Heating water systems.

C. Readings:

1. General: Take readings including, but not limited to, the following:

   a. Air Quantities:

      1) Supply, return, exhaust, and outdoor air at each terminal.
      2) Perform duct transverse at branch mains conveying minimum 2000 cfm and for system total air.

   b. Air Temperatures:

      1) Outdoor air at equipment.
      2) Return air at equipment.
      3) Supply air leaving equipment.
      4) Mixture of outdoor and return air before entering cooling and heating coils and other heat transfer equipment.

   c. Air Handling Equipment:

      1) Fan RPM.

2) System static pressure and fan suction and discharge pressures.
3) Clean filter pressure drop.
4) Heating and cooling coil air pressure drop.
5) Sheave make, sizes, and shaft size.
6) Number of belts, make, and size.

d. Hydronic Pressures and Flows:

1) Water pressure at inlet and outlet of pumps as close to pump impeller as possible.
2) Water pressure drop across suction strainer of pumps.
3) Water pressure drop across boilers, and other energy-producing equipment.
4) Water pressure drop across coils, heating elements, heat exchangers, and other energy-using equipment.

e. Hydronic Temperatures:

1) Inlet and outlet of boilers, and other energy-producing equipment.
2) Inlet and outlet of coils, heating elements, heat exchangers, and other energy-using equipment.

f. Electrical:

1) Measured voltage and amps on each phase of each motor (for example, pumps and fans) while equipment is under maximum normal load.
2) The nameplate voltage and current for each motor.

2. Compare pressure drop readings to manufacturers' rating sheets to determine actual flow through equipment.
3. Explain readings out of range.

D. System Difficulties: Obtain readings on each unit or piece of equipment as early as possible such that discrepancies can be resolved before anticipated close of job.

E. Fan Adjustment and Drive Changes:

1. Inform Contractor as to which sheaves and belts need to be changed. Take final readings and make required sheave adjustments.
2. Verify that fans with electronically commutated motors (ECMs) have been adjusted at the equipment factory as required by Section 15845. Make further adjustments to achieve design air flow.

F. Outdoor Air Cycles:

1. After supply air outlets and return air inlets are in balance and air quantities correct, adjust outdoor air damper to minimum air quantity indicated on the Drawings for each system. If not indicated, contact A/E for minimum outdoor air quantities.
2. Adjust using temperature averaging method when outside air temperature is 15 F higher or lower than return air temperature.
3. If economizer control is specified, check for setting of controls and for operation of dampers (outdoor air, return air, and relief). Adjust return/relief system to result in a slight positive pressure in building (0.03 to 0.05 inch w.g.) with exhaust

fans in operation. Indicate which mode air handling system was in when outlets were balanced (minimum and 100 per cent outdoor air modes).

4. Prepare outdoor air summary sheet indicating minimum outdoor air quantity for each system as designed and as tested. Include per cent of minimum outdoor air.

G. Inspection and Recheck:

1. Upon request, recheck random selections of up to 10 percent of readings recorded in Balancing Report in presence of the Owner's representative.
2. Balancing Report will be rejected if more than 20 percent of rechecked readings deviate more than 10 percent of recorded readings in report. In this event, perform complete rebalancing of system.
3. Life safety, stairwell pressurization, and elevator pressurization systems will be rechecked in their entirety.

H. Marking of Adjustments:

1. After final inspection and recheck, permanently mark dampers, valves, and other adjustment devices to allow adjustment to be restored if disturbed in the future.
2. If recheck requires re-balancing, eradicate previous markings and re-mark.
3. Set and lock valve memory stops.

I. Final Field Activities: Prior to final acceptance, perform the following:

1. Leave systems in proper working operation.
2. Reinstall belt guards.
3. Close access doors.
4. Reinstall covers on electrical J-boxes and switch boxes.
5. Restore thermostat settings to original settings.
6. Reinstall insulation over flow meters, balancing valves, and pumps.
7. Patch holes in insulation, ductwork and equipment housing, which have been cut or drilled for TAB work in manner recommended by insulation subcontractor.

END OF SECTION

SECTION 15996 - MECHANICAL SYSTEMS TRAINING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Description: Work includes training the Owner's personnel in the operation, maintenance, and management of the mechanical systems.

B. General Requirements: Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 1 sections apply to Work in this section.

1.2 SCOPE OF WORK

A. Mechanical systems training shall take the form of classroom and field sessions to introduce operation, maintenance and management personnel to Operation and Maintenance Manuals, drawings, and other documents and aids available to operate and maintain equipment. Training shall occur following installation of mechanical work and prior to final acceptance. Commence instruction periods with approved Operation and Maintenance Manuals.

B. Factory trained specialists in area of major equipment and system shall present sessions on their specific equipment and system. For control systems specified in Section 15900, representative shall be the technician who performed testing and adjustment.

C. Conduct extensive hands-on training during mechanical systems preliminary commissioning so that actual operation and maintenance of equipment and systems could be the responsibility of operation, maintenance and management personnel at completion of preliminary commissioning if the Owner so chooses. Conduct instructions in appropriate sessions. Comply with total minimum hours specified in individual specification sections.

D. Conduct a subsequent training session 90 days after occupancy to answer Owner's questions and review training instructions. This session shall also be by factory trained specialists. Include 4 hours for this session.

E. Video record training sessions with emphasis of video subject and hands-on equipment operation. Following training sessions, deliver 2 copies of CD/DVD to the Owner.

1.3 VISUAL AIDS

A. Utilize visual aids, such as slides, video, and movies. Visual aids shall be made a part of the Owner's permanent files.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 MECHANICAL SYSTEMS TRAINING

A. General: Operator training shall provide a complete overview of equipment, components, and systems with an emphasis on:

1. Documentation in the preliminary Operations and Maintenance Manuals.
2. How to use the Operations and Maintenance Manuals.

3. System operational procedures for all modes of operation, including warm-up, cool-down, occupied, unoccupied, start-up, shut-down and similar cycles.
4. Acceptable tolerances for system adjustments in operating modes including noise and vibration adjustments and economy and efficiency adjustment.
5. Procedures for dealing with abnormal conditions including emergency operations.
6. Hazards and safety.
7. Automatic temperature control sequences of operation.
8. Review of maintenance and operations in relation to written applicable warranties, agreements to maintain and service and similar continuing commitments.
9. Seasonal de-commission and re-commission.

B. Schedule: Submit training schedule and agenda to the A/E and the Owner for approval 4 weeks prior to first training session.

C. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain equipment, systems, and subsystems. Furnish educational materials and tools needed to conduct training sessions.

D. Typical Agenda as Follows:

1. Opening remarks.
2. Introduction.
3. Description of HVAC Systems:
    a. Air Side:
        1) Heating.
        2) Ventilation.
    b. Wet Side:
        1) Heating.
4. Description of HVAC Equipment and Systems (Individual Suppliers Shall Discuss Equipment):
    a. Wet Side:
        1) Hydronic:
            a) Pumps.
            b) Piping and valves.
            c) Controls.
            d) Water treatment.
            e) Electrical.
        2) Boilers:
            a) Water make-up.
            b) Water treatment.
            c) Piping.
            d) Controls.
            e) Safety accessories.
            f) Electrical.
        3) Insulation
    b. Air Side:
        1) Air Handling Units and Fans:

a) Fans.
b) Heat exchangers.
c) Controls.
d) Electrical.
e) Vibration isolation.
f) Insulation.

2) Duct System:

a) Type(s).

5. Description of Plumbing Equipment and Systems:

a. Piping and valves.
b. Pumps.
c. Plumbing fixtures.
d. Plumbing fixture faucets and flush valves.

6. Walk-through of building (project).
7. Start-up Procedures:

a. Seasonal considerations.
b. Check list.
c. Emergency procedures.

8. Operation Procedure:

a. Occupancy considerations.

9. Shut Downs:

a. Check list.
b. Normal.
c. Emergency.
d. Alarms and resets.

10. Maintenance of HVAC, Plumbing, and Fire Suppression Systems:

a. Routine.
b. Preventive.
c. Service.
d. Lubrication.
e. Overhaul.
f. Factory.
g. Cleaning.
h. Access provisions.

11. Warranties:

a. What they cover.
b. How to use them.

12. Spare Parts.
13. Tools:

a. Normal tools, supplies and equipment.
b. Special tools.

14. Hands-on operation of mechanical system equipment in conjunction with preliminary commissioning.

3.2 RETRAINING

A. After mechanical system commissioning, instruct Owner's operation and maintenance personnel on changes and reconfiguration which may have occurred during commissioning process.

END OF SECTION

DIVISION 16 – ELECTRICAL

SECTION 16720 - FIRE ALARM SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

1. Material and installation requirements for:
   a. Fire Alarm Control Panel.
   b. Signal Initiating Devices.
   c. Notification Appliances.
   d. Miscellaneous Devices.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.
2. Section 16050 – Basic Materials and Methods.
3. Section 16110 – Raceways Systems.

1.2 QUALITY ASSURANCE

A. REFERENCED STANDARDS

ADA	Americans with Disabilities Act
ADAAG	Accessibility Guidelines for Buildings and Facilities
FM	FM Global
FM	All applicable standards.
FM	All components FM approved.
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association (NFPA)
NFPA 70	National Electrical Code (NEC)
NFPA Article 760	Fire Alarm Systems.
NFPA 72	National Fire Alarm Code.
NICET	National Institute for Certification in Engineering Technologies
UL	Underwriters Laboratories, Inc.
UL 38	Standard for Manual Signaling Boxes for Fire Alarm Systems.
UL 268	Smoke Detectors for Fire Alarm Systems.
UL 268A	Standard for Smoke Detectors for Duct Applications.
UL 464	Standard for Audible Signaling Appliances.
UL 497B	Standard for Protectors for Data Communication and Fire Alarm Circuits.
UL 521	Standard for Heat Detectors for Fire Protective Signaling Systems.
UL 864	Standard for Control Units and Accessories for Fire Alarm Systems.
UL 1971	Standard for Signaling Devices for the Hearing Impaired.

ICC International Code Council (ICC): International Building Code and associated standards, 2009 Edition including all amendments, referred to herein as Building Code.

B. DESIGN CRITERIA

1. Provide a complete bidder design fire alarm system according to criteria of the Authority(ies) Having Jurisdiction (AHJ), NFPA, and building code.
   a. The fire alarm system shall be designed by a NICET Level 3 or 4 fire alarm technician.
   b. If required by state regulations, a professional engineer shall seal drawings submitted to the AHJ.
   c. Where system requirements described in the Contract Documents exceed those of the AHJ and/or NFPA, meet the requirements of both.
2. Provide fire alarm panel, notification devices, initiation devices and all other components based on NFPA, IBC, IFC and local AHJ requirements.
   a. The designer is responsible for understanding the construction of the building to take in consideration ceiling heights, ceiling construction (flat or not flat), and other features of the building that will affect the layout of devices.
3. Provide fire detection and alarm system design wiring diagrams, interface wiring diagrams, and operational details by system manufacturer or authorized technical representative.
4. Submit documents after design has been approved by Authority Having Jurisdiction (AHJ).

C. SERVICE ORGANIZATION QUALIFICATIONS

1. Offer an annual maintenance contract including complete service and equipment costs for maintenance of complete system.
2. Ten (10) years' experience minimum serving fire alarm systems.
3. Provide for 24 HR emergency service.

1.3 DEFINITIONS

A. For the purposes of providing materials and installing electrical work the following definitions shall be used.

1. Outdoor Area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
2. Architecturally Finished Area: Offices, laboratories, conference rooms, restrooms, corridors and other similar occupied spaces.
3. Non-architecturally Finished Area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
4. Hazardous areas: Class I, II or III areas as defined in NFPA 70.
5. Shop Fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established.

1.4 SYSTEM DESCRIPTION

A. Automatic and manual, analog addressable, general alarm and non-coded evacuation alarm, supervised, closed-circuit, 24 Vdc microprocessor based fire detection and alarm system.

B. PROVIDE COMPONENTS INCLUDING BUT NOT LIMITED TO FOLLOWING:

1. Main fire alarm control panel (FACP).
3. Analog addressable heat sensors.
4. Analog addressable smoke sensors.
5. Analog addressable duct smoke sensors.
6. Main, post indicator valve and OS&Y sprinkler valve tamper switch circuits.
7. Fan control relays associated with the HVAC control system.
8. Combination fire alarm horns with strobe.
9. General alarm strobes.
10. Addressable manual pull station.
11. Fire alarm system wire, with all wiring in conduit.

C. BASIC PERFORMANCE

1. Signal Line Circuits (SLC) shall be wired Class B (NFPA Style 4).
2. Notification Appliance Circuits (NAC) shall be wired Class B (NFPA Style Y).
3. Each SLC shall be limited to only 80 percent of its total capacity at the time of initial installation.

1.5 SUBMITTALS

A. SHOP DRAWINGS

1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Product technical data:
    a. Provide Submittal data for all products specified in PART 2 of this Specification Section.
    b. Battery calculations.
    c. Voltage drop calculations.
    d. Description of system operation.
    e. Name of local service organization.
    f. Entire system approved by AHJ.
3. Fabrication and/or layout drawings:
    a. Plan drawing(s) showing type and locations of all fire alarm devices.
        1) Indicate salient features of each device (e.g., weatherproof, strobe candela rating).

b. Wiring diagrams and riser diagrams.

B. OPERATION AND MAINTENANCE MANUALS

1. See Specification Section 01 33 00 for requirements for:
   a. The mechanics and administration of submittal process.
   b. The content of Operation and Maintenance Manuals.

C. MISCELLANEOUS SUBMITTALS

1. Field test reports.

1.6 AREA DESIGNATIONS

A. Designation of an area will determine the NEMA rating of the electrical equipment enclosures, types of conduits and installation methods to be used in that area.

1. Outdoor areas:
   a. Wet.
   b. Also, corrosive and/or hazardous when specifically designated on the Drawings or in the Specification Sections.
2. Indoor areas:
   a. Dry.
   b. Also, wet, corrosive and/or hazardous when specifically designated on the Drawings or in the Specification Sections.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable.

1. Fire alarm system:
   a. Edwards Systems Technology.
   b. Gamewell.
   c. Notifier.
   d. Pyrotronics.
   e. Siemens Cerberus Division.
   f. Silent Knight.
   g. SimplexGrinnell.
   h. Wheelock.
2. Manufacturer must have local service organization.

B. ALL EQUIPMENT

1. UL listed as a product of a single manufacturer under appropriate category.
2. Equipment shall not be modified or installed to alter or void UL label or listing.
3. FM approved.
4. Approved by Fire Marshal, when required by state or local codes.

2.2 FIRE ALARM CONTROL PANEL (FACP)

A. FACP shall perform operations as described in Fire Alarm System Operation.

B. The FA system shall have 100 point minimum initiating device capacity with the capability to add additional 100 point minimum initiating device control modules.

C. Construction shall be modular with solid-state, microprocessor-based electronics.

1. An 80-character LCD display shall indicate alarms, supervisory service conditions and any troubles.

D. Keyboards or keypads shall not be required to operate system during fire alarm conditions.

E. Provide necessary switches, relays, indicator lamps, wiring terminals, etc., to provide complete operation supervising, control, and testing facilities for entire system.

F. FACP shall allow for loading or editing special instructions and operating sequences as required.

1. System shall be capable of on-site programming to accommodate and facilitate expansion, building parameter changes or changes as required by local codes.

2. All software operations shall be stored in a non-volatile programmable memory within FACP.

G. System shall have provisions for disabling and enabling all circuits individually for maintenance and testing purposes.

H. System shall be capable of logging and storing 300 events in an alarm log and 300 events in a trouble log.

1. These events shall be stored in a battery protected random access memory.

2. Each recorded event shall include time and date of that event's occurrence.

3. System shall have capability of recalling alarms, trouble conditions, acknowledgments, silencing and reset activities in chronological order for purpose of recreating an event history.

I. FACP shall be listed under UL 864.

J. FACP shall be in an enclosed metal cabinet with glass door specifically designed for public areas.

1. Mounting: Surface.

2. Finish: Beige baked enamel.

K. Each addressable device shall be represented individually in FACP.

1. Indicate TROUBLE by a discreet LCD readout for each supervised circuit.

2. Indicate ALARM by a discreet LCD readout for each alarm initiating addressable device.

3. Include individual supervisory and alarm relays in each circuit arranged so that ground or open condition in any circuit or group of circuits, will not affect proper operation of any other device.

L. FACP shall include the capability to report alarm and trouble conditions via a telephone line to a third party alarm reporting services.

M. FACP shall include a system testing capability to help ensure that zoning and supervision have been maintained throughout system.

1. Actuation of the enable walk test program at FACP shall activate "Walk-Test" mode of system which shall cause the following to occur:
    a. City connection circuit shall be disconnected.
    b. Control relay functions shall be bypassed.
    c. FACP shall indicate a trouble condition.
    d. Alarm activation of any initiation device shall cause audible signals to activate for 2 seconds.
    e. FACP shall automatically reset itself after code is complete.
    f. Any momentary opening of alarm initiating or alarm indicating circuit wiring shall cause audible signals to sound continuously for 4 seconds to indicate trouble condition.
    g. System shall have 7 distinctive walk test groups such that only a portion of system need be disabled during testing and an alarm in any other area will be processed normally.

N. General Alarm Circuits: Positive non-interfering type so that a second device can be annunciated simultaneously, or closely following first zone.

O. POWER SUPPLY

1. 120 Vac dedicated circuit from panelboard to integral 24 Vdc regulated power supply in FACP and battery charger.
    a. The power supply shall provide all panel and peripheral device power needs.
2. If the FACP cannot provide power for the required number of notification appliances a power extender shall be used.
    a. An additional 120 Vac dedicated circuit from a panelboard shall be used to power the power extenders power supply and battery charger.

P. BATTERY

1. Low maintenance sealed type, for fire alarm use with automatic battery charger.
2. Batteries shall be capable of operating maximum normal load of system for 24 HRS and then capable of operating system for 5 minutes in alarm condition.
3. Size batteries for the total maximum number of devices that can be connected to the FACP not the install number of devices.
4. The notification appliance power extender shall have the same battery requirements as the FACP.

2.4 SIGNAL INITIATING DEVICES

A. ADDRESSABLE MANUAL PULL STATIONS

1. Pull-type with handle which shall lock in a protruding manner to facilitate quick visual identification of activated station.
    a. Key reset after operation.
    b. Non-coded.
    c. Single action.
2. High impact red Lexan with operating directions in white letters.
    a. Semi-flush mounted in architecturally finished areas.

b. Surface mounted in non-architecturally finished areas.

c. Surface mounted with clear Lexan weatherproof protective shield in areas designated as wet or in areas indicated in the schedules herein.

d. Explosion proof enclosure or intrinsically safe circuit in hazardous rated areas.

3. Stations shall be keyed alike with FACP.

4. Standards: UL 38.

B. ADDRESSABLE SENSOR BASE

1. Plug-in arrangement:

a. Sensor and associated encapsulated electronic components are mounted in a module that connects to a fixed base with a twist-locking plug connection.

b. The plug connection requires no springs for secure mounting and contact maintenance.

c. Terminals in the fixed base accept building wiring.

d. Sensor construction shall have a mounting base with a twist-lock detecting head that is lockable.

e. The locking feature must be field removable when not required.

f. Removal of the sensor head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the Control Unit.

5. Addressability: Sensors include a communication transmitter and receiver in the mounting base having a unique identification and capability for status reporting to the FACP.

6. Provide auxiliary relays in base to provide local control of equipment as described under system operation.

a. Provide separate 24 volt supply to sensors with auxiliary relays to guarantee that sufficient power will be available to operate relays.

C. ANALOG ADDRESSABLE HEAT SENSORS

1. Fixed temperature type or combination rate-of-rise and fixed temperature type.

2. Rated at 135 DegF for ordinary areas where normal ceiling temperatures do not exceed 100 DegF, or rated 190 DegF for up to 150 DegF ceiling temperatures.

3. Self-restoring: Sensors do not require resetting or readjustment after actuation to restore them to normal operation.

4. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.

5. Quantity and spacing:

a. Smooth ceilings: In accordance with UL rating.

b. Non-smooth ceilings: In accordance with State Fire marshal's requirements.

c. High hazard areas: As indicated.

6. Layout is based on 30 FT spacing for fixed-type and 50 FT spacing for combination type for smooth ceiling.

7. Standards: UL 521.

D. ANALOG ADDRESSABLE SMOKE SENSORS

1. Photoelectric type, dual chamber products of combustion sensors.
2. An infrared sensor light with matching silicon cell receiver and actuated by the presence of visible products of combustion.
3. Self-restoring: Sensors do not require resetting or readjustment after actuation to restore them to normal operation.
4. The sensor's electronics shall be immune from false alarms caused by EMI and RFI.
5. Standards: UL 268.

E. AIR DUCT SMOKE SENSOR

1. Duct smoke sensors shall utilize analog addressable photoelectric type sensor as specified herein.
2. Duct housing mounted directly to outside of duct with a sampling tube extended across duct to sample air movement.
3. Duct housing couplings slotted to insure proper alignment of sampling and exhaust tubes.
    a. Tube lengths as required per duct width.
4. Sensor housing shall have an alarm LED visible through front cover.
5. Remote red LED alarm indicator on ceiling adjacent to sensors above ceilings.
6. Standards: UL 268A.

2.5 AUTOMATIC CONTROL DEVICES

A. ADDRESSABLE RELAY/CONTROL MODULES

1. Allows FACP to control a remotely located Form "C" contact (e.g., HVAC fans, dampers, fire shutters, elevator capture).

2.6 NOTIFICATION APPLIANCES

A. ALARM HORNS

1. Electric-vibrating polarized type, operating on 24 Vdc, with provision for housing the operating mechanism behind a grille.
2. Horns produce a sound pressure level of 85 dB, measured at 10 FT.
3. Housing: Red with white "FIRE" lettering.
    a. Semi-flush or flush mounted in architecturally finished areas.
    b. Surface-mounted in non-architecturally finished areas.
4. Horns shall be weatherproof in areas designated as wet.
5. Horns shall be explosion proof in areas designated as hazardous.

B. ALARM STROBES

1. White tamper resistant lexan lens with 24 Vdc xenon strobe.
2. Provide Candela rating as required per ADAAG and synchronize of multiple strobes when required.
3. Housing: Red with white "FIRE" lettering.
    a. Semi-flush or flush mounted in architecturally finished areas.

b. Surface-mounted in non-architecturally finished areas.

4. Strobes shall be weatherproof in areas designated as wet or in areas indicated in the schedules herein.
5. Strobes shall be explosion proof in areas designated as hazardous.

C. COMBINATION AUDIO/VISUAL DEVICES

1. Shall be mounted in an integral unit and shall have the same features as the individual units specified herein.

D. STANDARDS: UL 464, UL 1971

2.7 MISCELLANEOUS DEVICES

A. ISOLATED LOOP CIRCUIT PROTECTOR (TRANSIENT SUPPRESSION)

1. Hybrid solid state high performance suppression system.
   a. Do not use gas tubes, spark gaps or other suppression system components which might short or crowbar the line resulting in interruption of normal power flow to connected loads.
2. Line-to-line response time of less than one (1) nanosecond capable of accepting a 2000 amps (8 x 20 usec pulse) at 28 V.
3. Line-to-ground response time of less than 1 nanosecond capable of accepting a 2000 amps (8 x 20 usec pulse) to earth.
4. Shield-to-ground shall be capable of accepting a 5000 amps (10 x 50 usec pulse) to earth.
5. Standard: UL 497B.

2.8 WIRING

A. CONDUIT

1. 1/2 IN minimum.
2. See Specification Section 16110.

B. CONDUCTORS

1. Insulation type per NFPA 70, Article 760.
2. 120 Vac and power supply connections: 12 GA, minimum.
3. Low-voltage general alarm circuits: 14 GA, minimum.
4. Low-voltage signal initiating circuits: 18 GA, minimum.
5. Annunciator and data communication circuits: As required by manufacturer, UL listed.
6. Use larger wire sizes when recommended by equipment manufacturer and per voltage drop calculations.

C. Outlet Boxes: See Specification Section 16110.

2.9 SYSTEM OPERATION

A. Activation of any signal initiating device, except tamper switches, shall cause the following:

1. General audible horns and/or bells to sound, visual strobes to strobe and automatic control devices to operate.

2. Alarm information shall be displayed at the FACP LCD displays.

B. All fire alarm signals are automatically locked in at FACP LCD displayed annunciators until originating device is returned to normal and FACP is manually reset.

1. Audible alarm signals shall be silence-able from FACP allowing for re-initiation following a subsequent alarm.

   a. Silencing of alarm signals shall not impair ability of system to continue to perform as specified.

C. AIR HANDLING EQUIPMENT FAN CONTROL

1. De-energize indicated air-handling equipment and interlocked exhaust fans, upon operation of any alarm initiating device via relay/control module {and all smoke dampers shall close}.

2. See Specification Section 15900 for mechanical equipment sequence of operation and coordinate all fan controls.

3. Fans shall not restart until FACP is manually reset.

D. ACTIVATION OF ANY SYSTEM TROUBLE SHALL INITIATE THE FOLLOWING

1. Common audible trouble signal shall sound and common trouble light shall illuminate at the FACP.

2. FACP shall indicate specific device.

E. AUDIBLE TROUBLE SIGNAL SHALL BE SILENCEABLE BY FACP

1. Visual trouble indication remains until trouble condition is corrected.

   a. A subsequent trouble condition received after manually silencing shall cause audible trouble signal to resound.

   b. Restoration of system to normal causes audible trouble signal until silencing switch is returned to normal position.

2. Trouble signal will be initiated under following conditions:

   a. Open on an initiation or alarm indicating circuit.

   c. Ground fault condition.

   d. Auxiliary manual control switch out of normal position.

   e. Loss of 120 volt operating power to FACP or transponders.

   f. Low or no battery voltage condition.

   g. Main sprinkler valve is closed.

   h. Post indicator valve is closed.

   i. Any sprinkler or standpipe OS&Y valve is closed.

F. Install isolated loop circuit protectors on all fire alarm data communication circuits, SLC and NAC wiring, including shields, which extends beyond the a building by either aerial or underground methods.

1. The isolated loop circuit protector shall be located as close as practicable to the point at which the circuits leave or enter a building.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all fire alarm equipment and wiring in accordance with local and national codes and NFPA 72.

B. Install all wiring in raceways:

1. Install raceways and boxes in accordance with Specification Section 16110.

2. The inside of all boxes are to be painted red.

C. Install all components as indicated and in accordance with manufacturer's wiring diagrams, instructions and recommendations.

D. Make all fire alarm wiring continuous from terminal to terminal or from terminal to device pigtail lead.

1. Circuit splices not permitted.

2. Wiring joints, only when required at device pigtail leads shall utilize Scotchlok insulate conical spring connector.

E. Color code all wiring by type of device

1. Coordinate colors with Tacoma Power.

F. Installation of equipment and devices that pertain to other work in contract shall be closely coordinated with appropriate subcontractors.

1. Coordinate 8 IN minimum square access door with rubber gasket in duct approximately 2 FT upstream from smoke sensor for testing and servicing with Division 15.

G. Cover all smoke detectors with plastic bags immediately after installation to maintain cleanliness.

H. DEVICE MOUNTING SCHEDULE

1. Dimensions are to center of item unless otherwise indicated.

2. Mounting heights as indicated below unless otherwise indicated on the Drawings.

   a. Manual pull stations: 48 IN.

   b. Notification appliances: 80 IN.

   c. Control panels: 72 IN to top.

3.2 TESTING

A. Obtain services of a factory trained representative of system manufacturer to supervise installation and its progress, supervise final connections to equipment and provide testing to assure that system is in proper operating condition, and is in compliance with all applicable regulations.

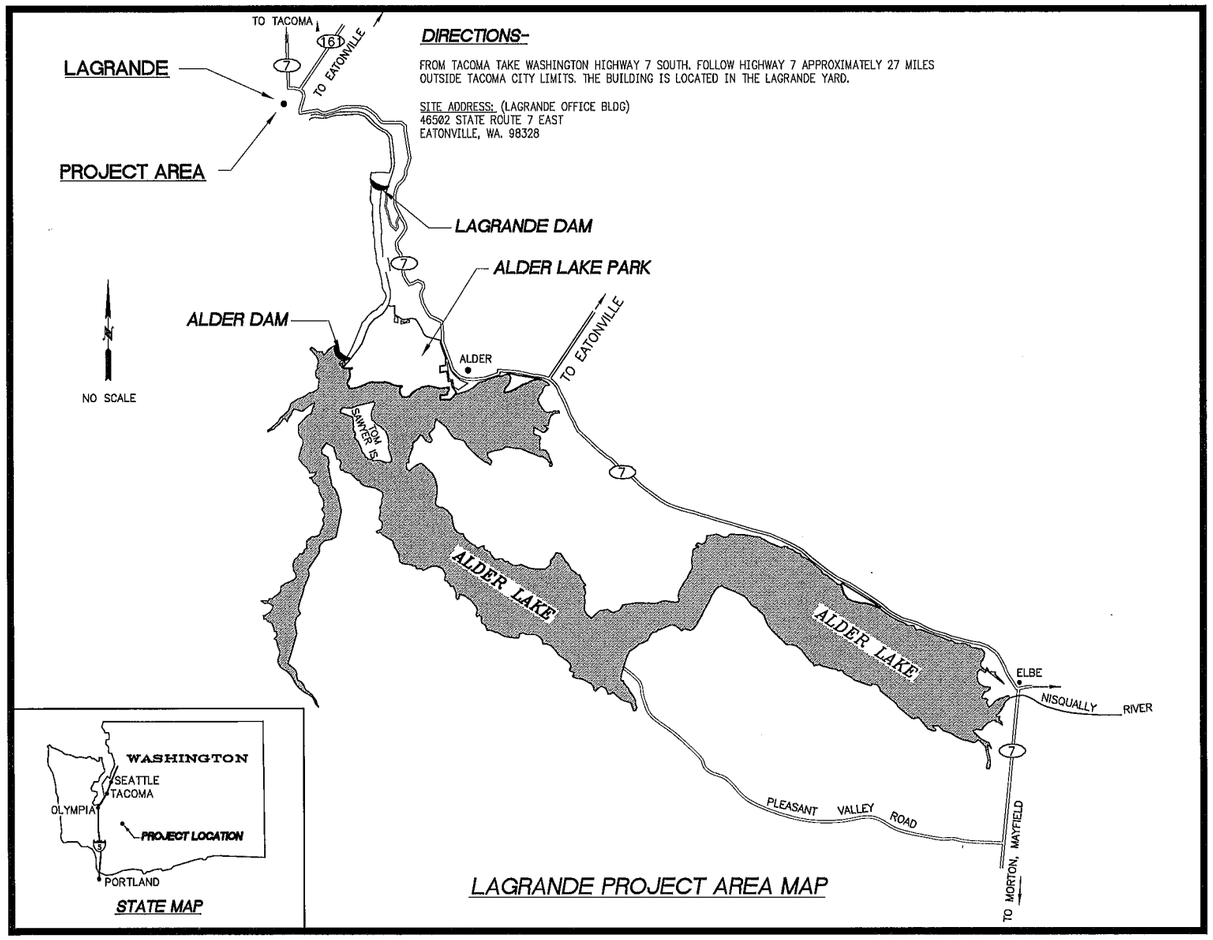
B. Test system to satisfaction of Engineer and state and local fire authorities in accordance with NFPA 72, state and local codes and manufacturer's requirements.

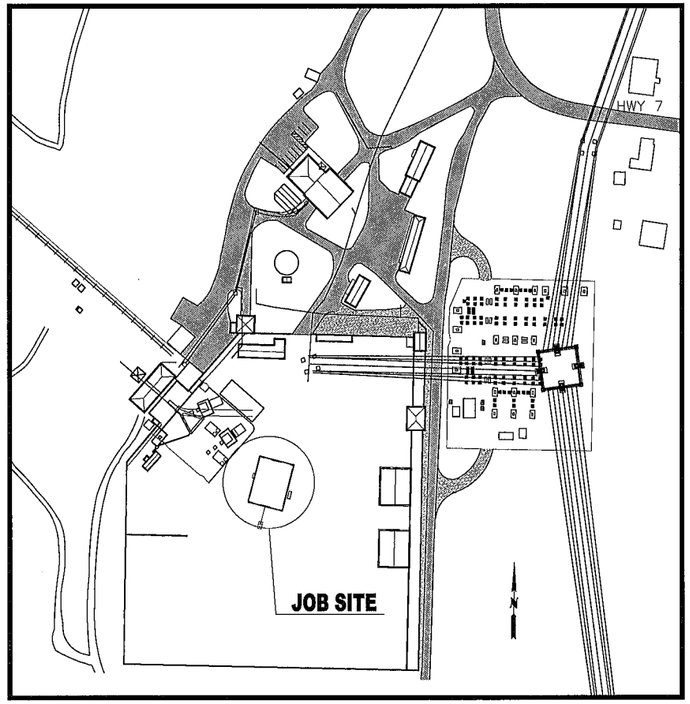
3.3 INSTRUCTION

A. Manufacturer shall provide an authorized representative to instruct and train Fire Department personnel and Tacoma Power’s personnel in operation of system.

END OF SECTION

Nisqually Project - LaGrande Shop Building





SITE MAP
N.T.S.

TACOMA POWER
TACOMA PUBLIC UTILITIES

OWNER

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION
3628 SOUTH 35TH STREET
TACOMA, WASHINGTON 98409-3192
CONTACT: MATTHEW WILSON
PHONE: (253) 502-8226

CIVIL

TACOMA PUBLIC UTILITIES
MATTHEW WILSON, P.E.
PHONE: (253) 502-8226

ARCHITECTURAL

TACOMA PUBLIC UTILITIES
STEPHEN FAIRCHILD, P.E.
PHONE: (253) 502-8747

STRUCTURAL

TACOMA PUBLIC UTILITIES
STEPHEN FAIRCHILD, P.E.
PHONE: (253) 502-8747

MECHANICAL

HARGIS ENGINEERING
PHONE: (206) 448-3376

DRAWING INDEX
LAGRANDE SHOP BUILDING

DWG NO.	DRAWINGS	REV NO.
	GENERAL	
AP2201	COVER SHEET AND SITE PLAN	0
AP2202	SITE AND UTILITY PLAN	0
AP2203	DEMOLITION AND DEBRIS REMOVAL	0
	ARCHITECTURAL	
AP2204	FLOOR PLAN AND SCHEDULES	0
AP2205	ELEVATION	0
AP2206	ELEVATION	0
AP2207	SECTIONS	0
AP2208	BUILDING ELEVATION AND WALL SECTIONS	0
AP2209	ARCHITECTURAL DETAILS	0
	STRUCTURAL	
AP2210	GENERAL NOTES	0
AP2211	GENERAL NOTES CONT.	0
AP2212	QUALITY ASSURANCE	0
AP2213	QUALITY ASSURANCE CONT.	0
AP2214	FOUNDATION PLAN	0
AP2215	FOUNDATION DETAILS	0

DRAWING INDEX
LAGRANDE SHOP BUILDING

DWG NO.	DRAWINGS	REV NO.
	STRUCTURAL	
AP2216	ADDITIONAL DETAILS	0
AP2217	NOT USED	0
	MECHANICAL	
AP2218	EQUIPMENT LAYOUT	0
AP2219	MECHANICAL LEGEND AND INDEX - HARGIS	0
AP2220	MECHANICAL NOTES AND ABBREVIATIONS - HARGIS	0
AP2221	MECHANICAL SCHEDULES - HARGIS	0
AP2222	MECHANICAL SCHEDULES- HARGIS	0
AP2223	PIPING FOUNDATION PLAN - HARGIS	0
AP2224	RADIANT FLOOR ZONING PLAN - HARGIS	0
AP2225	PIPING FLOOR PLAN - HARGIS	0
AP2226	MECHANICAL FLOOR PLAN - HARGIS	0
AP2227	COMPRESSED AIR FLOOR PLAN - HARGIS	0
AP2228	MECHANICAL DETAILS - HARGIS	0
AP2229	MECHANICAL DETAILS - HARGIS	0
AP2230	SEPTIC SYSTEM DETAILS	0

DRAWING INDEX
LAGRANDE SHOP BUILDING

DWG NO.	DRAWINGS	REV NO.
	ELECTRICAL	
AP2231	UNDERSLAB ELECTRICAL LAYOUT	0
AP2232	TRANSFORMER DETAILS	0
	REFERENCE DRAWINGS	
AP1819	LOCATION & ELEVATIONS OF SUBDRAINS	
AP1845	PLAN OF REGULATING RESERVOIR	

REV. NO. 0

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
COVER SHEET AND
SITE PLAN

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	1/ /19 DATE	STAMPED
	DRAWING NO. AP2201 G-0.1	

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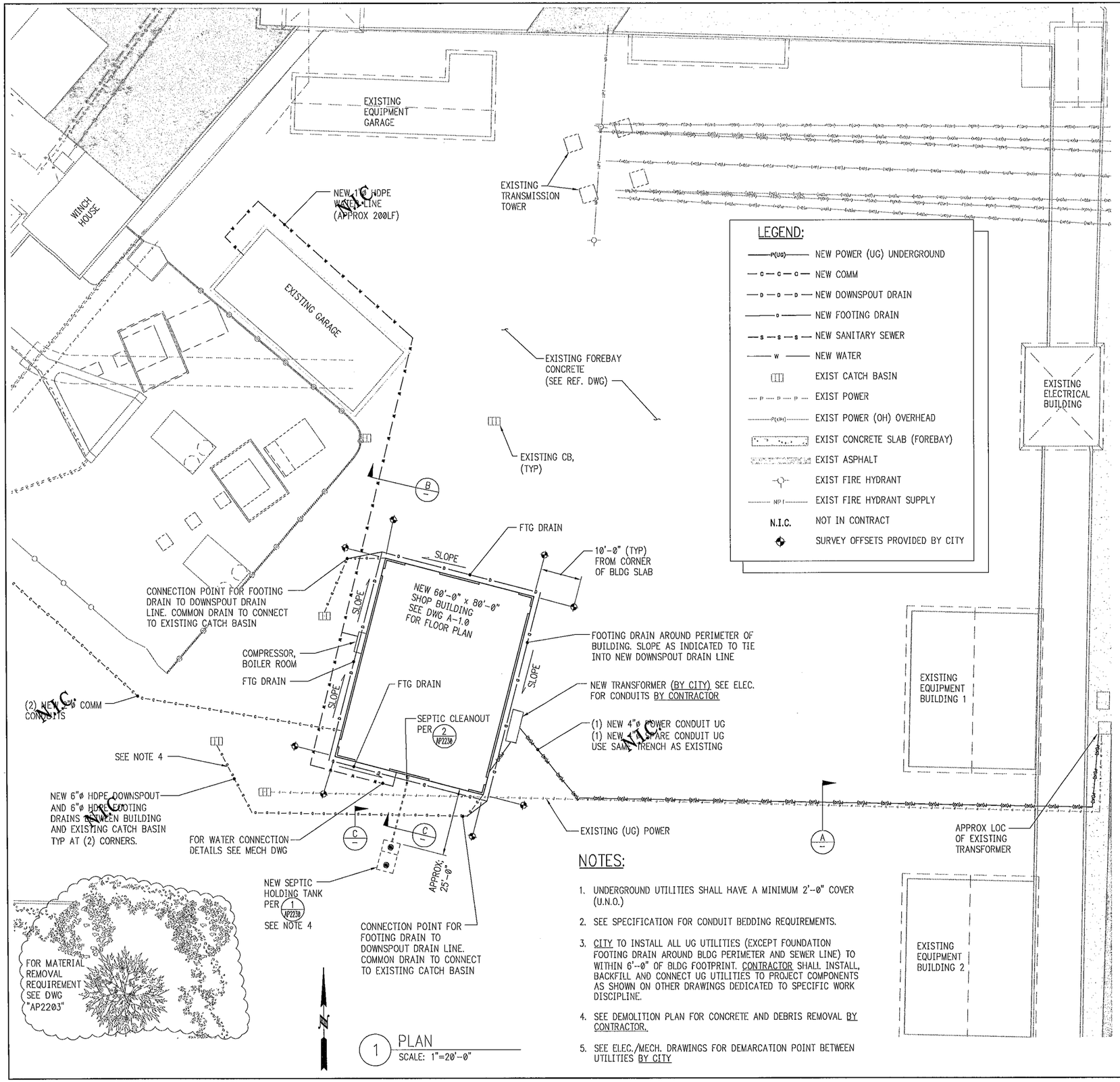


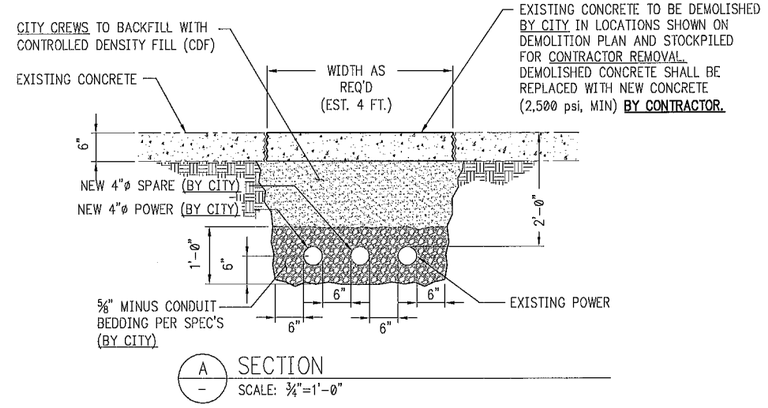
LEGEND:

P(UG)	NEW POWER (UG) UNDERGROUND
C	NEW COMM
D	NEW DOWNSPOUT DRAIN
D	NEW FOOTING DRAIN
S	NEW SANITARY SEWER
W	NEW WATER
	EXIST CATCH BASIN
P	EXIST POWER
P(OH)	EXIST POWER (OH) OVERHEAD
	EXIST CONCRETE SLAB (FOREBAY)
	EXIST ASPHALT
	EXIST FIRE HYDRANT
NPI	EXIST FIRE HYDRANT SUPPLY
N.I.C.	NOT IN CONTRACT
	SURVEY OFFSETS PROVIDED BY CITY

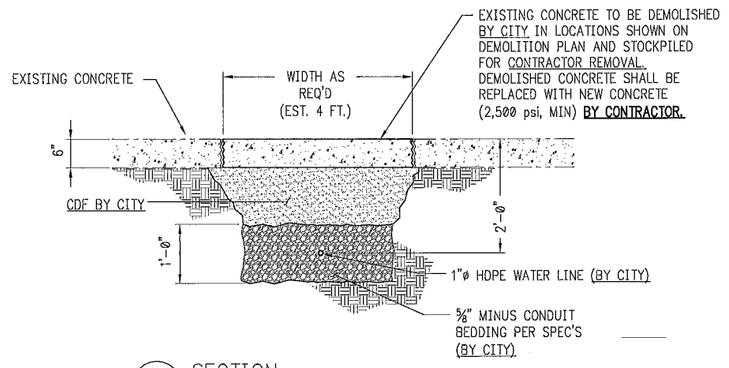
NOTES:

1. UNDERGROUND UTILITIES SHALL HAVE A MINIMUM 2'-0" COVER (U.N.O.)
2. SEE SPECIFICATION FOR CONDUIT BEDDING REQUIREMENTS.
3. CITY TO INSTALL ALL UG UTILITIES (EXCEPT FOUNDATION FOOTING DRAIN AROUND BLDG PERIMETER AND SEWER LINE) TO WITHIN 6'-0" OF BLDG FOOTPRINT. CONTRACTOR SHALL INSTALL, BACKFILL AND CONNECT UG UTILITIES TO PROJECT COMPONENTS AS SHOWN ON OTHER DRAWINGS DEDICATED TO SPECIFIC WORK DISCIPLINE.
4. SEE DEMOLITION PLAN FOR CONCRETE AND DEBRIS REMOVAL BY CONTRACTOR.
5. SEE ELEC./MECH. DRAWINGS FOR DEMARCATION POINT BETWEEN UTILITIES BY CITY

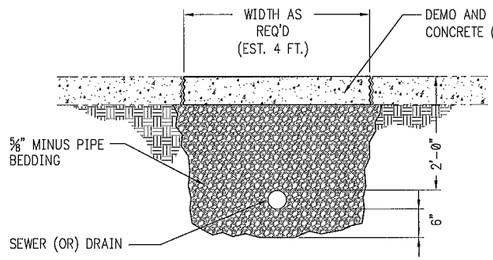
1 PLAN
SCALE: 1"=20'-0"



A SECTION
SCALE: 3/4"=1'-0"



B SECTION
SCALE: 3/4"=1'-0"



C SEWER LINE & DRAIN LINE (BY CONTRACTOR)
SCALE: 3/4"=1'-0"

(ALL WORK BY CONTRACTOR)

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
SITE AND UTILITIES
PLAN

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	1/ /19 DATE	STAMPED
	DRAWING NO.	AP2202 C-1.0

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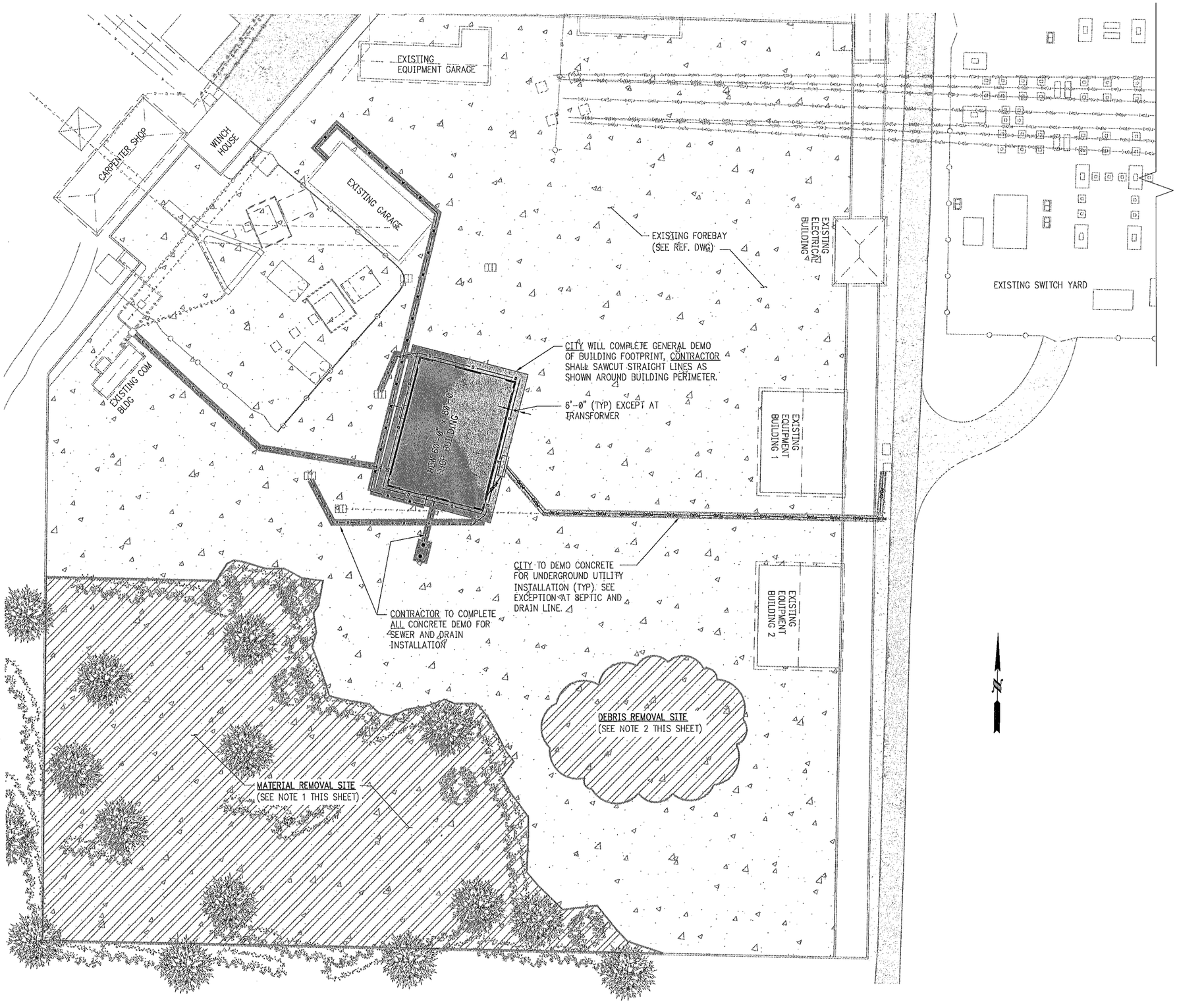

DEBRIS REMOVAL NOTES:

1. CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL MATERIAL LOCATED IN SOUTHWEST CORNER OF FOREBAY FACILITY. CONTRACTOR IS RESPONSIBLE FOR INSPECTING SURPLUS MATERIAL PRIOR TO BIDDING. MATERIAL TYPE UNKNOWN. FOR BIDDING PURPOSES THE VOLUME OF MATERIAL IS ESTIMATED TO BE 20,000 CUBIC YARDS.
2. CITY TO DEMOLISH CONCRETE SLAB AS REQUIRED, (U.N.O.) FOR CONSTRUCTION AND STOCKPILE CONCRETE DEBRIS IN LOCATION SHOWN. CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL DEBRIS. VOLUME OF CONCRETE DEBRIS IS ESTIMATED TO BE 300 CUBIC YARDS. SEE PLAN FOR EXCEPTION, WHERE DEMO FOR DRAIN LINE AND SEWER LINE IS BY CONTRACTOR AND SAWCUT LINES AROUND BLDG. FOOTPRINT ARE BY CONTRACTOR

LEGEND:

- P(UG) — NEW POWER (UG) UNDERGROUND
- C — C — C — NEW COMM
- D — D — D — NEW DRAIN
- S — S — S — NEW SANITARY SEWER
- W — NEW WATER
- EXIST CATCH BASIN
- P — P — P — EXIST POWER
- P(OH) — EXIST POWER (OH) OVERHEAD
- EXIST CONCRETE SLAB (FOREBAY)
- EXIST ASPHALT
- EXIST FIRE HYDRANT
- NPT — EXIST FIRE HYDRANT SUPPLY
- AREA INDICATES EXTENT OF FOREBAY CONCRETE SLAB TO BE DEMOLISHED AS NECESSARY FOR BUILDING CONSTRUCTION AND UTILITY INSTALLATION. SEE PLAN AND DEBRIS REMOVAL NOTES FOR BREAKDOWN OF WORK BY CITY AND WORK BY CONTRACTOR.
- AREA INDICATES APPROX. LOCATION OF DEBRIS REMOVAL.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING DEMOLITION AND DEBRIS REMOVAL

STEPHEN D. FAIRCHILD — STATE OF WASHINGTON — 31204 — REGISTERED PROFESSIONAL ENGINEER

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	DRAWING NO. AP2203	C-1.1

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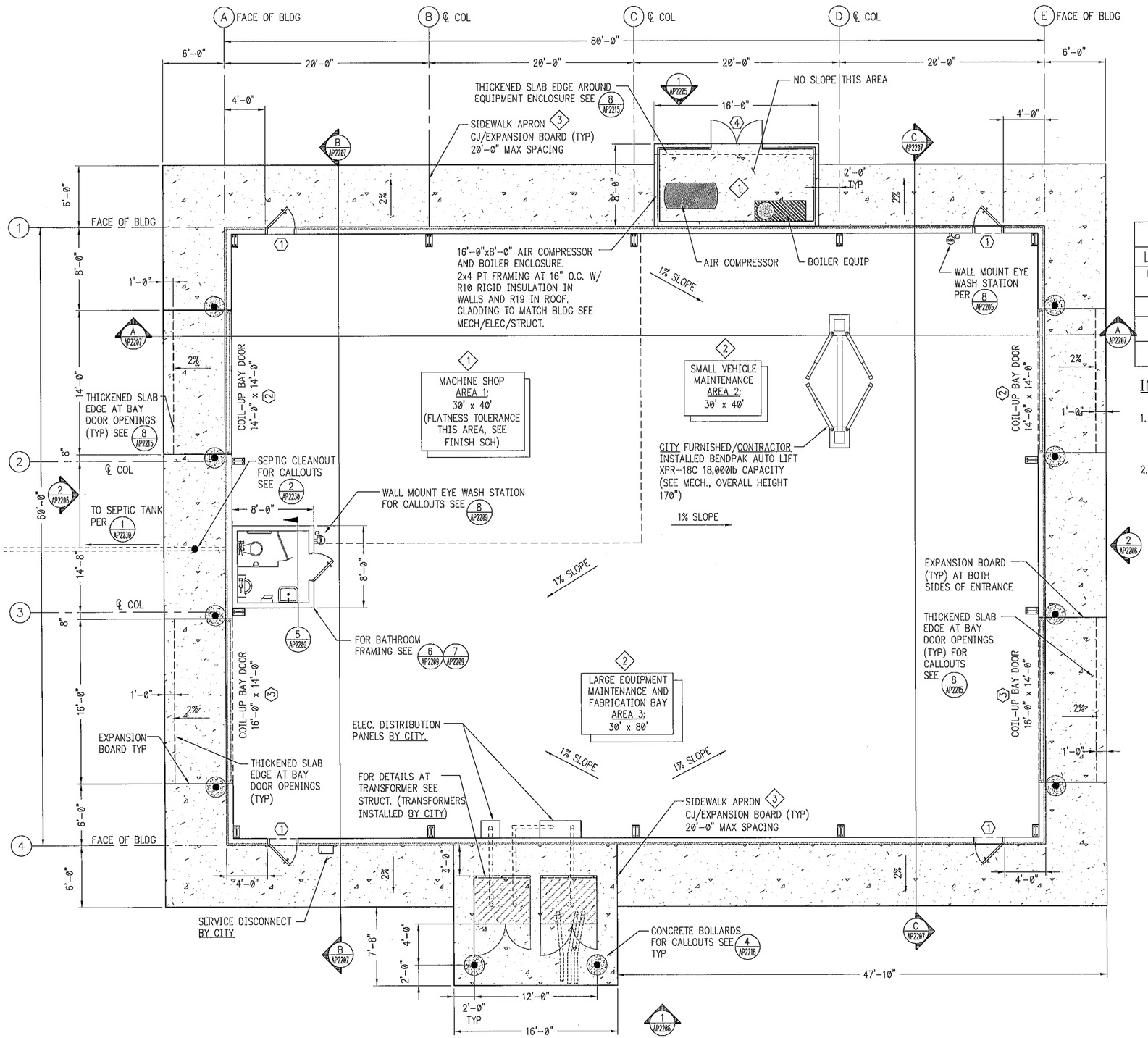

1 FLOOR PLAN
SCALE: 3/16"=1'-0"

DOOR SCHEDULE

NUMBER	OPENING SIZE (WIDTH x HEIGHT x THICKNESS)	MATERIAL	FINISH	HW GRP	REMARKS
1	3'-0" x 7'-0" x 1¾"	HM	PAINTED	HW01	MAN DOOR
2	14'-0" x 14'-0" x MFR	HM	FF	–	COIL-UP BAY DOOR
3	16'-0" x 14'-0" x MFR	HM	FF	–	COIL-UP BAY DOOR
4	6'-0" x 7'-0" x 1¾"	HM	PAINTED	HW01	DOUBLE DOOR

DOOR SCHEDULE NOTES:

1. SEE SPECIFICATION FOR DOOR HARDWARE CALLOUTS.
2. ALL DOORS TO BE INSULATED AND PAINTED TO MATCH BLDG COLOR

INSULATION SCHEDULE

LOCATION	R-VALUE	TYPE	NOTE
UNDER SLAB (INTERIOR)	10	RIGID INSULATION (OR ENGINEER APPROVED EQUAL)	ENTIRE FOOTPRINT
SLAB EDGE	10	RIGID INSULATION	
WALLS	19 15	VINYL FACED BATT INSULATION AND RIGID INSULATION	1
ROOF	30 20	VINYL FACED BATT INSULATION	2

INSULATION NOTES:

1. PROVIDE R-15 THERMAL BREAK BETWEEN WALL GIRT AND EXTERIOR SKIN OR BETWEEN P.E. FRAME/COLUMN AND WALL GIRT. SEE "AP2208" FOR RIGID INSULATION BEHIND PLYWOOD WALL SHEATHING.
2. PROVIDE R-20 THERMAL BREAK BETWEEN ROOF PURLIN AND EXTERIOR SKIN OR BETWEEN P.E. FRAME AND ROOF PURLIN.

SHEATHING SCHEDULE

LOCATION	FINISH TYPE
EXTERIOR WALLS (0'-0" TO 8'-0" AFF)	1
EXTERIOR WALLS (8'-0" TO ROOF)	2
ROOF	2
BATHROOM EXTERIOR	1
BATHROOM INTERIOR	3

SHEATHING FINISH

MARK	DESCRIPTION
1	5/8" PLYWOOD SHEATHING, PRIMER, FINISH PAINT COAT
2	NO FINISH
3	FRP WALL PANELS

FLOOR FINISH SCHEDULE

LOCATION	FINISH TYPE
AREA 1 & MECH ENCLOSURE	1
AREA 2	2
AREA 3	2
SIDEWALK/APRON	3

FLOOR FINISH TYPE

MARK	DESCRIPTION
1	TROWEL FINISH: SEE SPEC FOR FLATNESS TOLERANCE
2	TROWEL FINISH
3	BROOM FINISH

GENERAL NOTES:

1. RADIANT HYDRONIC FLOOR HEATING SYSTEM PER MECH.
2. COORDINATES FOR BLDG CORNERS ARE SHOWN ON DWG "AP2202"
3. IN SLAB CONDUITS NOT SHOWN FOR CLARITY. SEE MECH/ELEC.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT

LAGRANDE SHOP BUILDING FLOOR PLAN AND SCHEDULES

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	1/ /19 DATE	STAMPED
	DRAWING NO. AP2204 A--1.0	

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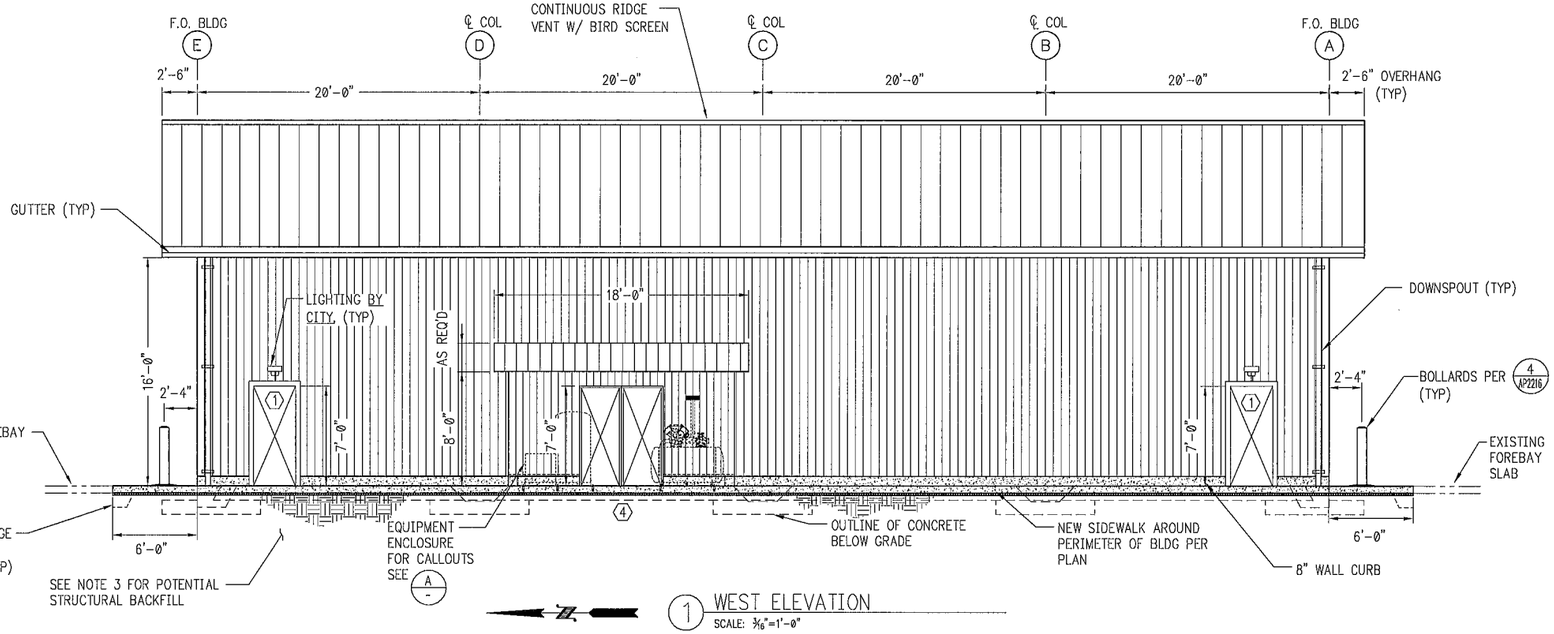
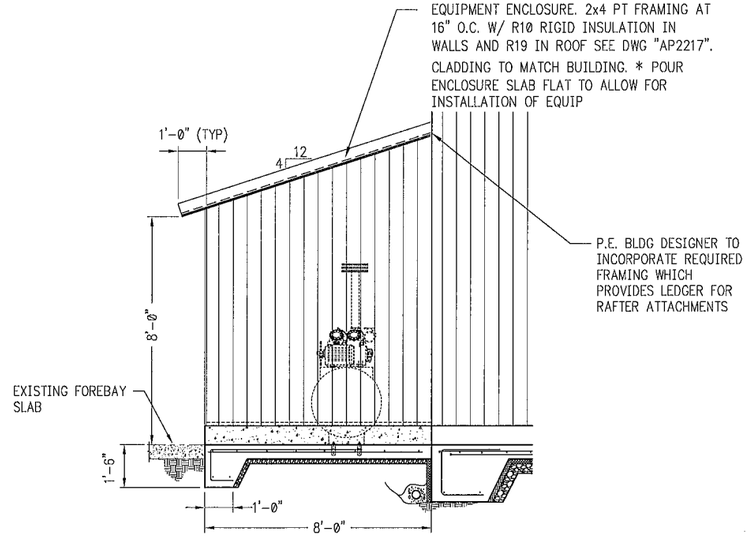


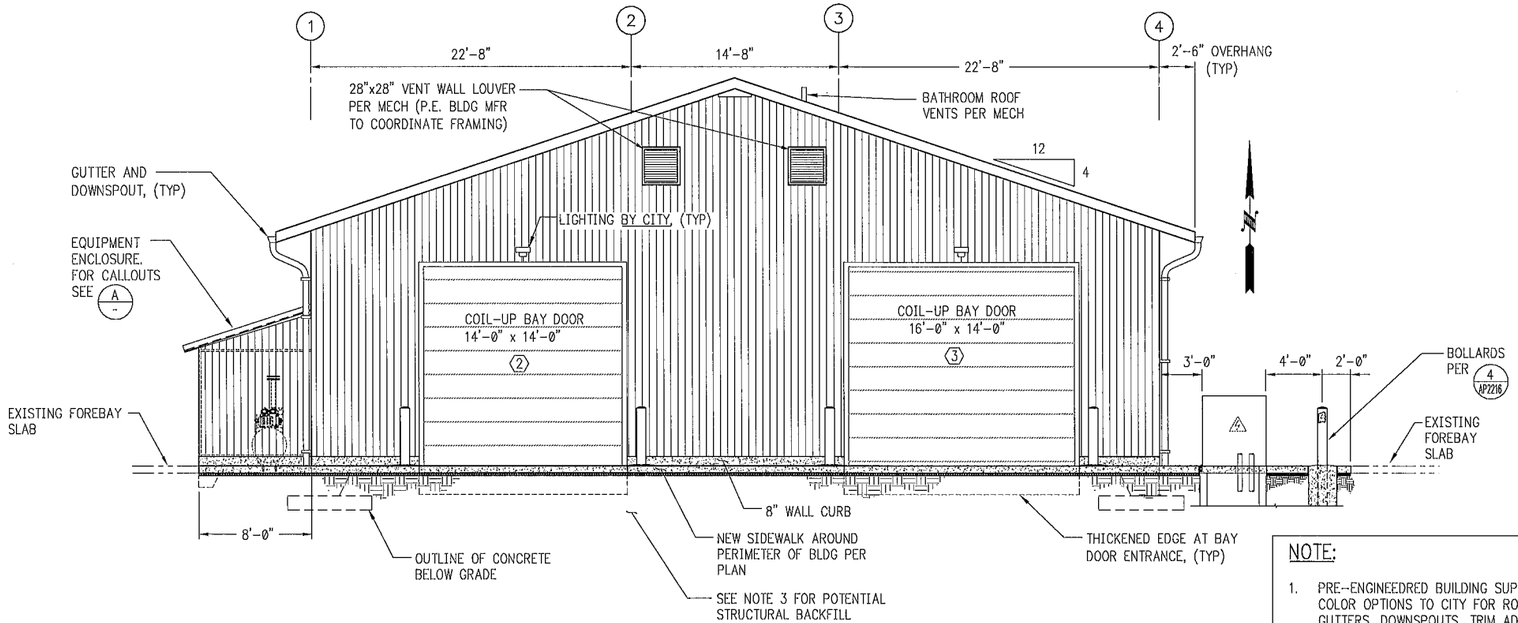
1 WEST ELEVATION

SCALE: 3/16"=1'-0"



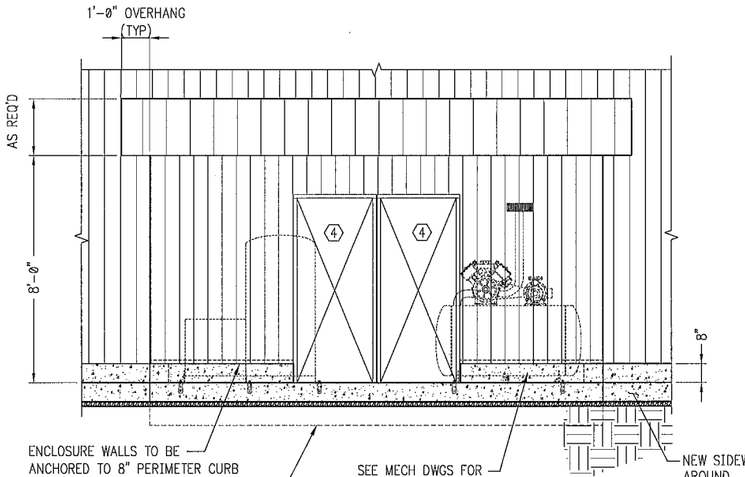
EQUIPMENT ENCLOSURE (SIDE VIEW)

SCALE: 3/8"=1'-0"



2 SOUTH ELEVATION

SCALE: 3/16"=1'-0"



A EQUIPMENT ENCLOSURE (FRONT VIEW)

SCALE: 3/8"=1'-0" (SEE DWG "AP2217" FOR ADDITIONAL DETAILS)

NOTE:

1. PRE-ENGINEEDRED BUILDING SUPPLIER TO PROVIDE COLOR OPTIONS TO CITY FOR ROOFING, SIDING, GUTTERS, DOWNSPOUTS, TRIM AD DOORS PRIOR TO ORDERING.
2. ☐ INDICATES DOOR TYPE No. PER SHEET "AP2204"
3. POTENTIAL OVEREXCAVATION AND STRUCTURAL BACKFILL BELOW FOUNDATION SLAB NOT SHOWN. SEE "AP2207" FOR ADDITIONAL DETAILS.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

NISQUALLY PROJECT

LAGRANDE SHOP BUILDING ELEVATIONS

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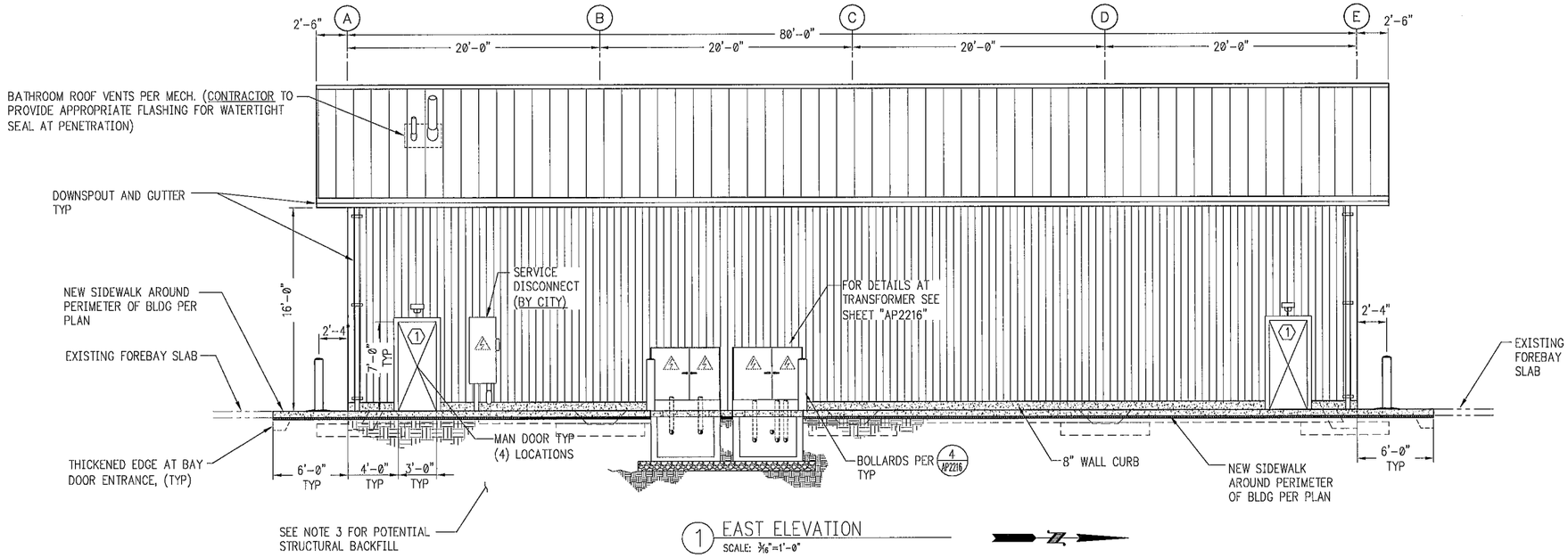
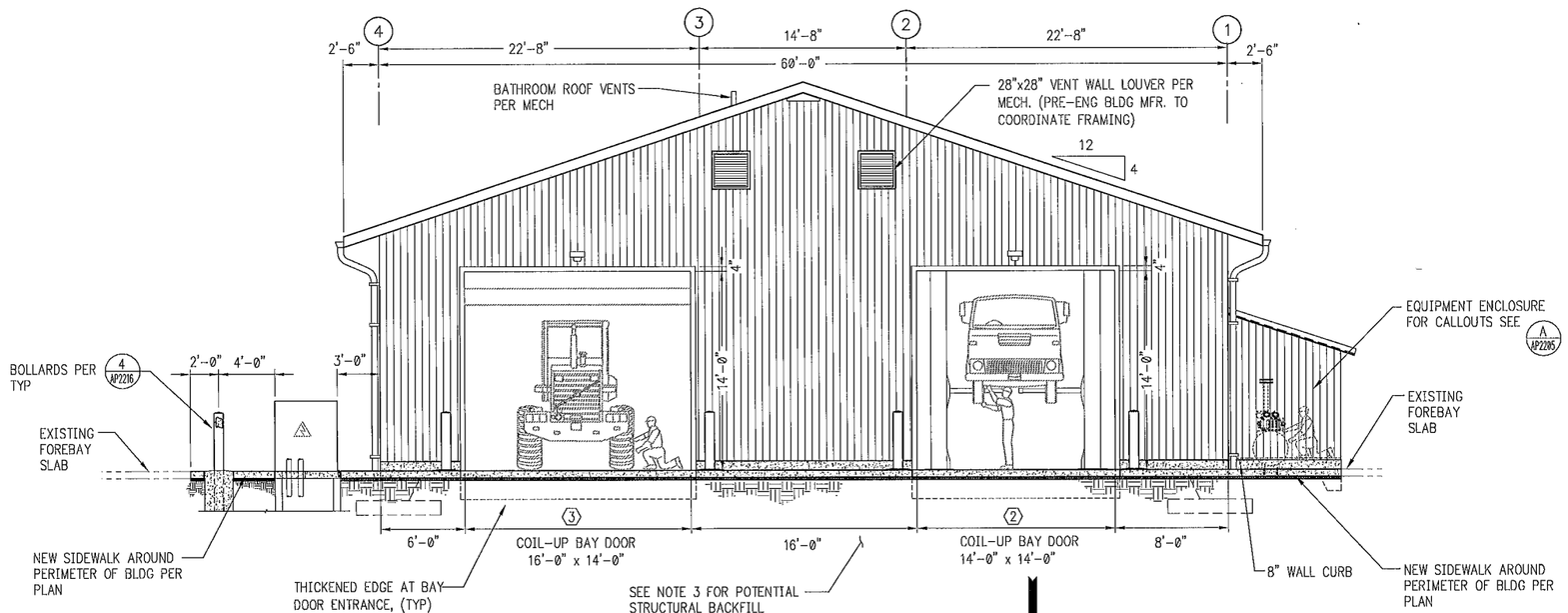


1 EAST ELEVATION
SCALE: 3/16"=1'-0"



2 NORTH ELEVATION
SCALE: 3/16"=1'-0"

NOTE:

1. PRE-ENGINEEDRED BUILDING SUPPLIER TO PROVIDE COLOR OPTIONS TO CITY FOR ROOFING, SIDING, GUTTERS, DOWNSPOUTS, TRIM AD DOORS PRIOR TO ORDERING.
2. ⬡ INDICATES DOOR TYPE No. PER SHEET "AP2204"
3. POTENTIAL OVEREXCAVATION AND STRUCTURAL BACKFILL BELOW FOUNDATION SLAB NOT SHOWN. SEE "AP2207" FOR ADDITIONAL DETAILS

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

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NISQUALLY PROJECT
LAGRANDE SHOP BUILDING ELEVATIONS

STEPHEN D. FAIRCHILD — STATE OF WASHINGTON — 31204 — REGISTERED PROFESSIONAL ENGINEER

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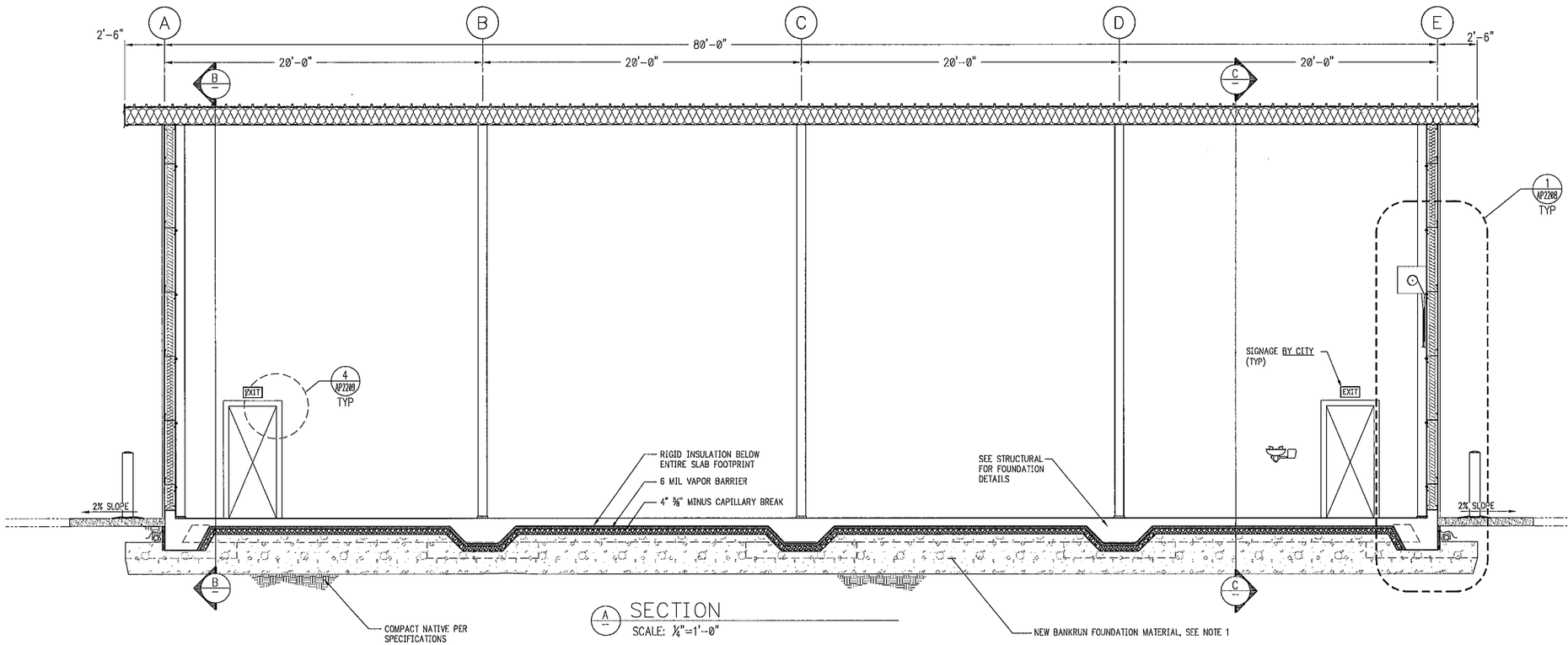
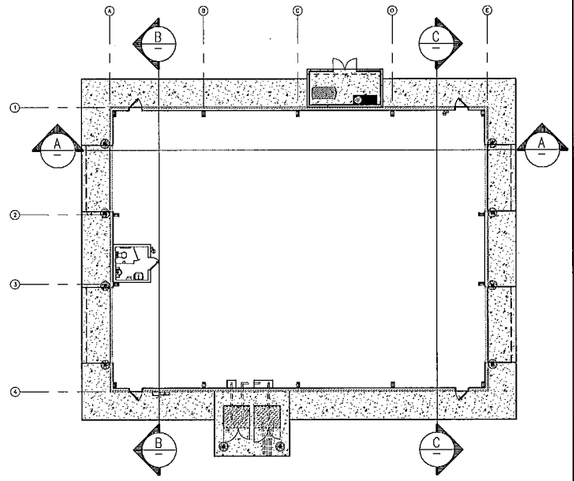


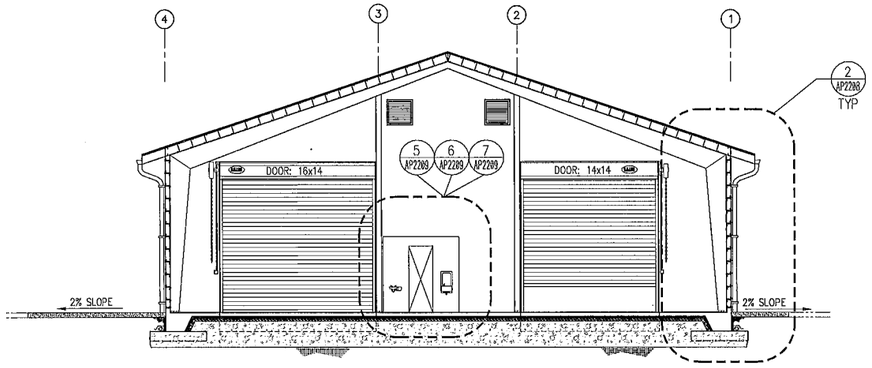
A SECTION
SCALE: 1/4"=1'-0"

NOTE:

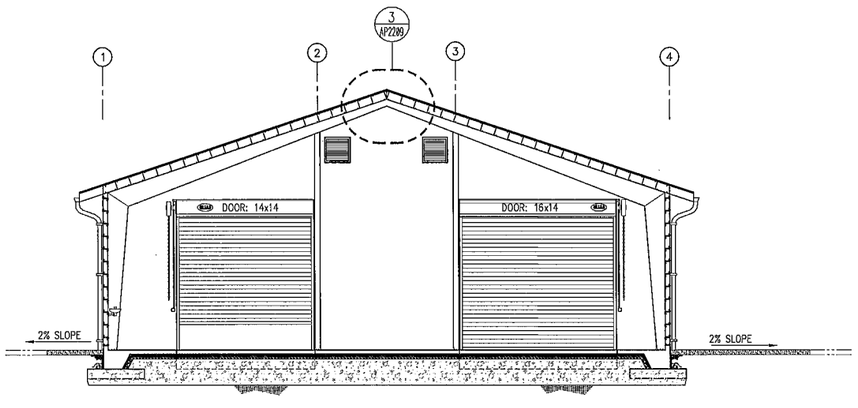
1. CITY TO INSPECT CONDITION OF NATIVE MATERIAL BELOW EXISTING FOREBAY SLAB AND MAKE DETERMINATION IF OVEREXCAVATION IS REQUIRED. CONTRACTOR SHALL BID PROJECT ASSUMING 2'-0" OF OVEREXCAVATION IS REQUIRED ONCE FOREBAY SLAB IS REMOVED. BID ASSUMPTION INCLUDES 95% COMPACTION OF REMAINING NATIVE MATERIAL AND COMPACTION OF NEWLY PLACED BANKRUN. (TYP. BLDG FOOTPRINT)



PLAN
SCALE: 1/16"=1'-0"



B SECTION
SCALE: 1/8"=1'-0"



C SECTION
SCALE: 1/8"=1'-0"

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
SECTIONS

STEPHEN D. FAIRCHILD
STATE OF WASHINGTON
31204
REGISTERED
PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
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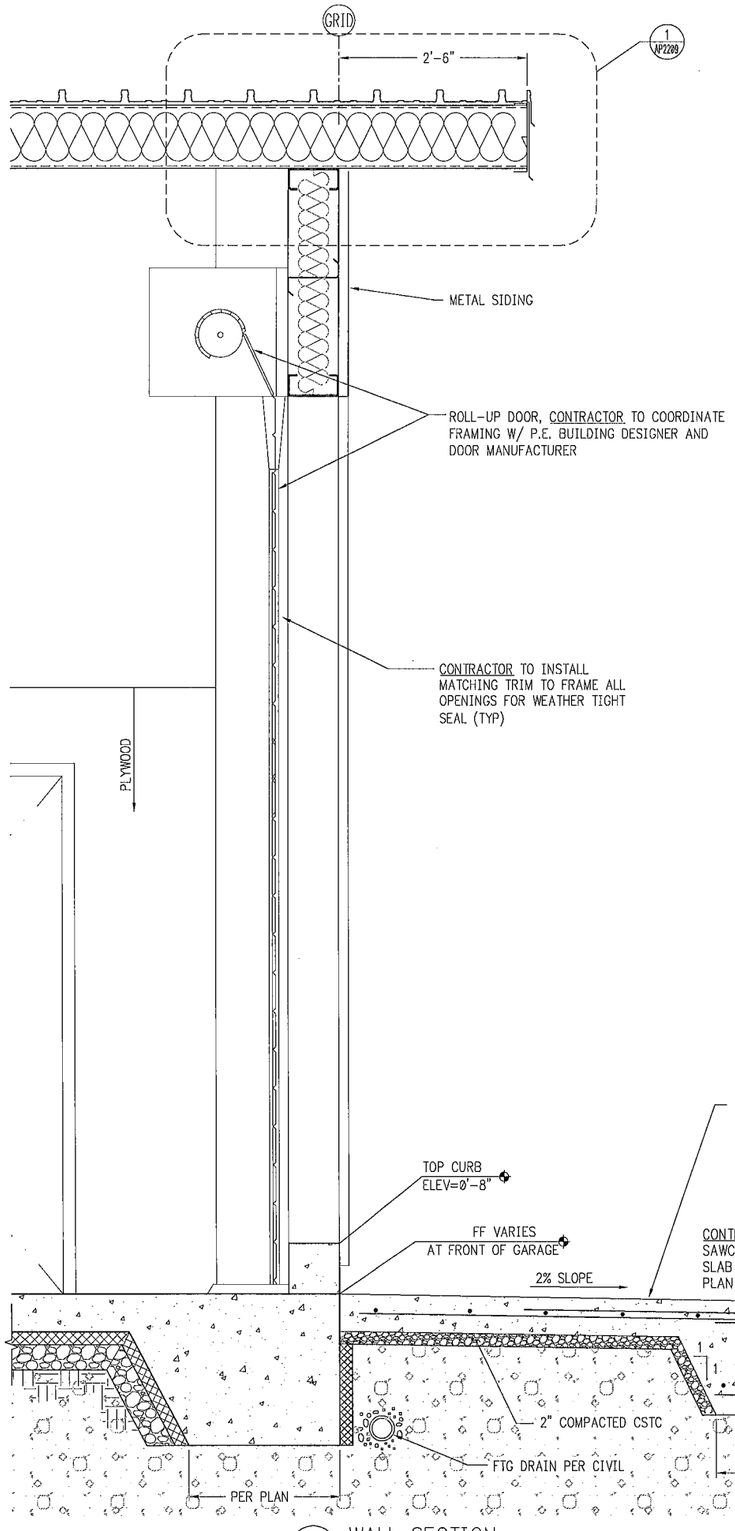
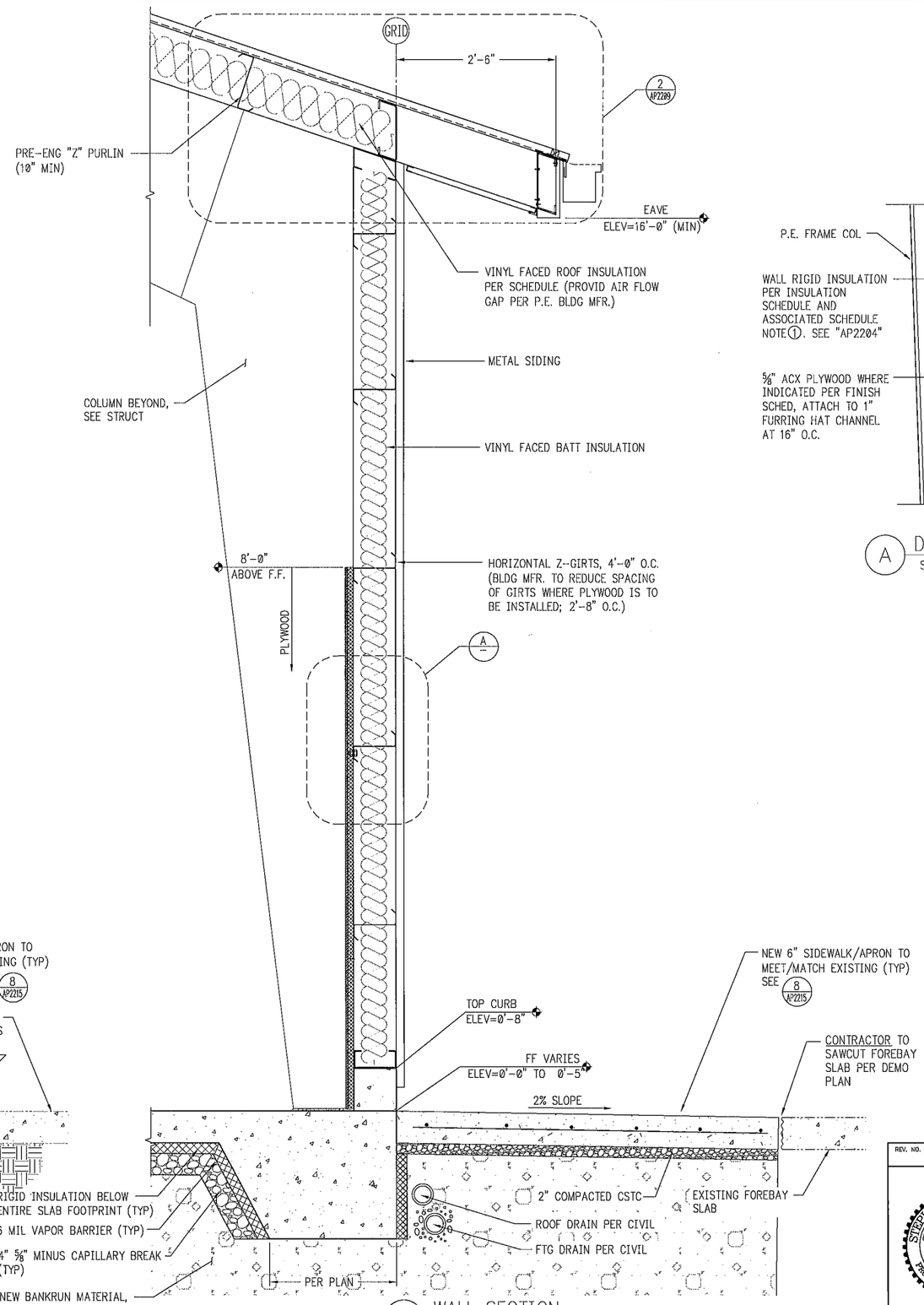
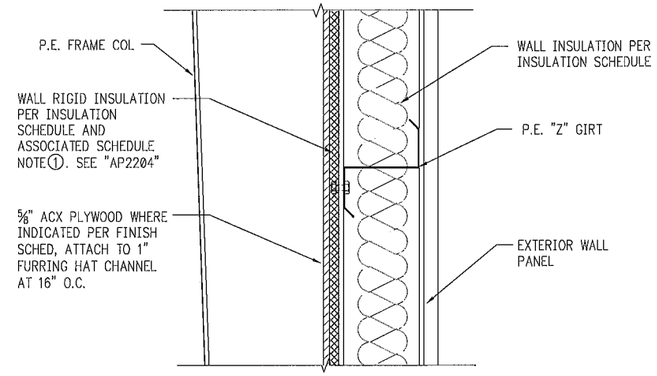


1 WALL SECTION
SCALE: 1"=1'-0"



2 WALL SECTION
SCALE: 1"=1'-0"



A DETAIL – EXTERIOR WALL FINISH
SCALE: 1½"=1'-0"

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
BUILDING ELEVATIONS
WALL SECTIONS

REV. NO. 0

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

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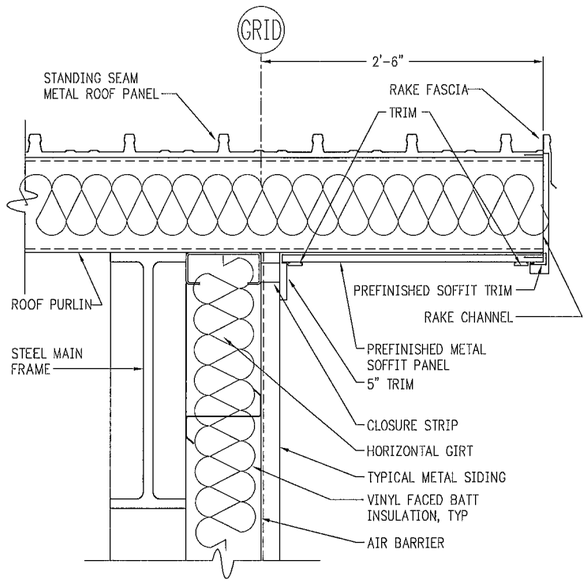
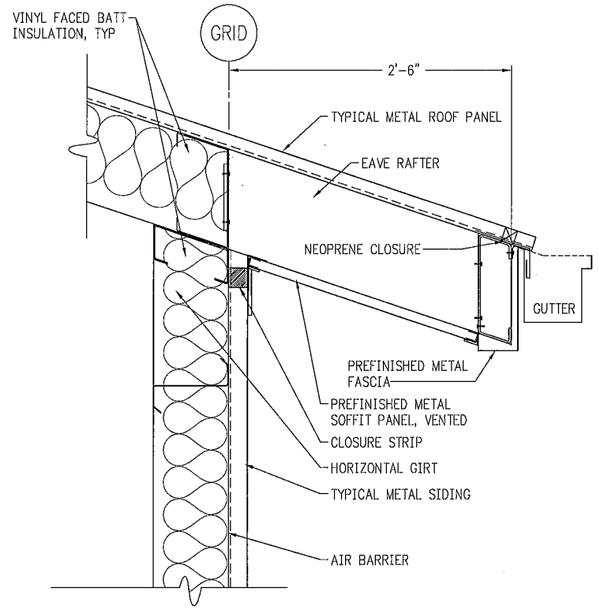
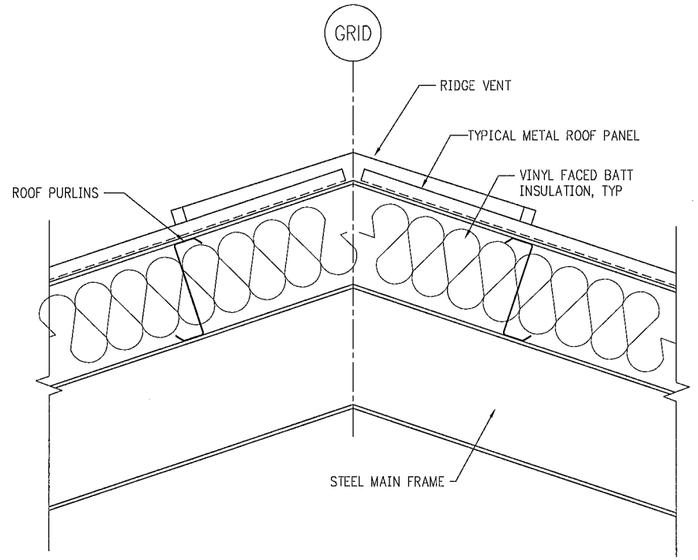


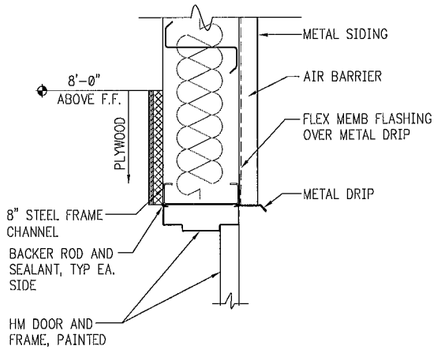
1 ROOF RAKE DETAIL
SCALE: 1 1/2"=1'-0"



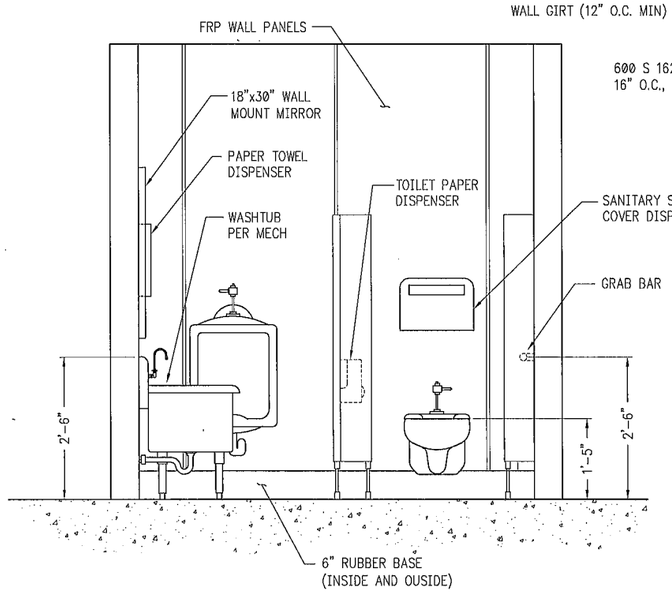
2 ROOF EAVE DETAIL
SCALE: 1 1/2"=1'-0"



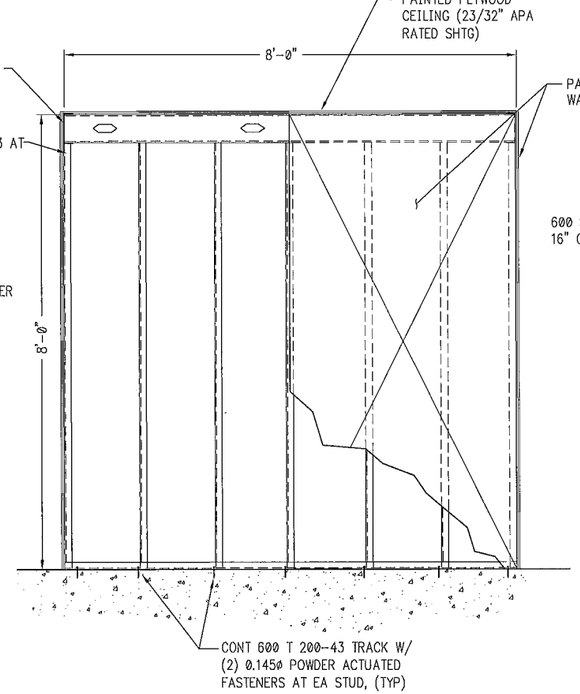
3 ROOF RIDGE DETAIL
SCALE: 1 1/2"=1'-0"



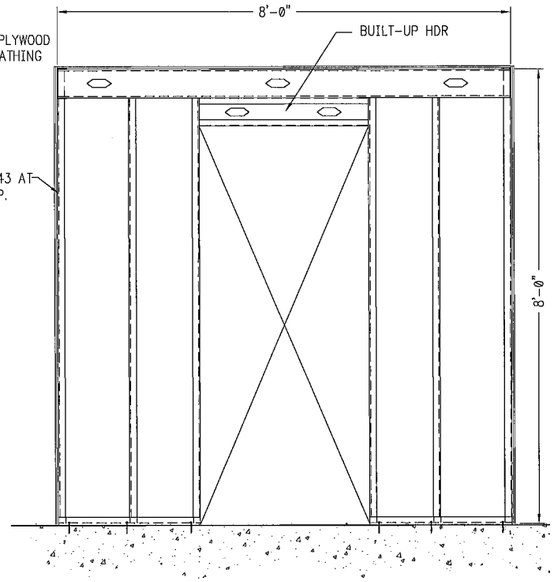
4 EXTERIOR HM DOOR HEAD DETAIL (TYP)
SCALE: 1 1/2"=1'-0"



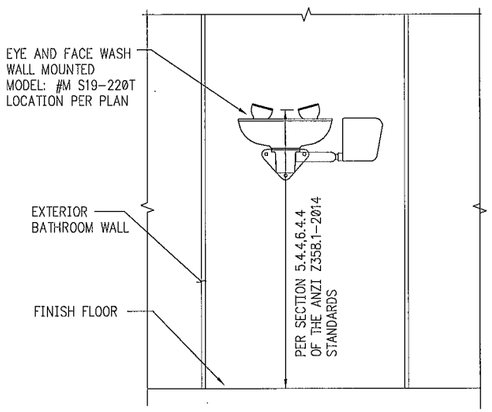
5 BATHROOM ELEVATION
SCALE: 3/4"=1'-0"



6 BATHROOM FRAMING
SCALE: 3/4"=1'-0"



7 BATHROOM FRAMING
SCALE: 3/4"=1'-0"



8 EYE--WASH DETAIL
SCALE: 1"=1'-0"

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING ARCHITECTUAL DETAILS

STEPHEN D. FAIRCHILD — STATE OF WASHINGTON — 31204 — REGISTERED PROFESSIONAL ENGINEER

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1. STRUCTURAL NOTES

ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ARCHITECT, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION. THE CONTRACTOR IS RESPONSIBLE FOR ALL ERECTION BRACING, FORMWORK AND TEMPORARY CONSTRUCTION SHORING.

1.1 BIDDERS WARRANTY

BY THE ACT OF SUBMITTING A BID FOR THE PROPOSED CONTRACT, THE CONTRACTOR WARRANTS THAT:

1.1.1 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE (INCLUDING AGENTS AND SUPPLIERS) HAVE CAREFULLY AND THOROUGHLY REVIEWED THE DRAWINGS AND STRUCTURAL NOTES AND HAVE FOUND THEM COMPLETE AND FREE FROM AMBIGUITIES AND SUFFICIENT FOR THE PURPOSE INTENDED; FURTHER THAT,

1.1.2 THE CONTRACTOR HAS CAREFULLY EXAMINED THE SITE OF THE WORK AND THAT FROM HIS OWN INVESTIGATIONS, HE HAS SATISFIED HIMSELF AS TO THE NATURE AND LOCATION OF THE WORK, AS TO THE CHARACTER, QUALITY, QUANTITIES OF MATERIAL AND DIFFICULTIES TO BE ENCOUNTERED, AS TO THE EXTENT OF EQUIPMENT AND OTHER FACILITIES NEEDED FOR THE PERFORMANCE OF THE WORK AND AS TO THE GENERAL AND LOCAL CONDITIONS, AND OTHER ITEMS WHICH MAY IN ANY AFFECT THE WORK OR ITS PERFORMANCE, FURTHER THAT,

1.1.3 THE CONTRACTOR AND ALL WORKERS HE INTENDS TO USE ARE SKILLED AND EXPERIENCED IN THE TYPE OF CONSTRUCTION REPRESENTED BY THE DRAWINGS AND DOCUMENTS BID UPON; FURTHER THAT,

1.1.4 NEITHER THE CONTRACTOR NOR ANY OF HIS EMPLOYEES, AGENTS, INTENDED SUPPLIERS, OR SUBCONTRACTORS HAVE RELIED UPON ANY VERBAL REPRESENTATIONS ALLEGEDLY AUTHORIZED OR UNAUTHORIZED FROM THE OWNER OR HIS EMPLOYEES OR AGENTS, INCLUDING THE ARCHITECT OR ENGINEERS, IN ASSEMBLING THE BID FIGURES; FURTHER THAT,

1.1.5 CONTRACT DOCUMENT DRAWING COORDINATION:

1.1.5.1 THE REQUIREMENTS CONTAINED WITHIN THESE SECTIONS (1.1.5.1 THRU 1.1.5.5), SUPERSEDE REQUIREMENTS AND/OR RECOMMENDATIONS CONTAINED IN THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDING AND BRIDGES", AS WELL AS CASE DOCUMENT 962-D "A GUIDELINE ADDRESSING COORDINATION AND COMPLETENESS OF STRUCTURAL CONSTRUCTION DOCUMENTS"

1.1.5.2 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE ARE AWARE OF AND ACKNOWLEDGE THAT CLOSE COORDINATION AMONG ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND OTHER TRADE DRAWINGS IS REQUIRED.

1.1.5.3 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE SHALL RECOGNIZE THAT THE PROJECT CONTRACT DOCUMENTS INCLUDE THE ARCHITECTURAL, AND STRUCTURAL, AND OTHER TRADE DRAWINGS AND SPECIFICATIONS.

1.1.5.4 THE CONTRACTOR AND ALL SUBCONTRACTORS ACKNOWLEDGE THAT CLOSE COORDINATION BETWEEN DISCIPLINES INCLUDED WITHIN THE CONTRACT DOCUMENTS IS NECESSARY. ELEMENTS THAT WILL REQUIRE CLOSE COORDINATION BY THE CONTRACTOR INCLUDE (BUT ARE NOT LIMITED TO):

1. VERIFICATION OF ALL DIMENSIONS
2. DETERMINATION OF ALL COLUMN LOCATIONS
3. DETERMINATION OF TOP OF FLOOR, TOP OF STEEL, WALL PLATE AND/OR TOP OF BEAM ELEVATIONS
4. DETERMINATION OF TOP OF FOOTING ELEVATIONS AND FOOTING STEP LOCATIONS
5. MECHANICAL/ELECTRICAL EQUIPMENT LOCATIONS AND WEIGHTS
6. COORDINATION WITH DESIGNERS/SUPPLIERS OF PRE-ENGINEERED COMPONENTS

1.1.5.5 THE CONTRACTOR AND ALL SUBCONTRACTORS HE INTENDS TO USE SHALL MAKE CONSIDERATION FOR, AND INCLUDE MONIES FOR THE ABOVE IN THE PREPARATION OF THEIR BIDS.

1.1.6 NEITHER THE CONTRACTOR NOR ANY OF HIS EMPLOYEES, AGENTS, INTENDED SUPPLIERS, OR SUBCONTRACTORS HAVE SCALED THESE DRAWINGS TO OBTAIN REQUIRED DIMENSIONS; FURTHER THAT,

1.1.7 THE BID FIGURE IS BASED SOLELY UPON THE CONSTRUCTION CONTRACT DOCUMENTS AND PROPERLY ISSUED WRITTEN OR VERBAL REPRESENTATIONS.

1.2 CODES

1.2.1 ALL METHODS, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE 2012 INTERNATIONAL BUILDING CODE (IBC) AS AMENDED AND ADOPTED BY THE LOCAL BUILDING AUTHORITY.

1.2.2 ALL REFERENCES TO OTHER CODES, STANDARDS AND SPECIFICATION, (ACI, ASTM, ETC.), SHALL BE FOR THE LATEST OR MOST CURRENT EDITION AVAILABLE.

1.3 DESIGN CRITERIA

1.3.1 UNIFORM LOADS:

LOCATION	LIVE LOAD	DEAD LOAD
ROOF	50 PSF (SNOW*)	ACTUAL
SLAB ON GRADE	125 PSF	ACTUAL

* THIS IS A GROUND SNOW LOAD

1.3.2 CONCENTRATED LOADS:

ALL MANUFACTURERS OF PRE-ENGINEERED COMPONENTS OR SYSTEMS SHALL LOCATE, COORDINATE, VERIFY WEIGHTS, ETC., OF MECHANICAL UNITS OR OTHER CONCENTRATED LOADS AND DESIGN THEIR SYSTEM FOR THESE LOADS.

1.3.4 LATERAL LOADS:

1.3.4.1 WIND: PER IBC SECTION 1609

BASIC WIND SPEED: 110 MPH

EXPOSURE: C

APPLICABLE INTERNAL PRESSURE COEFFICIENT: ± 0.55

TOPOGRAPHIC FACTOR (K_{zt}) 1.0

PARTIALLY ENCLOSED/UNENCLOSED STRUCTURE

DESIGN WIND PRESSURES TO BE USED FOR DESIGN OF EXTERIOR CLADDING MATERIALS

ZONE	POSITIVE (PSF)	NEGATIVE (PSF)
1	21.7	-33.8
2	21.7	-44.9
3	21.7	-65.1
4	35.4	-37.8
5	35.4	-42.2

1.3.4.2 SEISMIC: PER IBC SECTION 1613

SITE CLASS: D

SEISMIC DESIGN CATEGORY: D

OCCUPANCY CATEGORY: II

S_{DS} : 0.963

S_{D1} : 0.600

S_S : 1.445

S_1 : 0.600

SEISMIC RESISTING SYSTEM: STEEL ORDINARY MOMENT FRAME AND STEEL ORDINARY CONCENTRICALLY BRACED FRAME

RESPONSE MODIFICATION COEFFICIENT (R): 3.5 & 3.25

DESIGN BASE SHEAR: 0.275 W & 0.296 W

SEISMIC RESPONSE COEFFICIENT (C_S): 0.275 & 0.296

OVERSTRENGTH FACTOR (Ω_0): 2.5

SEISMIC IMPORTANCE FACTOR (I_E): 1.0

ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE

1.3.4.3 FOR PIPES, CONDUITS, DUCTS AND MECHANICAL EQUIPMENT SUPPORTED OR BRACED FROM STRUCTURE: CONFORM TO SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC., PUBLICATION "APPENDIX E: SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS." ALL BRACING AND SUPPORTS SHALL BE DESIGNED FOR SEISMIC HAZARD LEVEL (SHL) B. SPRINKLER LINE ATTACHMENTS SHALL CONFORM TO NFPA PAMPHLET 13.

1.4 SOIL DATA

SOIL DATA NOT AVAILABLE UNTIL FOREBAY SLAB IS REMOVED ASSUME ALLOWABLE SOIL PRESSURE IS 1,500 PSF.

1.5 INSPECTION/TESTING REQUIREMENTS

SEE STATEMENT OF SPECIAL INSPECTION AND TESTING SHEET "S-0.3" AND "S-0.4"

INSPECTIONS BY THE BUILDING OFFICIAL (IBC SECTION 109)

1.5.1 FOUNDATION INSPECTION SHALL BE MADE AFTER EXCAVATIONS ARE COMPLETE AND ANY REQUIRED REINFORCING IS IN PLACE. ANY REQUIRED FORMS SHALL BE IN PLACE PRIOR TO INSPECTION.

1.5.2 CONCRETE SLAB INSPECTION SHALL BE MADE AFTER ALL IN-SLAB OR UNDER SLAB ACCESSORIES AND REINFORCEMENT ARE PLACED AND PRIOR TO CONCRETE SLAB PLACEMENT.

1.5.3 FRAME INSPECTIONS SHALL BE MADE AFTER ALL FRAMING,STRUCTURAL BRACING ARE COMPLETE AND ALL PIPES, DUCTS, ELECTRICAL, PLUMBING, ETC., ARE INSTALLED, INCLUDING BRACING AND APPROVED PRIOR TO COVER.

1.5.4 IN ADDITION TO THE INSPECTION SPECIFIED ABOVE, THE BUILDING OFFICIAL IS AUTHORIZED TO MAKE OR REQUIRE OTHER INSPECTION OF ANY CONSTRUCTION WORK TO ASCERTAIN COMPLIANCE WITH THE PROVISIONS OF THE IBC.

STRUCTURAL TESTS AND SPECIAL INSPECTIONS (IBC CHAPTER 17)

1.5.5 SEE PROJECT SPECIFICATIONS FOR QUALITY ASSURANCE PLAN

1.6 SHOP DRAWINGS

SUBMIT SHOP DRAWINGS TO ARCHITECT/ENGINEER FOR THE FOLLOWING:

1.6.1 CONCRETE MIX DESIGN SUBMITTALS

1.6.2 REINFORCING STEEL

1.6.3 STRUCTURAL AND MISCELLANEOUS STEEL

1.6.4 PRE-ENGINEERED METAL BUILDING SYSTEMS AND COMPONENTS

1.7 MISCELLANEOUS

1.7.1 VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD.

1.7.2 VERIFY SIZE AND LOCATION OF ALL OPENINGS IN THE FLOORS, ROOF AND WALLS WITH PRE-ENGINEERED BUILDING DRAWINGS.

1.7.3 CONSTRUCTION DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS OF SECTIONS OF THIS PROJECT AS APPROVED BY THE ENGINEER.

1.7.4 SEE PRE-ENGINEERED BUILDING DRAWINGS FOR DIMENSIONS AND LOCATIONS OF OPENINGS NOT DIMENSIONED OR SHOWN ON STRUCTURAL PLANS.

1.7.5 THE STRUCTURE HAS BEEN DESIGNED TO RESIST CODE REQUIRED VERTICAL AND LATERAL FORCES AFTER THE CONSTRUCTION OF ALL STRUCTURAL ELEMENTS HAS BEEN COMPLETED. STABILITY OF THE STRUCTURE PRIOR TO COMPLETION IS THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR. THIS RESPONSIBILITY INCLUDES BUT IS NOT LIMITED TO JOB SITE SAFETY: ERECTION MEANS, METHODS, AND SEQUENCES; TEMPORARY SHORING, FORMWORK, AND BRACING; USE OF EQUIPMENT AND CONSTRUCTION PROCEDURES. WHERE SHORING IS REQUIRED, A SHORING PLAN, STAMPED BY A LICENSED PROFESSIONAL ENGINEER SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

2. SITE WORK

2.1 EXCAVATION

EXCAVATE TO DEPTH SHOWN AND TO FIRM UNDISTURBED MATERIAL. OVER-EXCAVATIONS SHALL BE BACKFILLED WITH LEAN CONCRETE (f'_c=2,000 PSI) OR STRUCTURAL FILL AT THE CONTRACTOR'S EXPENSE. EXERCISE EXTREME CARE DURING EXCAVATION TO AVOID DAMAGE TO BURIED LINES, TANKS, AND OTHER CONCEALED ITEMS. UPON DISCOVERY, DO NOT PROCEED WITH WORK UNTIL RECEIVING WRITTEN INSTRUCTIONS FROM THE ENGINEER. A COMPETENT REPRESENTATIVE OF THE OWNER SHALL INSPECT ALL FOOTING EXCAVATIONS FOR SUITABILITY OF BEARING SURFACES PRIOR TO PLACEMENT OF REINFORCING STEEL. PROVIDE DRAINAGE AS NECESSARY TO AVOID WATER-SOFTENED SUBGRADE.

2.2 FILL, BACKFILL AND COMPACTION

BACKFILL AGAINST WALLS SHALL NOT BE PLACED UNTIL AFTER THE REMOVAL OF ALL MATERIAL SUBJECT TO ROT OR CORROSION. STRUCTURAL FILL OTHER THAN PER GRAVEL SHALL BE GRANULAR PLACED IN 6-INCH LIFTS AND COMPACTED TO AT LEAST 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557 (MOD PROCTOR) AND ASTM D-698 (STANDARD PROCTOR). PEA GRAVEL FILL SHALL HAVE A MAXIMUM PARTICLE SIZE OF 3/8" DIAMETER.

3. STRUCTURAL CONCRETE

3.1 GENERAL

ALL CONCRETE SHALL BE HARD ROCK CONCRETE MEETING THE REQUIREMENTS OF ACI-301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS." PROPORTIONING OF INGREDIENTS FOR EACH CONCRETE MIX SHALL BE BY METHOD 2 OR THE ALTERNATE PROCEDURE GIVEN IN ACI-301. PLACE CONCRETE PER ACI-304 AND CONFORM TO ACI-306 FOR WINTER CONCRETING AND ACI-305 FOR HOT WEATHER CONCRETING. USE INTERIOR MECHANICAL VIBRATORS WITH 7,000 RPM MINIMUM FREQUENCY. DO NOT OVER-VIBRATE. CONCRETE SHALL BE PLACED MONOLITHICALLY BETWEEN CONSTRUCTION OR CONTROL JOINTS. PROTECT ALL CONCRETE FROM PREMATURE DRYING, EXCESSIVE HOT OR COLD TEMPERATURE FOR SEVEN DAYS AFTER PLACING.

3.2 STRENGTH

TWENTY-EIGHT DAY COMPRESSIVE STRENGTHS SHALL BE:

	PSI
SLABS	3000
FOOTINGS	3000

1. PROVIDE CONCRETE MIX DESIGN AND REQUIRED TEST REPORTS FOR APPROVAL BY ENGINEER OF RECORD MINIMUM TWO WEEKS PRIOR TO PLACING ANY POST TENSIONED CONCRETE.

CONCRETE SUPPLIER TO PROVIDE TEST RECORDS PER SECTION 5.6 OF ACI 318.

WHEN NO PRIOR EXPERIENCE OR TRIAL MIXTURE DATA ARE AVAILABLE, THE WATER/CEMENT RATIO FROM THE TABLE BELOW MAY BE USED, BUT ONLY WHEN SPECIAL PERMISSION IS GIVEN BY ENGINEER.

MAXIMUM ABSOLUTE WATER-CEMENT RATIO BY WEIGHT

SPECIFIED COMPRESSIVE STRENGTH	NON-AIR ENTRAINED CONCRETE	AIR-ENTRAINED CONCRETE
3000	0.58	0.46

THESE MAXIMUMS MAY BE EXCEEDED IF TEST RECORDS PER SECTION 5.6 OF ACI 318 (BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE) ARE SUBMITTED TO AND APPROVED BY THE ENGINEER.

3.3 MATERIALS

3.3.1 CEMENT: ASTM C150, TYPE I OR TYPE II. ENGINEER'S APPROVAL IS NEEDED FOR USE OF TYPE III CEMENT.

3.3.2 COARSE AND FINE AGGREGATE: ASTM C33.

3.3.3 WATER SHALL BE CLEAN AND POTABLE.

3.4 ADMIXTURES

3.4.1 WATER REDUCING ADMIXTURE: ASTM C494. ADMIXTURES SHALL BE USED IN EXACT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

3.4.2 SYNERGIZED PERFORMANCE SYSTEMS: CONCRETE USING ADMIXTURES TO PRODUCE FLOWABLE CONCRETE MAY BE USED SUBJECT TO ENGINEER'S APPROVAL.

3.4.3 AIR ENTRAINMENT: ASTM C260 AND ASTM C494 ENTRAIN 5% PLUS/MINUS 1.5% BY VOLUME IN ALL CONCRETE EXPOSED TO WEATHER.

3.4.4 NO OTHER ADMIXTURES PERMITTED UNLESS APPROVED BY THE ENGINEER.

3.9 FORMWORK AND SHORING

3.9.1 FOLLOW RECOMMENDED PRACTICE FOR CONCRETE FORMWORK (ACI-347).

3.9.4 ALL SHORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. FORMWORK SUPPORTS AND SHORING SHALL BE DESIGNED TO PROVIDE FINISHED CONCRETE SURFACES AT ALL FACES LEVEL, PLUMB AND TRUE TO THE DIMENSIONS AND ELEVATIONS SHOWN. TOLERANCES AND VARIATIONS SHALL BE AS SPECIFIED.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
GENERAL NOTES

STEPHEN D. FAIRCHILD — STATE OF WASHINGTON — 31204 — REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	DATE 1/ /19	STAMPED
	DRAWING NO. AP2210	

S-0.1

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3.10 REINFORCING STEEL

DETAIL, FABRICATE, AND PLACE PER ACI-315 AND ACI-318. SUPPORT REINFORCEMENT WITH APPROVED CHAIRS, SPACERS, OR TIES.

3.10.1 DEFORMED BAR REINFORCEMENT: ASTM A615 GR 60

3.10.2 WELDABLE DEFORMED BAR REINFORCEMENT: ASTM A706 GR 60

3.10.4 WELDED WIRE FABRIC: ASTM A-185 & ASTM A-82 F_y=65 KSI

3.10.5 DEFORMED BAR ANCHORS: ASTM A-496

3.10.7 EXCEPT AS NOTED SPECIFICALLY ON THE DRAWINGS, ALL REINFORCEMENT SHALL BE LAP-SPLICED AS FOLLOWS:

#6 AND SMALLER	48 X BAR DIAMETER
#7 AND LARGER	56 X BAR DIAMETER

COMMENT: THESE VALUES ARE BASED ON CLASS A SPLICES FOR UNCOATED DEFORMED BARS IN NORMAL WEIGHT CONCRETE WITH f'_c = 3,000 PSI

NO MORE THAN 50% HORIZONTAL OR VERTICAL BARS SHALL BE SPLICED AT ONE LOCATION

3.10.8 EXCEPT AS NOTED SPECIFICALLY ON THE DRAWINGS, PROVIDE CORNER BARS TO MATCH DIAMETER AND LAP HORIZONTAL REINFORCEMENT AS FOLLOWS:

#6 AND SMALLER	48 X BAR DIAMETER
#7 AND LARGER	56 X BAR DIAMETER

THESE CORNER BARS SHALL BE PLACED AT ALL CORNERS AND INTERSECTIONS IN FOOTINGS AND WALLS.

3.10.9 LAP WELDED WIRE FABRIC 12" OR ONE SPACING PLUS 2", WHICHEVER IS MORE.

3.11 CONCRETE COVER ON REINFORCING (UNLESS SHOWN OTHERWISE)

3.11.1	BOTTOM OF FOOTINGS	3"
3.11.2	SLAB ON GRADE	2"
3.11.3	WALLS, WEATHER FACE	1-1/2"

3.12 CONSTRUCTION AND CONTROL JOINTS

3.12.3 UNLESS NOTED OTHERWISE, LOCATION OF THE CONSTRUCTION OR CONTROL JOINTS IN SLAB ON GRADE SHALL BE ON COLUMN GRIDS OR UNDER PERMANENT PARTITIONS AND SHALL NOT EXCEED 20'-0" C/C EACH WAY.

3.13 CONDUIT AND PIPING EMBEDDED IN CONCRETE

3.13.1 ELECTRICAL CONDUIT SHALL NOT BE PLACED WITHIN A SLAB ON GRADE, BUT PLACED BELOW THE SLAB IN THE SUB-BASE.

3.14 GROUT FOR BEARING PLATES:

THE NON-SHRINK GROUT SHALL BE MASTERFLOW 928 BY MASTER BUILDERS TECHNOLOGIES, OR EQUIVALENT, AND A PRE-PACKAGED NATURAL AGGREGATE GROUT, MIXED, PLACED, AND CURED AS RECOMMENDED BY THE MANUFACTURER.

5. METALS

5.1 WELDING

5.1.1 ALL WELDING SHALL BE IN ACCORDANCE WITH THE "STRUCTURAL WELDING CODE," ANSI/AWS D1.1.

5.1.2 ALL WELDING SHALL BE BY CERTIFIED WELDERS; USE 70 KSI LOW HYDROGEN FILLER METAL, AND SHALL BE PROTECTED PER AWS D1.1 UNTIL USE. FOR ALL FULL PENETRATION WELDS, FILLER METAL SHALL BE NOTCH TOUGH TO MEET CHARPY V-NOTCH OF 20 FOOT-POUND AT -20°F.

5.1.3 NO WELDING OF REINFORCING STEEL SHALL BE ALLOWED EXCEPT WHERE SHOWN. ALL WELDING OF REINFORCEMENT SHALL BE PER ANSI/AWS D1.4. THE FOLLOWING FILLER METAL SHALL BE USED WHEN WELDING REINFORCEMENT:

1. FOR WELDING OF ASTM A706 GR 60 REBAR, 80 KSI FILLER METAL

5.1.4 ALL FULL PENETRATION FIELD AND SHOP WELDS SHALL BE FULL TIME INSPECTED AND TESTED BY ULTRASONIC, NON-DESTRUCTIVE PROCEDURES. RESULTS OF TESTS SHALL BE SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER.

5.2 WELDING PROCEDURE SPECIFICATION (WPS)

FOR ALL WELDING OF REINFORCING STEEL, NON PREQUALIFIED WELDS AND ALL WELDING OF COMPONENTS WHICH ARE PART OF THE SEISMIC FORCE RESISTING SYSTEM, CONTRACTOR SHALL SUBMIT A WELDING PROCEDURE SPECIFICATION (WPS) TO ENGINEER FOR APPROVAL. PRIOR TO WELDING, EACH WPS SHALL INCLUDE ALL NECESSARY INFORMATION REQUIRED BY AWS D1.1 AND AWS D1.4 AND AS FOLLOWS:

1. APPLICABLE BASE METAL TYPES AND THICKNESSES
2. SKETCH OF JOINT INDICATING APPLICABLE DIMENSIONS. INDIVIDUAL PASSES SHALL BE IDENTIFIED AND NUMBERED TO IDENTIFY THE SEQUENCE. THE SKETCH SHALL IDENTIFY THE MAXIMUM THICKNESS AND BEAD WIDTH. IN NO CASE SHALL THE LAYER THICKNESS EXCEED 1/4" NOR THE BEAD WIDTH EXCEED 5/8"
3. PREHEAT REQUIREMENTS.
4. ELECTRICAL CHARACTERISTICS (I.E., CURRENT, VOLTAGE, TRAVEL SPEED, ETC.)

ELECTRODE REQUIREMENTS SHALL MEET THE REQUIREMENTS OF AWS A5.1, AWS A5.5, AWS A5.17, AWS A5.23, AWS A5.18, AWS A5.20, AWS A5.28, AND AWS A5.29, AS APPLICABLE FOR WELDING METHOD USED.

5.3 STRUCTURAL STEEL

5.3.1 ALL DETAILING, FABRICATION, AND ERECTION SHALL CONFORM TO THE AISC, "MANUAL OF STEEL CONSTRUCTION," LATEST EDITION EXCEPT AS AMENDED BY SECTION 1.1 OF THESE STRUCTURAL NOTES.

5.3.2 ANGLES AND PLATES SHALL BE ASTM A36 Fy=36 KSI.

5.3.4 RECTANGULAR AND ROUND HOLLOW STEEL SECTIONS (HSS) SHALL BE ASTM A500, GRADE B, Fy=46 KSI (Fy=42 KSI FOR ROUND SECTIONS)

5.3.5 ANCHOR RODS:

5.3.5.1 ANCHOR RODS SHALL BE ASTM F 1554, Fy=36 KSI WITH HOOKED END..

5.3.6 MACHINE BOLTS.

5.3.6.1 MACHINE BOLTS SHALL BE AS SPECIFIED.

5.3.9 EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT TZ (ICC ESR-1917) CARBON STEEL ANCHORS, SIMPSON STRONG-BOLT (ICC ESR-1771) WEDGE ANCHORS, ITW-RED HEAD TRUEBOLT + (ICC ESR-2427) WEDGE ANCHORS, OR APPROVED EQUIVALENT WITH A CURRENT ICC REPORT THAT COMPLIES WITH THE 2006 IBC.

5.3.10 POST INSTALLED ADHESIVE (EPOXY) ANCHOR RODS & REBAR DOWELS SHALL USE AN INJECTABLE TWO-COMPONENT EPOXY ADHESIVE WITH A CURRENT ICC REPORT THAT COMPLIES WITH THE 2012 IBC. FOR SOLID BASE MATERIAL USE SIMPSON SET (ICC ESR-1772) OR HILTI HY200 EPOXY (ICC ESR 3187). THREADED ROD SHALL BE A36 UNLESS NOTED OTHERWISE.

5.3.12 METAL PROTECTION: ALL STEEL EXPOSED TO WEATHER, MOISTURE, SOIL, OR AS NOTED SHALL BE GALVANIZED PER ASTM A-123 OR A153 AS APPLICABLE. ALL OTHER STEEL SURFACES SHALL BE SHOP PRIMED AFTER FABRICATION. LINTEL ANGLES SHALL HAVE A MINIMUM OF 1.5 OZ OF ZINC SPELTER PER SQUARE FOOT OF SURFACE AREA.

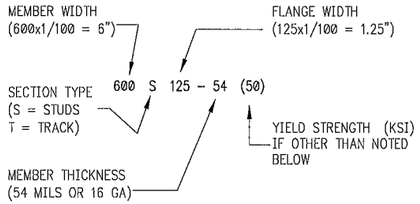
REPAIR ALL DAMAGED AREAS OF GALVANIZED PARTS SUCH AS FIELD WELDS, ETC. APPLY COATING THICKNESS GREATER THAN OR EQUAL TO ORIGINAL ZINC COATING THICKNESS.

5.3.13 WELDED MARK NUMBERS ON STRUCTURAL STEEL MEMBERS EXPOSED TO VIEW ARE UNACCEPTABLE, AND SHALL NOT BE PERMITTED. ANY WELDED MARKS SHALL BE REMOVED AT THE CONTRACTOR'S EXPENSE. SEE ARCH SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

5.4 STEEL STUDS

5.4.1 ALL STUD FRAMING MEMBERS SHALL BE OF THE TYPE, SIZE AND GAGE AS SHOWN AND SHALL BE MANUFACTURED BY A CURRENT MEMBER OF THE STEEL STUD MANUFACTURERS ASSOCIATION.

5.4.2 ALL STRUCTURAL STEEL STUDS AND JOISTS HAVE BEEN SPECIFIED PER THE GUIDELINES GIVEN IN THE STEEL STUD MANUFACTURER'S ASSOCIATION ICC ER-4943P. THE IDENTIFICATION CODE IDENTIFIES THE MEMBER DEPTH (IN MILS), STYLE, FLANGE WIDTH (IN MILS), AND MATERIAL THICKNESS (IN MILS). THE ICC REPORT IS AVAILABLE AT WWW.SSMA.COM.



5.4.3 ALL STUDS, 12, 13, 14 AND 16 GAGE, SHALL BE FORMED FROM STEEL THAT CORRESPONDS TO THE MINIMUM REQUIREMENTS OF 2004 AISI (AMERICAN IRON AND STEEL INSTITUTE) STANDARDS WITH A MINIMUM YIELD STRENGTH OF 50 KSI.

5.4.4 ALL 18 AND 20 GAGE STUDS, AND ALL TRACK, BRIDGING, END CLOSURES AND ACCESSORIES SHALL BE FORMED FROM STEEL THAT CORRESPONDS TO THE MINIMUM REQUIREMENTS OF 2004 AISI (AMERICAN IRON AND STEEL INSTITUTE) STANDARDS WITH A MINIMUM YIELD STRENGTH OF 33 KSI.

5.4.5 ALL STUDS, AND ACCESSORIES SHALL BE FORMED FROM STEEL HAVING A G-60 GALVANIZED COATING IN ACCORDANCE WITH ASTM A-525,

5.4.6 ALL FRAMING COMPONENTS SHALL BE CUT FOR A TIGHT FIT AGAINST ABUTTING MEMBERS, UNLESS SHOWN OTHERWISE. MEMBERS SHALL BE HELD POSITIVELY IN PLACE UNTIL PROPERLY FASTENED.

5.4.8 NON-AXIALLY LOADED WALL STUDS SUCH AS INTERIOR PARTITION WALLS AND EXTERIOR INFILL WALLS SHALL HAVE VERTICAL DEFORMATION CAPABILITY BETWEEN WALL AND ROOF/FLOOR STRUCTURE UNLESS SHOWN OTHERWISE.

5.7 PRE-ENGINEERED BUILDINGS

5.7.1 THE METAL BUILDING MANUFACTURER SHALL BE CURRENTLY APPROVED BY ICC (INTERNATIONAL CODE COUNCIL).

5.7.2 STEEL FRAME MANUFACTURER SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT FOR THE STRUCTURAL DESIGN AND FABRICATION OF THE COMPLETE PRE-ENGINEERED BUILDING PACKAGE INCLUDING PRIMARY FRAMING SYSTEMS, LATERAL LOAD RESISTING SYSTEMS, BRACING, SECONDARY FRAMING, ROOFING, SIDING, FLASHING AND GUTTERS.

5.7.2.1 THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLOSE COORDINATION DURING BIDDING AND CONSTRUCTION AS THE BUILDING MANUFACTURER'S "STANDARD BUILDING PACKAGE" MAY NOT INCLUDE SOME STRUCTURAL STEEL MEMBERS REQUIRED BY THE DRAWINGS.

5.7.3 BAY SPACINGS, PLAN DIMENSIONS, COLUMN LOCATIONS, EAVE HEIGHTS AND ROOF SLOPE SHALL BE AS SHOWN.

5.7.4 DESIGN LOADS:

5.7.4.1 BUILDING MANUFACTURER SHALL DESIGN ROOF FRAMING TO SUPPORT A MINIMUM 5 PSF COLLATERAL DEAD LOAD AT ROOF UNLESS NOTED OTHERWISE.

5.7.4.2 SEE SECTION 1.3 FOR ADDITIONAL LOADING REQUIREMENTS.

NOTE: IT IS BUILDING MANUFACTURER'S RESPONSIBILITY TO VERIFY LOADING REQUIREMENTS SPECIFIED MEET MINIMUM COUNTY REQUIREMENTS FOR THE PROJECT LOCATION.

5.7.5 DOCUMENTS

5.7.5.1 THE MANUFACTURER SHALL FURNISH COMPLETE DESIGN DRAWINGS (CAN BE SHOP AND ERECTION DRAWINGS), SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT.

5.7.5.2 THE MANUFACTURER SHALL (PRIOR TO THE CONCRETE FOUNDATION WORK) FURNISH ALL ANCHOR BOLT SIZES AND PLACEMENT PLANS FOR APPROVAL.

5.7.5.3 THE MANUFACTURER SHALL FURNISH DESIGN CALCULATIONS SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF THE PROJECT

5.7.5.4 IT SHALL BE THE RESPONSIBILITY OF THE BUILDING MANUFACTURER TO PROVIDE ALL ADDITIONAL CLIPS, ANCHORS, FRAMING MEMBERS ETC. AS REQUIRED TO INTEGRATE HIS STANDARD BUILDING COMPONENTS WITH WORK BY OTHERS. SEE ALSO SHOP DRAWINGS REQUIREMENTS.

5.7.6 PRE-ENGINEERED BUILDING MATERIALS

5.7.6.1 ALL STRUCTURAL STEEL SECTIONS AND WELDED PLATE MEMBERS SHALL BE DESIGNED AND FABRICATED IN ACCORDANCE WITH AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS," LATEST EDITIONS.

5.7.6.2 ALL COLD-FORMED STRUCTURAL MEMBERS AND EXTERIOR COVERINGS SHALL BE DESIGNED AND FABRICATED IN ACCORDANCE WITH THE LATEST EDITION OF THE AISI, "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS."

5.7.6.3 STEEL RIGID FRAMES AND OTHER BUILT-UP PRIMARY FRAMING SHALL BE FABRICATED FROM HOT ROLLED STEEL PLATE PER ASTM A-572 (MINIMUM YIELD STRENGTH 50,000 PSI).

5.7.6.4 LIGHT GAUGE Z AND C PURLINS, GIRTS AND SECONDARY FRAMING SHALL BE COLD FORMED UTILIZING HOT ROLLED STEEL COIL MEETING ASTM A-570 (MINIMUM YIELD STRENGTH 55,000 PSI).

5.7.6.5 STEEL ROOF AND WALL SHEETING (SEE SPECIFICATIONS) SHALL BE COLD FORMED FROM HIGH STRENGTH (50 KSI) STEEL SHEETING TO MEET THE CHEMICAL REQUIREMENTS OF ASTM A-446 GRADE D AND GALVANIZED WITH 1.25 OZ COMMERCIAL GRADE COATING MEETING THE BEND, COATING AND TOLERANCE REQUIREMENTS OF ASTM A-525.

5.7.6.6 FOUNDATION ANCHOR BOLTS AND TENSION RODS USED FOR WALL AND ROOF BRACING SHALL BE FABRICATED FROM A36 MATERIAL AS A MINIMUM EXCEPT AS NOTED. MACHINE BOLTS SHALL BE ASTM A 307. HIGH STRENGTH BOLTS SHALL BE ASTM A 325.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
GENERAL NOTES
CONTINUED

STEPHEN D. FAIRCHILD
STATE OF WASHINGTON
31204
REGISTERED
PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	1/ /19 DATE	STAMPED
	DRAWING NO. AP2211 S-0.2	

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STATEMENT OF SPECIAL INSPECTION			
IBC	SI	SO	TITLE
1705.2	✓	✓	STEEL CONSTRUCTION (AISC 360, AISC 341, TABLE 1705.2.2 AND AWS D1.3, D1.4, ACI 318)
1705.3 1705.12.1	✓	✓	CONCRETE CONSTRUCTION (ACI 318, TABLE 1705.3)
1705.4	✓	✓	MASONRY CONSTRUCTION
1705.5	✓	✓	WOOD CONSTRUCTION
1705.6	✓	✓	SOILS (TABLE 1705.6)
1705.7 1705.8	✓	✓	PILE FOUNDATIONS (TABLE 1705.7, 1705.8)
1705.13	✓	N/R	SPRAYED FIRE-RESISTANT MATERIALS
1705.14	✓	N/R	MASTIC AND INTUMESENT FIRE-RESISTANT COATINGS
1705.15	✓	N/R	EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)
1705.17	✓	N/R	SMOKE CONTROL
1705.11.1 1705.12.2	✓	✓	STRUCTURAL STEEL (LATERAL FORCE RESISTING SYSTEM)
1705.11.2	✓	✓	STRUCTURAL WOOD (SEISMIC FORCE RESISTING SYSTEM)
1705.10.2	✓	✓	COLD-FORMED STEEL (LATERAL FORCE RESISTING SYSTEM)
1707.5	✓	✓	PIER FOUNDATIONS (SEISMIC FORCE RESISTING SYSTEM)
1705.11.5.1 1705.11.7	✓	✓	STORAGE RACKS AND ACCESS FLOORS
1705.11.5	✓	N/R	ARCHITECTURAL COMPONENTS
1705.11.6	✓	N/R	MECHANICAL AND ELECTRICAL COMPONENTS
1705.11.8	✓	✓	SEISMIC ISOLATION SYSTEM
1705.10.1	✓	✓	STRUCTURAL WOOD (MAIN WINDFORCE-RESISTING SYSTEM)

1) SI = SPECIAL INSPECTION REQUIRED.
2) SO = STRUCTURAL OBSERVATION REQUIRED.
3) SPECIAL INSPECTIONS INDICATED ARE FOR STRUCTURAL ELEMENTS ONLY. SEE ARCH AND ADD'L SPECIAL INSPECTIONS.
4) ✓ INDICATES REQUIRED ELEMENTS.
5) N/R = NOT REQUIRED.

1.1 INSPECTION/TESTING REQUIREMENTS

SEE DRAWINGS, SPEC'S, AND IBC SECTIONS 110. AND CHAPTER 17

1.2 INSPECTIONS BY THE BUILDING OFFICIAL (IBC SECTION 110)

1.2.1 FOUNDATION INSPECTION SHALL BE MADE AFTER EXCAVATIONS ARE COMPLETE AND ANY REQUIRED REINFORCING IS IN PLACE. ANY REQ'D FORMS SHALL BE IN PLACE PRIOR TO INSPECTION.

1.2.2 CONCRETE SLAB INSPECTION SHALL BE MADE AFTER ALL UNDER SLAB ACCESSORIES AND REINFORCEMENT ARE PLACED AND PRIOR TO CONCRETE SLAB PLACEMENT OR FLOOR SHEATHING INSTALLATION.

1.2.3 FRAME INSPECTIONS SHALL BE MADE AFTER ALL FRAMING IS COMPLETE AND ALL PIPES, DUCTS, ELECTRICAL, PLUMBING, ETC.. ARE INSTALLED AND APPROVED PRIOR TO COVER.

1.2.4 IN ADDITION TO THE INSPECTION SPECIFIED ABOVE, THE BUILDING OFFICIAL IS AUTHORIZED TO MAKE OR REQUIRE OTHER INSPECTION OF ANY CONSTRUCTION WORK TO ASCERTAIN COMPLIANCE WITH THE PROVISIONS OF THE IBC.

1.3 STRUCTURAL TESTS AND SPECIAL INSPECTIONS (IBC CHAPTER 17)

1.3.1 SEE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

1.3.2 STRUCTURAL TESTS AND SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE IBC AS WELL AS ANY ADDITIONAL REQUIREMENTS OF THE BUILDING OFFICIAL. OMISSION FROM THE LIST BELOW OF TESTING AND INSPECTION REQUIREMENTS SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING TESTING AND INSPECTION REQUIRED BY THE SPECIFICATIONS, THE IBC AND THE BUILDING OFFICIAL.

1.3.3 TESTING AND SPECIAL INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE IBC FOR THE ITEMS LISTED IN THIS SECTION.

1.4 STRUCTURAL OBSERVATION

1.4.1 STRUCTURAL OBSERVATION SHALL BE PERFORMED DURING CONSTRUCTION IN A MANNER AS REQUIRED TO BECOME GENERALLY FAMILIAR WITH THE IN PLACE CONSTRUCTION.

1.4.2 STRUCTURAL OBSERVATION EXTENT SHALL BE AS INDICATED ABOVE. TIMING AND DURATION OF OBSERVATIONS SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR DURING CONSTRUCTION.

1.4.3 CONSTRUCTION OBSERVATION REPORTS AND FINDINGS SHALL NOT BE VIEWED AS A WARRANTY OR GUARANTEE BY THE STRUCTURAL ENGINEER.

1.5 SPECIAL INSPECTOR: SHALL BE CURRENTLY WABO CERTIFIED AND UNDER THE SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER.

1.5.1 THE SPECIAL INSPECTOR SHALL OBSERVE THE WORK ASSIGNED FOR CONFORMANCE WITH THE APPROVED DESIGN DRAWINGS AND SPECIFICATIONS.

1.5.2 THE SPECIAL INSPECTOR SHALL FURNISH REPORTS TO THE BUILDING OFFICIAL, THE ENGINEER OF RECORD, THE ARCHITECT OF RECORD, AND OTHER DESIGNATED PERSONS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE GENERAL CONTRACTOR FOR CORRECTION. THEN, IF NOT IN CONFORMANCE, TO THE PROPER DESIGN AUTHORITY AND TO THE BUILDING OFFICIAL.

1.5.3 THE SPECIAL INSPECTOR SHALL SUBMITT A SEALED FINAL REPORT BY A REGISTERED PROFESSIONAL ENGINEER STATING WHETHER THE WORK REQUIRING SPECIAL INSPECTION WAS IN CONFOMANCE WITH THE APPROVED PLANS AND SPECIFICATIONS AND THE APPLICABLE WORKMANSHIP PROVISION OF THE IBC.

1.6 STEEL CONSTRUCTION:

REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL IBC TABLE:1705.2.2				
VERIFICATION AND INSPECTION	CONTINUOUS		PERIODIC	REFERENCED STANDARD[a]
1. MATERIAL VERIFICATION OF COLD-FORMED STEEL DECK:				
a. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	–		X	APPLICABLE ASTM MATERIAL STANDARDS
b. MANUFACTURER'S CERTIFIED TEST REPORTS.	–		X	
2. INSPECTION OF WELDING:				
a. COLD-FORMED STEEL DECK:				
1) FLOOR AND ROOF DECK WELDS.	–		X	AWS D1.3
b. REINFORCING STEEL:				
1) VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706	–		X	AWS D1.4 ACI 318: SECTION 3.5.2
2) REINFORCIING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMENT.		X	–	
3) SHEAR REINFORCEMENT.		X	–	
4) OTHER REINFORCING STEEL.		–	X	

FOR SI: 1 INCH = 25.4 mm

a. WHERE APPLICABLE, SEE ALSO SECTION 1705.11, SPECIAL INSPECTION FOR SEISMIC RESISTANCE.
b. SEE BELOW FOR EXTENT OF SPECIAL INSPECTION REQ'D
c. X = REQUIRED ELEMENTS
d. – = NOT REQUIRED

1.6.1 STEEL CONSTRUCTION: SPECIAL INSPECTION AND TESTING PER AISC 341, AISC 360 AND AWS D1.1, IBC TABLE: 1705.2.2

1. HIGH STRENGTH BOLTING: VERIFY THAT THE PROPER NUMBER AND TYPE OF BOLTS ARE INSTALLED WITH THE PROPER TORQUE. TORQUE TESTING NOT REQUIRED FOR BOLTS SPECIFIED AS BEARING TYPE (N) CONNECTIONS.

2. STRUCTURAL WELDING:

A. VERIFY THAT WELD FILLER MATERIAL AND MANUFACTURERS CERTIFICATE OF COMPLIANCE CONFORM TO AWS SPECIFICATION SPECIFIED. VERIFY WELDERS ARE CERTIFIED BY WABO, THAT PROPER ELECTRODES IN OVEN DRY CONDITIONS ARE USED, AND THAT PROPER METHODS AND PREPARATIONS ARE USED.

B. PERIODIC SPECIAL INSPECTION OF WELDING SHALL BE PERFORMED FOR SINGLE PASS FILLET WELDS LESS THAN OR EQUAL TO 5/16"

C. CONTINUOUS SPECIAL INSPECTION OF WELDING SHALL BE PERFORMED ON COMPLETE AND PARTIAL PENETRATION GROOVE WELDS AND FILLET WELDS > 5/16"

D. INSPECTION AND TESTING OF ALL WELDS SHALL BE AS FOLLOWS:

a. ALL WELDS SHALL BE CHECKED VISUALLY.

b. ALL SHOP AND FIELD WELDING SHALL BE SUBJECT TO INSPECTION BY A WABO CERTIFIED WELDING INSPECTOR EMPLOYED BY THE OWNER. THE INSPECTOR SHALL UTILIZE RADIOGRAPHIC, ULTRASONIC, OR MAGNETIC PARTICLE TESTING AND ANY OTHER AID TO VISUAL INSPECTION THAT MAY BE DEEMED NECESSARY TO ASSURE THE ADEQUACY OF WELDING. THE OWNER SHALL CARRY OUT TESTING AND INTERPRETATION AT ANY STAGE AFTER WELDIING.

c. 10% OF ALL FILLET WELDS SHALL BE CHECKED BY MAGNETIC PARTICAL TESTING.

d. 100% OF ALL COMPLETE PENETRATION WELDS SHALL BE CHECKED BY RADIOGRAPHIC OR ULTRASONIC TESTING.

e. ALL WELDS FOUND DEFECTIVE AND REPAIRED SHALL BE REINSPECTED BY THE SAME METHOD ORIGINALLY USED. THE COST OF REPAIR AND REINSPECTION SHALL BE BORNE BY THE CONTRACTOR.

f. STANDARDS FOR ACCEPTANCE SHALL BE AS GIVEN IN AWS D1.1.

3. WELDING OF REINFORCING STEEL: PER IBC, AISC 360, ACI 318, AWS D1.4 AND THE FOLLOWING:

A. VERIFY WELDABILITY OF REINFORCING STEEL FOR OTHER THAN ASTM A706.

B. PROVIDE WELDING PROCEDURE SPECIFICATION (WPS) PER SECTION 5.2 AND QUALIFYING TEST OF (WPS) AS REQUIRED BY AWS D1.4

C. CONTINUOUS SPECIAL INSPECTION SHALL BE PERFORMED PER AISC 360.

D. WELDS SHALL BE CHECKED BY RADIOGRAPHIC OR ULTRSONIC TESTING AS REQUIRED BY AWS D1.1

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LAGRANDE SHOP BUILDING
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1.7 SPECIAL INSPECTION FOR CONCRETE CONSTRUCTION:

REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION: IBC: TABLE 1705.3				
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD[a]	IBC REFRENCE
1. INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS AND PLACEMENT	–	X	ACI 318: 3.5, 7.1 – 7.7	1910.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1705.2.2, ITEM 2b	–	–	AWS D1.4 ACI 318: 3.5.2	–
3. INSPECTION OF ANCHORS CAST IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED.	–	X	ACI 318: 8.1.3, 21.2.8	1908.5, 1909.1
4. INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS[b]	–	X	ACI 318: 3.8.6, 8.1.3, 21.2.8	1909.1
5. VERIFYING USE OF REQUIRED DESIGN MIX	–	X	ACI 318: CH4, 5.2–5.4	1904.2, 1910.2, 1910.3
6. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	–	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1910.10
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	X	–	ACI 318: 5.9, 5.10	1910.6, 1910.7, 1910.8
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	–	X	ACI 318: 5.11, – 5.13	1910.9
9. INSPECTION OF PRESTRESSED CONCRETE:				
a. APPLICATION OF PRESTRESSING FORCES.	X	–	ACI 318: 18.20 ACI 318: 18.18.4	–
b. GROUTING OF BONDED PRESTRESSING TENDONS IN THE SEISMIC FORCE-RESISTING SYSTEM.	X	–		
10. ERECTION OF PRECAST MEMBERS	–	X	ACI 318: CH. 16	–
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	–	X	ACI 318: 6.2	–
12. INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED	–	X	ACI 318: 6.1.1	–

FOR SI: 1 INCH = 25.4 mm

a. WHERE APPLICABLE, SEE ALSO SECTION 1705.11, SPECIAL INSPECTION FOR SEISMIC RESISTANCE.
b. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH ACI 355.2 OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF THE WORK.
c. SEE BELOW FOR EXTENT OF SPECIAL INSPECTION REQUIRED
d. X = REQUIRED ELEMENTS
e. – = NOT REQUIRED

1.7.1 CONCRETE:
SPECIAL INSPECTION AND TESTING PER IBC TABLE 1705.3 INCLUDING:

1. CONTINUOUS SPECIAL INSPECTION OF BOLTS INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE.

1.10 SPECIAL INSPECTION FOR SOILS:
SPECIAL INSPECTIONS FOR EXISTING SITE SOIL CONDITIONS, FILL PLACEMENT AND LOAD BEARING REQUIREMENTS SHALL BE AS REQUIRED BY TABLE 1705.6

REQUIRED VERIFICATION AND INSPECTION OF SOILS: TABLE 1705.6		
VERIFICATION AND INSPECTION TASKS	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED
1. VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY	–	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL	–	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS	–	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES, AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL	X	–
5. PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	–	X

a. X = REQUIRED ELEMENT
b. – = NOT REQUIRED

1.13 ADDITIONAL REQUIRED SPECIAL INSPECTION FOR SEISMIC RESISTANCE PER IBC SECTION 1707:

1.13.1 STEEL CONSTRUCTION:

A. CONTINUOUS SPECIAL INSPECTION OF STRUCTURAL WELDING OF ELEMENTS OF THE SEISMIC FORCE RESISTING SYSTEM EXCEPT FOR SINGLE PASS FILLET WELDS NOT EXCEEDING 5/16" IN SIZE

1.14 EPOXY ANCHORS:
SPECIAL INSPECTION SHALL BE REQUIRED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

KEY TO ABBREVIATIONS

(E)	EXISTING	INSUL	INSULATION
(N)	NEW	INT	INTERIOR
□	SQUARE	JNT	JOINT
ø	DIAMETER	JST	JOIST
℄	CENTERLINE	K, KIPS	KIPS = 1000 LBS
℄	PLATE	KSI	KIPS PER SQUARE INCH
AB	ANCHOR BOLT	L	ANGLE
ABV	ABOVE	LAM	LAMINATE
ADDL	ADDITIONAL	LBS, #	POUNDS
ADJ	ADJACENT	LL	LIVE LOAD
AFF	ABOVE FINISH FLOOR	LLH	LONG LEG HORIZONTAL
ALT	ALTERNATE	LLV	LONG LEG VERTICAL
ARCH	ARCHITECTURAL, ARCHITECT	LOC	LOCATE, LOCATION
ASD	ALLOWABLE STRESS DESIGN	LONGIT, LONG	LONGITUDINAL
BEL	BELOW	LS	LAG SCREW
BET, BTWN	BETWEEN	MATL	MATERIAL
BLDG	BUILDING	MAX	MAXIMUM
BLKG	BLOCKING	MB	MACHINE BOLT
BM	BEAM	MECH	MECHANICAL
BNDY	BOUNDARY	MFR	MANUFACTURER
BOT	BOTTOM	MIN	MINIMUM
BRG	BEARING	MIW	MALLEABLE IRON WASHER
BS	BOTH SIDES	NS	NEAR SIDE
BU STUD	BUILT UP STUD	NTS	NOT TO SCALE
CHAM	CHAMFER	NWT	NORMAL WEIGHT
CIP	CAST-IN-PLACE	O/	OVER
CJ	CONSTRUCTION/ CONTROL JOINT	OC	ON CENTER
CLG	CEILING	OF	OUTSIDE FACE
CLR	CLEAR	OPNG	OPENING
CMU	CONCRETE MASONRY UNIT	OPP	OPPOSITE HAND
COL	COLUMN	OSB	ORIENTED STRAND BOARD
CONC	CONCRETE	PC	PRE-CAST
CONN	CONNECTION	PDF	POWDER DRIVEN FASTENERS
CONT	CONTINUOUS	PERP	PERPENDICULAR
CONTR	CONTRACTOR	PLF	POUNDS PER LINEAR FOOT
COORD	COORDINATE	PNL	PANEL
CSK	COUNTERSINK	PRE-ENG, PE	PRE-ENGINEERED
CTR	CENTER	PROV	PROVIDE
CVR	COVER	PSF	POUNDS PER SQUARE FOOT
DBL	DOUBLE	PSI	POUNDS PER SQUARE INCH
DIA	DIAMETER	PT	PRESSURE TREATED
DIAPH	DIAPHRAGM	PW	PLYWOOD
DIM	DIMENSION	QTY	QUANTITY
DL	DEAD LOAD	REF	REFERENCE
DWG	DRAWING	REINF	REINFORCEMENT, REINFORCING
EA	EACH	REQD	REQUIRED
EL, EQL	EARTHQUAKE LOAD, SEISMIC LOAD	REQTS	REQUIREMENTS
ELEV	ELEVATION	RF	ROOF
EMB	EMBEDMENT	SCHED	SCHEDULE
ENGR	ENGINEER	SHTG	SHEATHING
EOR	ENGINEER OF RECORD	SIM	SIMILAR
EQ	EQUAL, EQUIVALENT	SL	SNOW LOAD
EQUIV	EQUIVALENT	SOG	SLAB ON GRADE
ES	EACH SIDE	SPCG	SPACING
EW	EACH WAY	STD	STANDARD
EXIST, EX	EXISTING	STIFF	STIFFENER
EXP	EXPANSION	STL	STEEL
EXT	EXTERIOR	STRUCT	STRUCTURAL
FDN	FOUNDATION	SW	SHEARWALL
FF	FINISH FLOOR	T&G	TONGUE AND GROOVE
FFE	FINISH FLOOR ELEVATION	THK	THICK
FLR	FLOOR	THRD	THREADED
FOC	FACE OF CONCRETE	TO	TOP OF
FOM	FACE OF MASONRY	TOC	TOP OF CONCRETE
FOS	FACE OF STUD	TOF	TOP OF FOOTING
FRMG	FRAMING	TOPL	TOP OF PLATE
FS	FAR SIDE	TOS	TOP OF STEEL
FTG	FOOTING	TOW	TOP OF WALL
GA	GAGE	TRANS, TRANSV	TRANSVERSE
GALV	GALVANIZED	TRTD	TREATED
GC	GENERAL CONTRACTOR	TS	TUBE STEEL
GL	GLUE LAMINATED	TYP	TYPICAL
GLB	GLUE LAMINATED BEAM	UNO	UNLESS NOTED OTHERWISE
GWB	GYPSUM WALL BOARD	VERT	VERTICAL
HDR	HEADER	W/	WITH
HGR	HANGER	W/O	WITHOUT
HORIZ	HORIZONTAL	WF	WIDE FLANGE
HSS	HOLLOW STEEL SECTION	WHS	WELDED HEADED STUD
HT	HEIGHT	WL	WIND LOAD
IBC	INTERNATIONAL BUILDING CODE	WTS	WELDED THREADED STUD
IF	INSIDE FACE	WWF	WELDED WIRE FABRIC
INCL	INCLUDING		

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STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

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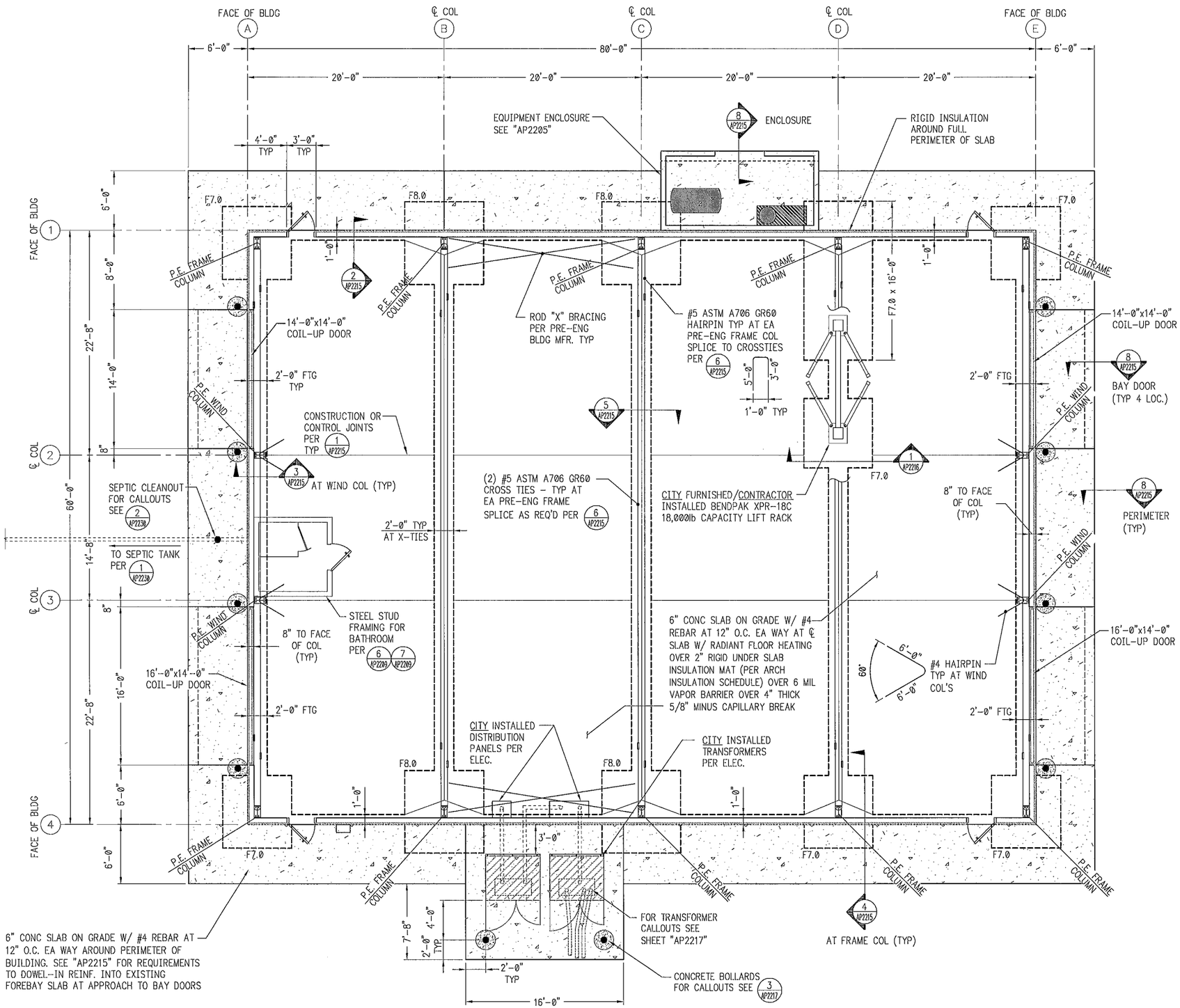

1 FOUNDATION PLAN
SCALE: 3/16"=1'-0"

FOUNDATION NOTES:

1. CITY TO INSPECT CONDITION OF NATIVE MATERIAL BELOW EXISTING FOREBAY SLAB AND MAKE DETERMINATION IF OVEREXCAVATION IS REQUIRED. CONTRACTOR SHALL BID PROJECT ASSUMING 2'-0" OF OVEREXCAVATION IS REQUIRED ONCE FOREBAY SLAB IS REMOVED. BID ASSUMPTION INCLUDES 95% COMPACTION OF REMAINING NATIVE MATERIAL AND COMPACTION OF NEWLY PLACED BANKRUN. (TYP. BLDG FOOTPRINT)
2. SEE SHEET "AP2210" THRU "AP2213" FOR STRUCTURAL NOTE AND QUALITY ASSURANCE.
3. SEE ARCHITECTURAL/MECHANICAL DRAWINGS FOR DRAINS, SLOPES, AND OTHER FLOOR DEPRESSIONS AND EMBEDS NOT SHOWN.
4. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS, ELEVATIONS, AND WALLS NOT SHOWN.
5. VERIFY ALL DOOR WIDTHS AND HEIGHTS WITH ARCHITECTURAL DRAWINGS.
6. COLUMNS NOT SPECIFICALLY LOCATED BY DIMENSIONS SHALL BE LOCATED ADJACENT TO OPENINGS AS DIMENSIONED BY THE ARCHITECT.
7. LATERAL LOAD RESISTING SYSTEM SHOWN IS SCHEMATIC. ALTERNATE LATERAL LOAD RESISTING SYSTEMS MAY BE USED, PROVIDED THEY ARE SUBMITTED TO AND APPROVED BY THE ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO THE START OF FOUNDATION CONSTRUCTION.
8. ANCHOR BOLT QUANTITIES, SIZES, AND LOCATIONS SHALL BE INSTALLED PER THE BUILDING MANUFACTURER ANCHOR BOLT SETTING PLAN. THE ANCHOR BOLT SETTIING PLAN SNALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER FOR APPROVAL PRIOR TO THE START OF FOUNDATION CONSTRUCTION.
9. ANCHOR BOLT GROUPS SHALL BE SET TRUE AND PLUMB BY TEMPLATE AS INDICATED ON THE BUILDING MANUFACTURER ANCHOR BOLT SETTING PLAN.
10. FOUNDATIONS SHALL NOT BE FORMED OR PLACED UNTIL PRE-ENGINEERED BUILDING SHOP DRAWINGS, CALCULATIONS AND FRAME REACTIONS HAVE BEEN REVIEWED AND APPROVED BY THE ARCHITECT AND STRUCTURAL ENGINEER. FOOTING SIZES INDICATED ON STRUCTURAL DRAWINIGS ARE PRELIMINARY, AND MUST BE VERIFIED FOR ACCURACY AGAINST THE FINAL BUILDIING REACTIONS.
11. FOUNDATIONS HAVE BEEN DESIGNED AS A PINNED CONNECTION AT THE BASE OF MOMENT FRAMES AND WIND COLUMNS. DESIGNS WHICH ATTEMPT TO USE A FIXED BASE CONNECTION SHALL NOT BE PERMITTED.
12. BUILDING MANUFACTURER TO DESIGN BUILDING TO SUPPORT ALL SUSPENDED EQUIPMENT (E.G. EXHAUST FANS, PIPING, LIGHTING, ETC...) SHOWN ON ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS. BUILDING MANUFACTURE TO COORDINATE WEIGHTS AND LOCATIONS AND DESIGN BUILDING ACCORDINGLY.

FOOTING SCHEDULE			
MARK	SIZE	REINFORCING	REMARKS
F7.0	7'-0"x7'-0"x1'-0"	(8) #6 EA WAY TOP AND BOTTOM	
F8.0	8'-0"x8'-0"x1'-6"	(9) #6 EA WAY TOP AND BOTTOM	
F7.0x16.0	7'-0"x16'-0"x1'-0"	#6 EA WAY TOP AND BOTTOM @ 12" O.C.	

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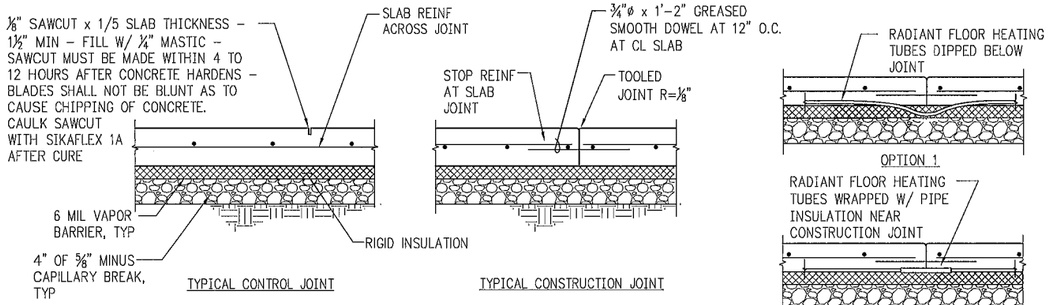
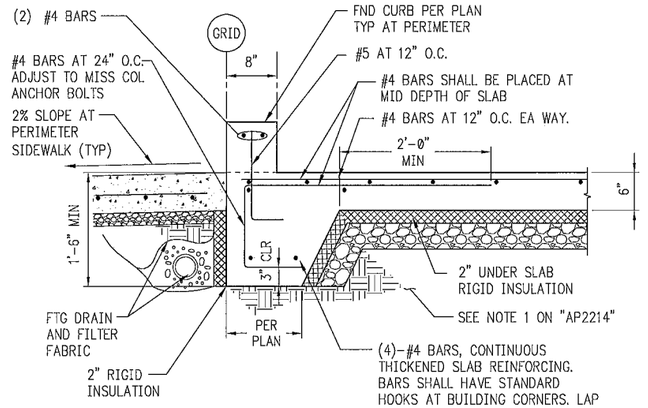


1 TYPICAL CONSTRUCTION/CONTROL JOINT

NO SCALE



2 TYP DETAIL

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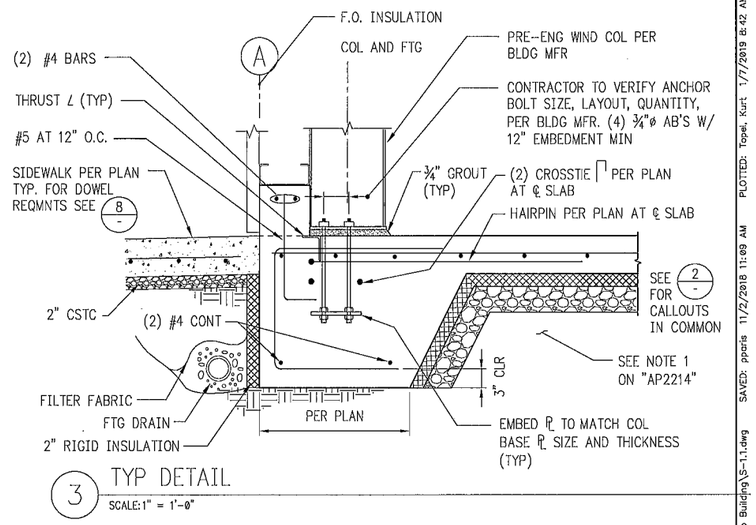

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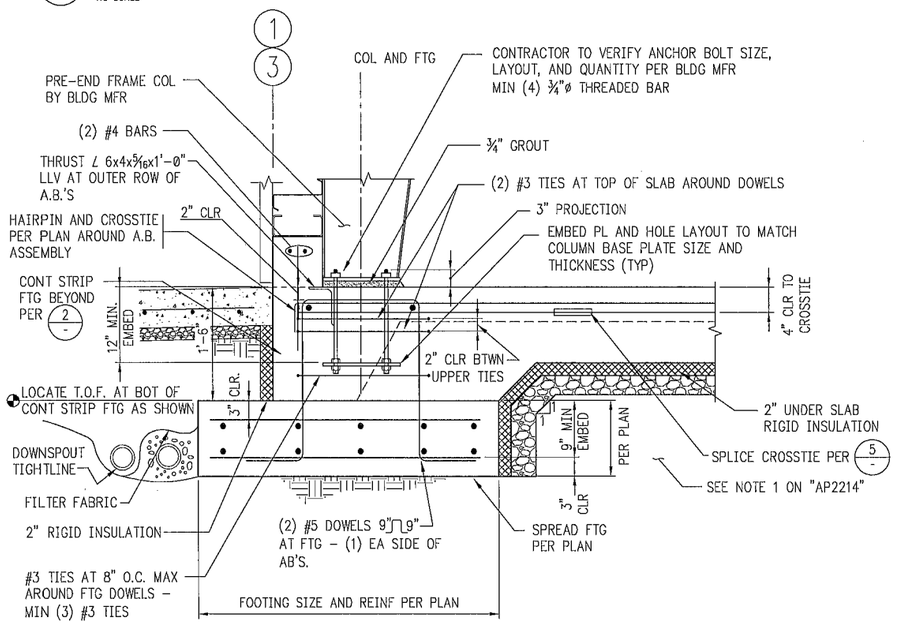

4 TYP DETAIL

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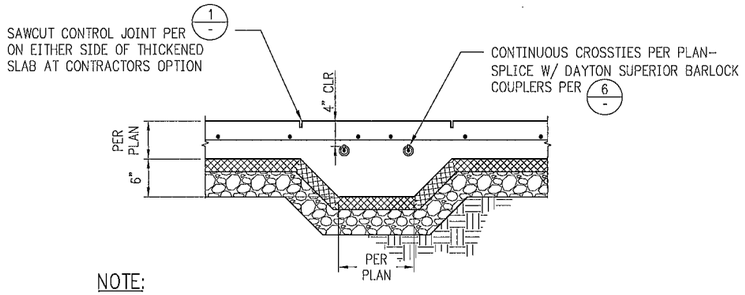
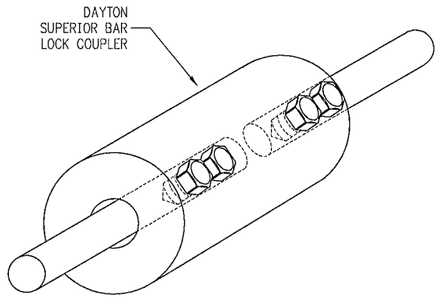


NOTE:

1. PROVIDE A615 MECHANICAL SPLICE CAPABLE OF DEVELOPING 125% OF THE SPECIFIED YIELD STRENGTH OF THE SPLICED BARS IN TENSION. (BARLOCK MBT COUPLER OR APPROVED EQUIVALENT)
2. RADIANT FLOOR HEATING NOT SHOWN FOR CLARITY

5 TYP DETAIL

SCALE:1" = 1'-0"



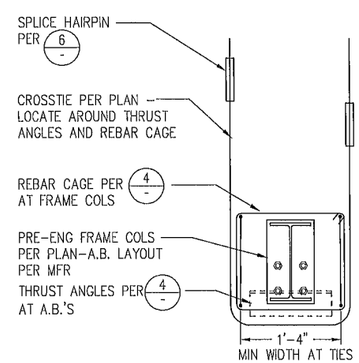
TYPICAL SPLICE AT CROSSTIES

6 TYP DETAIL

SCALE: N.T.S.

NOTE:

1. UNDER SLAB INSULATION AND RADIANT FLOOR HEATING NOT SHOWN FOR CLARITY. CONTRACTOR TO TAKE CARE NOT TO DAMAGE TUBING IF SLAB IS SAW CUT FOR CONTROL JOINTS.
2. SEE NOTE 1 ON "AP2214" FOR SUB-GRADE PREP NOT SHOWN IN DETAILS



7 TYP DETAIL

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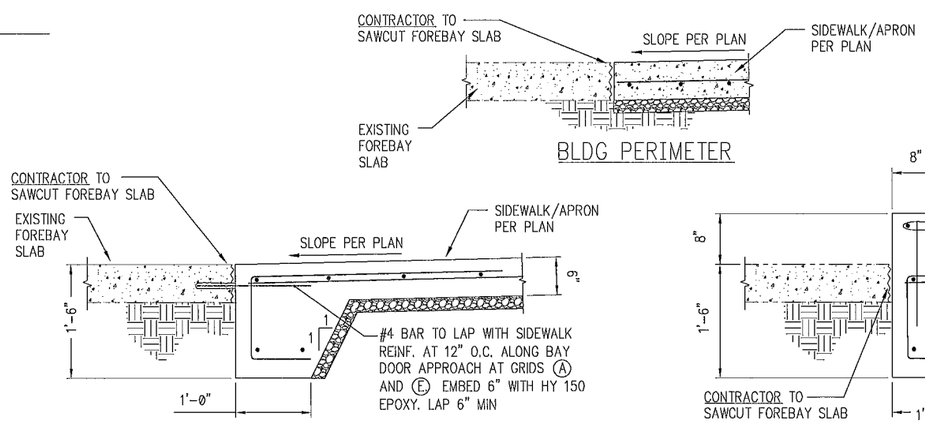

8 SIDEWALK/APRON DETAILS

SCALE:1" = 1'-0"

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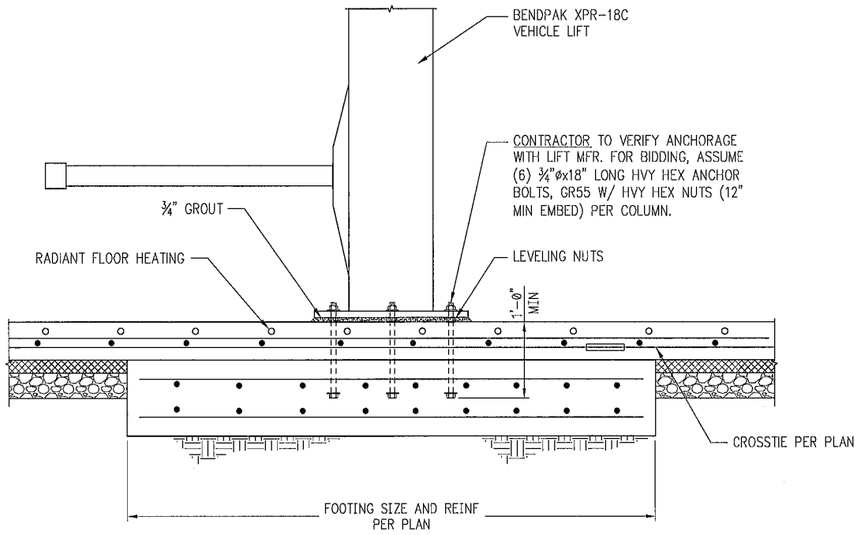
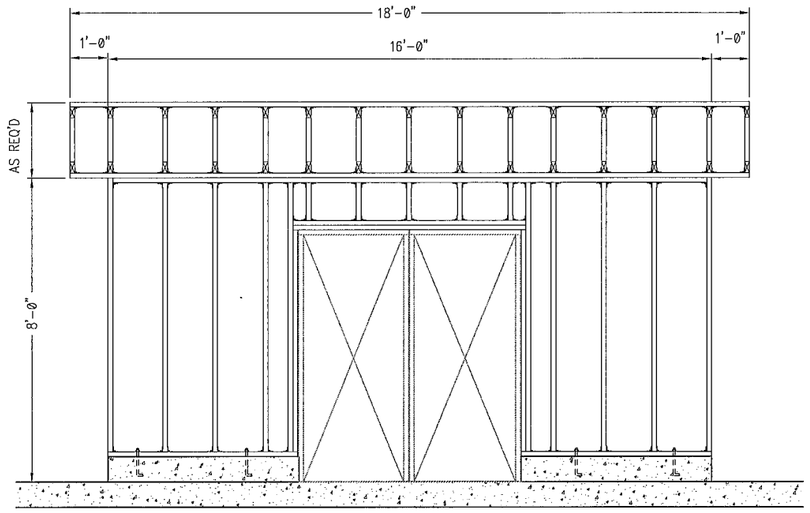
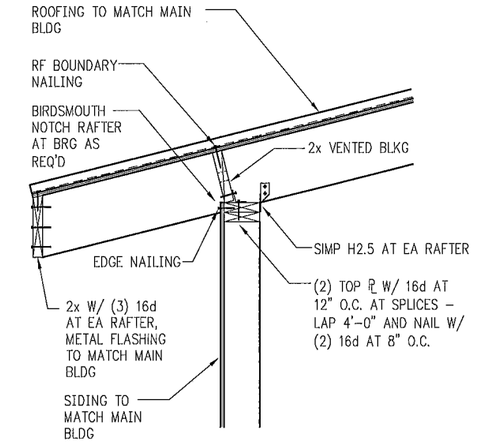


1 DETAIL
SCALE: 1" = 1'-0"

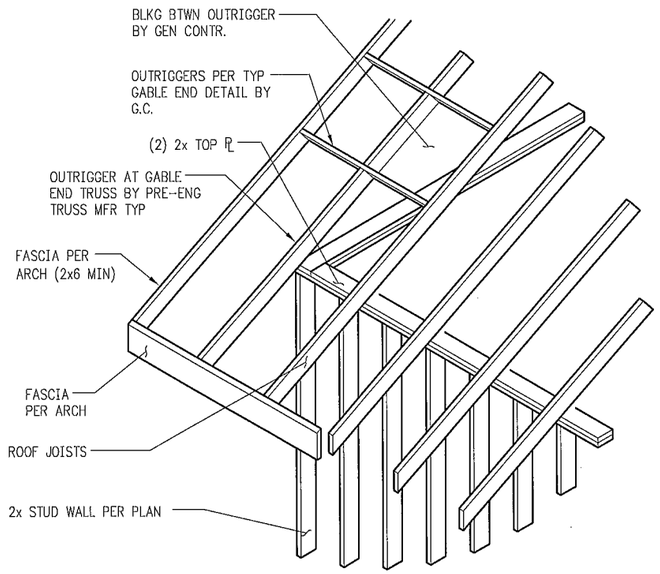


2 DETAIL
SCALE: ½" = 1'-0"



NOTE:
BLDG INSULATION NOT SHOWN FOR CLARITY (SEE ARCH DWGS)

3 DETAIL
SCALE: 1" = 1'-0"



4 DETAIL
SCALE: ½" = 1'-0"

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NISQUALLY PROJECT
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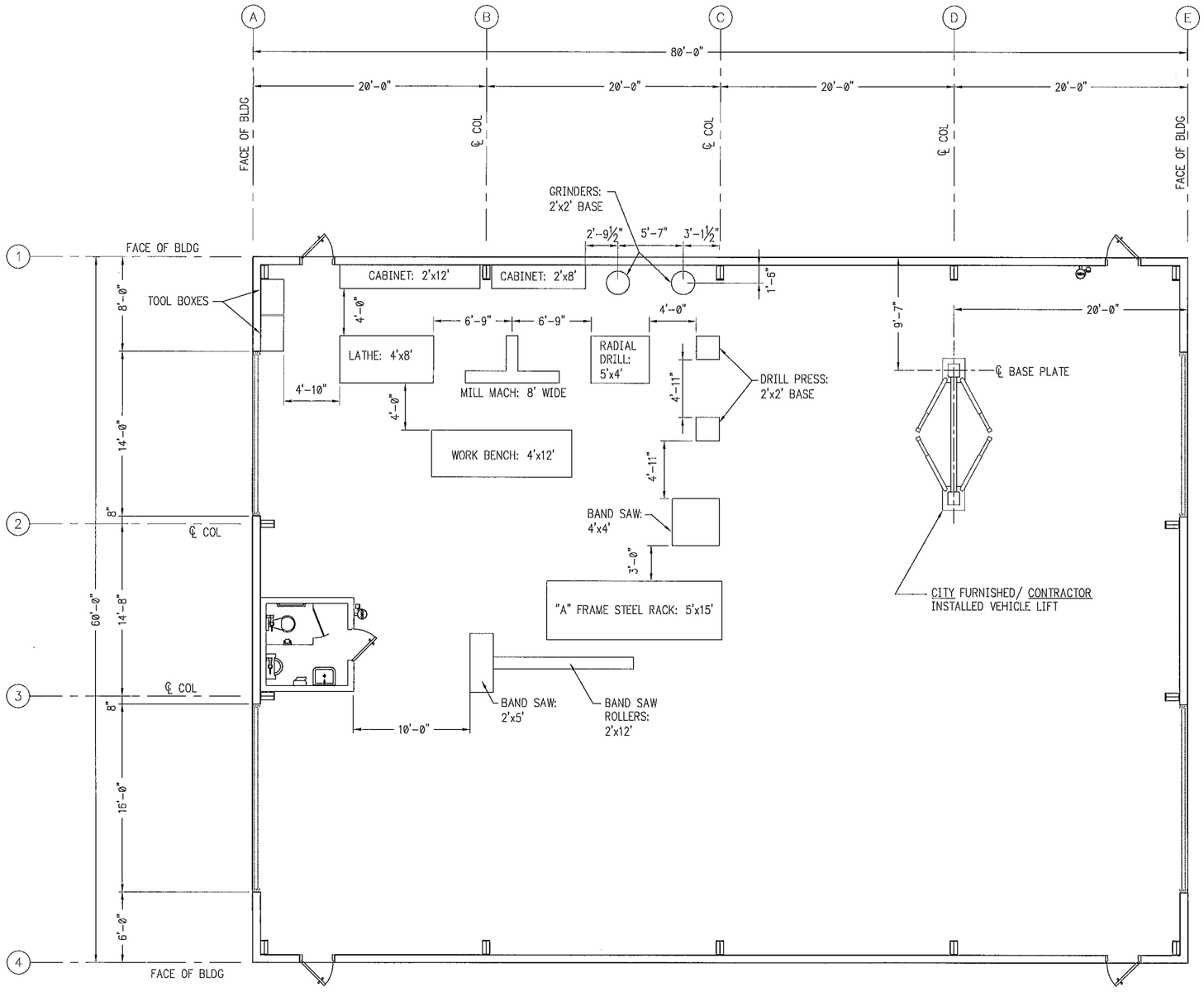

1 EQUIPMENT LAYOUT – FLOOR PLAN
SCALE: 3/16"=1'-0"

NOTE:

1. ALL MECH EQUIPMENT (EXCEPT VEHICLE LIFT) TO BE SUPPLIED AND INSTALLED BY CITY.
2. CONTRACTOR TO COORDINATE EQUIPMENT LAYOUT WITH ALL OTHER DISCIPLINES.

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
EQUIPMENT LAYOUT

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	SDF	PAP
APPROVED	1/ /19 DATE	STAMPED
	DRAWING NO. AP2218 M-1.0	

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GENERAL

- NEW MECHANICAL WORK
- DETAIL/PLAN IDENTIFIER (1 / M1.01)
- REVISION DEFINITION AREA, AREA ENCIRCLED CONTAINS CHANGES MADE SUBSEQUENT TO PREVIOUS ISSUE
- REVISION CALLOUT (1)
- FLAG NOTE CALLOUT (1)
- MECHANICAL EQUIPMENT TAG (AHU-01)
- NORTH ARROW (N)
- INVERT ELEVATION OR POC

ELECTRICAL PROVISIONS FOR MECHANICAL WORK

- HEAT TRACE BETWEEN SYMBOLS OR END OF RUN (HT HT)

ACCESS

- MECHANICAL ACCESS (SPECIFIED OR AS SHOWN ON DWGS)

PIPING

- PIPE ELBOW UP OR PIPE TEE UP AND DOWN
- PIPE ELBOW DOWN
- PIPE TEE UP
- PIPE TEE DOWN
- PIPE RISE
- PIPE CAP
- PIPE PLUG
- FLOW DIRECTION
- PIPE BREAK
- PIPE CONNECTION

VALVES

- VALVE: GATE, BALL, BUTTERFLY (REFER TO SPECIFICATIONS)
- GLOBE VALVE
- SOLENOID VALVE
- CHECK VALVE
- PRESSURE REDUCING VALVE
- REDUCED PRESSURE BACKFLOW ASSEMBLY
- SAFETY RELIEF VALVE
- TEMPERATURE/PRESSURE RELIEF VALVE

PIPING SPECIALTIES

- UNION
- FLANGE
- FLEX CONNECTOR
- STRAINER
- STRAINER WITH BLOW OFF VALVE
- TEMPERATURE/PRESSURE TEST PORT (T/P)
- THERMOMETER IN WELL
- PRESSURE GAGE (P)
- TEMPERATURE SENSOR IN WELL

PUMPS

- CIRCULATING PUMP

DOMESTIC WATER PIPING SYSTEM

- DOMESTIC COLD WATER
- BASKET STRAINER
- HOSE BIBB/WALL HYDRANT

HYDRONIC PIPING SYSTEM

- RADIANT HEATING SUPPLY (RHS)
- RADIANT HEATING RETURN (RHR)
- AUTOMATIC AIR VENT/MANUAL AIR VENT
- BALANCING/MEASURING VALVE

COMPRESSED AIR PIPING SYSTEM

- COMPRESSED AIR (A)
- COMPRESSED AIR DROP

DUCTWORK

- BACKDRAFT DAMPER (BDD)
- VOLUME DAMPER
- FLEXIBLE CONNECTION TO MECHANICAL EQUIPMENT
- TRANSITION - FROM RECTANGULAR TO ROUND
- TRANSITION - FROM ROUND TO RECTANGULAR
- RISE IN DUCT (D=DROP IN DUCT) (R)
- DUCT SIZE (CLEAR INSIDE DIMENSION) (16x8)
- RECTANGULAR DUCT UP
- RECTANGULAR DUCT DN
- ROUND DUCT UP
- ROUND DUCT DN
- FLEXIBLE DUCTWORK
- TRANSITION OR REDUCER (FOT=FLAT ON TOP, FOB=FLAT ON BOTTOM)
- TRANSITION - ECCENTRIC
- 45° ELBOW, R/D OR R/W=1.5
- 90° ELBOW, R/D OR R/W=1.5
- SQUARE CORNER ELBOW WITH TURNING VANES
- 90° TAKE-OFF WITH 45° TAPER
- 45° TAKE-OFF
- RADIUS TAP IN
- WYE FITTING
- RADIUS TEE
- SQUARE TEE WITH TURNING VANES
- BULLHEAD TEE
- SECTION THRU RECTANGULAR SUPPLY AIR DUCT
- SECTION THRU RECTANGULAR RETURN OR OUTSIDE AIR DUCT
- SECTION THRU RECTANGULAR EXHAUST AIR DUCT
- SECTION THRU ROUND DUCT
- RECTANGULAR SUPPLY DUCT ROOF PENETRATION
- RECTANGULAR RETURN OR OUTSIDE AIR DUCT ROOF PENETRATION
- RECTANGULAR EXHAUST DUCT ROOF PENETRATION
- ROUND DUCT ROOF PENETRATION

INLETS AND OUTLETS

- GRILLE REGISTER OR DIFFUSER TYPE (A)
- RUNOUT SIZE (INCHES) (24x24)
- AIR QUANTITY (CFM) (600)
- CEILING DIFFUSER
- RETURN/RELIEF AIR GRILLE
- EXHAUST AIR GRILLE
- SUPPLY GRILLE
- RETURN/EXHAUST GRILLE
- RETURN/EXHAUST AIRFLOW
- SUPPLY AIR FLOW

CONTROLS (PLAN VIEW)

- THERMOSTAT OR TEMPERATURE SENSOR (T TU-XX)
- SENSOR: SHOWN WITH GUARD (TYPICAL ALL SENSORS) (S G)
- CARBON MONOXIDE SENSOR (CO)
- MOTORIZED DAMPER (M)
- SWITCH BY MECHANICAL (Y S HOOD)

REFERENCE DRAWINGS

CONSTR #	TPU #	DRAWING
M-0.1	--	MECHANICAL LEGEND AND INDEX
M-0.2	--	MECHANICAL NOTES AND ABBREV
M-0.3	--	MECHANICAL SCHEDULES
M-0.4	--	MECHANICAL SCHEDULES
M-1.0	--	PIPING FOUNDATION PLAN
M-1.1	--	RADIANT FLOOR ZONING PLAN
M-1.2	--	PIPING FLOOR PLAN
M-1.3	--	MECHANICAL FLOOR PLAN
M-1.4	--	COMPRESSED AIR FLOOR PLAN
M-2.0	--	MECHANICAL DETAILS
M-2.1	--	MECHANICAL DETAILS

NOT ALL SYMBOLS MAY APPEAR ON THE DRAWINGS

WARNING
0 1
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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING MECHANICAL LEGEND & INDEX

REVIEWED	DESIGNED	DRAWN
	BJB	SLR
APPROVED	4/10/18 (DATE)	STAMPED
	DRAWING NO. AP2219	

ABBREVIATIONS

Ø	DIAMETER, PHASE
A	AIR, AMPS
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
AG	ABOVE GROUND
AHJ	AUTHORITY HAVING JURISDICTION
AMB	AMBIENT
APD	AIR PRESSURE DROP
ARCH	ARCHITECT
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS, INC.
ASSY	ASSEMBLY
ATM	ATMOSPHERE
B	BOILER
BDD	BACK DRAFT DAMPER
BHP	BRAKE HORSE POWER
BLW	BELOW
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BTUH	BRITISH THERMAL UNIT PER HOUR
BV	BALL VALVE
C	CONDENSATE PIPING
CA	AIR COMPRESSOR
CAP	CAPACITY
CBV	CIRCUIT SETTING BALANCING VALVE
CFM	CUBIC FEET PER MINUTE
CKV	CHECK VALVE
CLG	CEILING, COOLING
CO	CARBON MONOXIDE SENSOR
CO2	CARBON DIOXIDE SENSOR
COMB	COMBUSTION, COMBINATION
COND	CONDENSER, CONDENSATE
CONN	CONNECTOR
CONT	CONTINUE, CONTROL
COP	COEFFICIENT OF PERFORMANCE
Cv	FLOW COEFFICIENT
CV	CONSTANT VOLUME
CW	COLD WATER PIPING
D	DRAIN
DB	DRY BULB (TEMPERATURE)
dB	DECIBEL
DEG	DEGREE
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DISC	LOCATION OF STARTER, DISCONNECT AND CONTROLS
DISCH	DISCHARGE
DN	DOWN
DPV	DIFFERENTIAL PRESSURE VALVE
DWGS	DRAWINGS
DV	DRAIN VALVE
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFF	EFFICIENCY
EG	EXHAUST GRILLE, ENGINE GENERATOR
EL	ELEVATION
ELEC	ELECTRIC
EQUIV	EQUIVALENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWT	ENTERING WATER TEMP
EXH	EXHAUST
EXT	EXTERIOR, EXTERNAL
F	FAHRENHEIT, FIRE MAIN PIPING
FF	FOULING FACTOR, FLAT FILTER
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FLTR	FILTER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FEET, FIN TUBE
FTU	FIN TUBE UNIT
FV	FACE VELOCITY
G	GAS
GA	GAGE
GAL	GALLONS
GALV	GALVANIZED
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRD	GRILLES, REGISTERS, AND DIFFUSERS
GV	GATE VALVE, GLOBE VALVE
H	HUMIDISTAT, HEIGHT
HB	HOSE BIBB
HD	HEAD, HUB DRAIN
HORIZ	HORIZONTAL
HP	HORSEPOWER, HEAT PUMP
HRU	HEAT RECOVERY UNIT
HTG	HEATING
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HX	HEAT EXCHANGER
HZ	HERTZ
IN.	INCH
IN. WC	INCHES WATER COLUMN
kW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUND
LF	LINEAR FOOT
LRA	LOCKED ROTOR AMPS
LVR	LOUVER
LWCD	LOW WATER CUT-OFF
LWT	LEAVING WATER TEMPERATURE
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPACITY
MECH	MECHANICAL
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
MOD	MOTOR OPERATED DAMPER
NA	NOT APPLICABLE
NC	NORMALLY CLOSED, NOISE CRITERIA
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN, NITROUS OXIDE
NO.	NUMBER
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIMENSION OR DIAMETER
OSA	OUTDOOR SUPPLY AIR
OV	OUTLET VELOCITY
P	PUMP, PRESSURE, PLUMBING FIXTURE
PD	PRESSURE DROP, PUMPED DRAIN
P.E.	PRE ENGINEERED
PH	PHASE
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAGE
QTY	QUANTITY
RA	RETURN AIR, RELIEF AIR
REG	REGISTER
REF	REFERENCE, RETURN/EXHAUST FAN
RF	RELIEF FAN
RG	RETURN GRILLE
RI&C	ROUGH IN AND CONNECT
RLA	RATED LOAD AMPS
RPBA	REDUCED PRESSURE BACKFLOW ASSEMBLY
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
RV	SAFETY RELIEF VALVE
S	SENSOR
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SENS	SENSIBLE
SF	SUPPLY FAN, SQUARE FOOT
SG	SUPPLY GRILLE, SIGHT GLASS WITH MOISTURE INDICATOR
SIM	SIMILAR
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.
SO	SCREENED OPENING
SOV	SHUTOFF VALVE
SP	STATIC PRESSURE
SS	STAINLESS STEEL, SANITARY SEWER
T	TEMPERED WATER PIPING
TBV	TOWER BYPASS VALVE
TCV	TEMPERATURE CONTROL VALVE
TD	TRENCH DRAIN, TEMPERATURE DIFFERENCE
TDH	TOTAL DYNAMIC HEAD
TEFC	TOTALLY ENCLOSED, FAN COOLED
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TOS	TOP OF STEEL
TOF	TOP OF FOOTING
TSP	TOTAL STATIC PRESSURE
T'STAT	THERMOSTAT
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
V	VENT PIPING, VOLT
VA	VALVE
VEL	VELOCITY
VENT	VENTILATION, VENTILATOR
VFD	VARIABLE FREQUENCY DRIVE
VOLT	VOLTAGE
W	WASTE, WATT, WIDE, WATER
W/	WITH
WB	WET BULB (TEMPERATURE)
WC	WATER CLOSET, WATER COLUMN
WM	WATER METER
WSEC	WASHINGTON STATE ENERGY CODE
WT	WEIGHT

NOT ALL SYMBOLS MAY APPEAR ON THE DRAWINGS

GENERAL NOTES - MECHANICAL

1. COORDINATE MECHANICAL WORK WITH THAT OF OTHER TRADES (ELECTRICAL, ARCHITECTURAL, STRUCTURAL, AND CIVIL). REFER TO ELECTRICAL, ARCHITECTURAL, STRUCTURAL, AND CIVIL DRAWINGS AND SPECIFICATIONS. COORDINATION SHALL OCCUR PRIOR TO FABRICATION, PURCHASE, AND/OR INSTALLATION OF ALL WORK.
2. COORDINATE PLUMBING AND HVAC SYSTEMS ROUTING PRIOR TO INSTALLATION. DURING LAYOUT COORDINATION, DUCTWORK TAKES PRECEDENCE OVER PLUMBING.
3. REFER TO STRUCTURAL DRAWINGS FOR ALLOWABLE METHODS/LOADS FOR HANGING PIPING/DUCTS FROM STRUCTURAL MEMBERS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFE KEEPING OF HIS OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT, AND ENVIRONMENTAL CONDITIONS.

MECHANICAL EQUIPMENT INSTALLATION NOTES

1. ACCESS CLEARANCES FOR MAINTENANCE AND REPLACEMENT: VERIFY PHYSICAL DIMENSIONS OF EQUIPMENT TO ENSURE THAT ACCESS CLEARANCES CAN BE MET. COORDINATE LOCATIONS OF MECHANICAL WORK AND WORK OF OTHER TRADES TO PROVIDE ACCESS CLEARANCES FOR SERVICE AND MAINTENANCE.

PIPING NOTES

1. DISASSEMBLY PROVISIONS: PROVIDE UNIONS OR FLANGES AT PIPING CONNECTIONS TO EQUIPMENT AND OTHER COMPONENTS TO ALLOW DISASSEMBLY FOR MAINTENANCE. PROVIDE ISOLATION VALVES FOR EACH PIECE OF EQUIPMENT.
2. PRESSURE/TEMPERATURE TEST PORTS: PROVIDE AT SUPPLY AND RETURN PIPING CONNECTIONS TO EQUIPMENT.
3. PROVIDE AN INSULATED COPPER TRACER WIRE OR OTHER APPROVED CONDUCTOR ADJACENT TO UNDERGROUND NONMETALLIC (PLASTIC) PIPING. ACCESS SHALL BE PROVIDED TO THE TRACER WIRE OR THE TRACER WIRE SHALL TERMINATE ABOVE GROUND AT EACH END OF THE PIPING. THE TRACER WIRE SHALL NOT BE LESS THAN NO. 18 AWG AND THE INSULATION TYPE SHALL BE SUITABLE FOR BURIAL.

PLUMBING NOTES

1. REDUCED PRESSURE BACKFLOW PREVENTERS (RPBP): PROVIDE INDIRECT DRAIN PIPING FROM RPBP TO EXTERIOR.

SHEET METAL NOTES

1. BACKDRAFT DAMPERS: PROVIDE ADJACENT TO LOUVERS UNLESS MOTOR OPERATED DAMPERS PROVIDED. OR AS NOTED ON DRAWINGS.

ENERGY CODE NOTES

1. MOTORS: COMPLY WITH MINIMUM FULL LOAD EFFICIENCIES LISTED IN ENERGY CODE ENFORCED BY AHJ.
2. PIPING AND DUCT INSULATION: COMPLY WITH THICKNESSES AND TYPES LISTED IN ENERGY CODE ENFORCED BY AHJ UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED. [PROVIDE SCHEDULES ON DRAWINGS IF REQUIRED BY AHJ]
3. DUCT SEALING: SEAL DUCT TRANSVERSE JOINTS AND LONGITUDINAL SEAMS PER ENERGY CODE ENFORCED BY AHJ UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED.
4. RECORD DRAWINGS: SUBMIT TO THE BUILDING OWNER PER ENERGY CODE ENFORCED BY THE LOCAL AHJ.
5. OPERATION AND MAINTENANCE MANUALS: SUBMIT TO THE BUILDING OWNER PER ENERGY CODE ENFORCED BY THE LOCAL AHJ.
6. SYSTEM BALANCING: BALANCE HVAC SYSTEMS PER ENERGY CODE ENFORCED BY THE LOCAL AHJ AND SUBMIT A WRITTEN REPORT TO THE BUILDING OWNER. REFER TO SPECIFICATIONS FOR ADDITIONAL TESTING, ADJUSTING, AND BALANCING (TAB) REQUIREMENTS.
7. MECHANICAL SYSTEMS COMMISSIONING AND COMPLETION REQUIREMENTS: TEST SYSTEMS TO ENSURE THAT BUILDING SYSTEMS HAVE BEEN DESIGNED, INSTALLED, AND FUNCTION PROPERLY, EFFICIENTLY, AND CAN BE MAINTAINED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS IN ORDER TO SATISFY THE BUILDING OWNER'S DESIGN INTENT AND OPERATIONAL REQUIREMENTS PER ENERGY CODE ENFORCED BY THE LOCAL AHJ.
8. THIS BUILDING AND ITS ENERGY SYSTEMS HAVE BEEN DESIGNED TO COMPLY WITH ENERGY CODE ENFORCED BY THE LOCAL AHJ. CONTRACTOR IS RESPONSIBLE FOR CORRECT INSTALLATION OF ENERGY CONSERVATION MEASURES.

NON-STRUCTURAL MECHANICAL COMPONENT NOTES

1. THE COMPONENT IMPORTANCE FACTOR (Ip) FOR ALL NON-STRUCTURAL COMPONENTS SHALL BE:

   Ip = 1.0

2. THE FOLLOWING ITEMS ARE TAKEN DIRECTLY FROM THE 2015 INTERNATIONAL BUILDING CODE AND FROM THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD 7-05. THE CONTRACTOR SHALL REFER TO THE ABOVE FOR ADDITIONAL INFORMATION, EXCEPTIONS, AND FURTHER DESCRIPTIONS. THE CONTRACTOR SHALL ADHERE TO REQUIREMENTS AND AS SUCH, SHALL BE INCLUDED WITHIN BID. ALSO REFER TO SPECIFICATION SECTION 15210.
3. 2015 IBC, 1613.1, SCOPE: ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND NON-STRUCTURAL COMPONENTS THAT ARE PERMANENTLY ATTACHED TO STRUCTURES AND THEIR SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED AND CONSTRUCTED TO RESIST THE EFFECTS OF EARTHQUAKE MOTIONS IN ACCORDANCE WITH ASCE 7-05, EXCLUDING CHAPTER 14 AND APPENDIX 11A.
4. 2015 IBC, 1704.4, CONTRACTOR RESPONSIBILITY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONSTRUCTION OF A SEISMIC-FORCE-RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM, OR SEISMIC-RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS AND SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL INCLUDE THE FOLLOWING:
   A. ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS;
   B. ACKNOWLEDGEMENT THAT CONTROL WILL BE EXERCISED TO OBTAIN CONFORMANCE WITH THE CONSTRUCTION DOCUMENTS APPROVED BY THE BUILDING OFFICIAL;
   C. PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION, THE METHOD AND FREQUENCY OF REPORTING AND THE DISTRIBUTION OF THE REPORTS;
   D. IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THEIR POSITION(S) IN THE ORGANIZATION.
4. DIVISION 15 RESPONSIBILITIES:
   A. HANGERS AND SEISMIC BRACING FOR MECHANICAL SYSTEMS SHALL BE DESIGNED AND SPECIFIED BY DIVISION 15. DIVISION 15 SHALL REFER TO THE MECHANICAL DRAWINGS FOR LOCATIONS OF EQUIPMENT AND HUNG MECHANICAL SYSTEMS AS STRUCTURAL DRAWINGS DO NOT SHOW THE LOCATIONS OF MECHANICAL EQUIPMENT, DUCTWORK, PIPING, AND OTHER COMPONENTS.
   B. DIVISION 15 SHALL COORDINATE THE SUPPORT SYSTEMS AND DESIGN LOADS FOR HUNG PIPING AND OTHER MECHANICAL SYSTEMS (INCLUDING COMBINED MULTIPLE PIPE RUNS) WITH THE GENERAL CONTRACTOR AND THE P.E. BUILDING MANUFACTURERS IN ADDITION TO OTHER TRADES THAT MAY BE IMPACTED.

WARNING
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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
MECHANICAL NOTES & ABBREVIATIONS

BRIAN J. BOETTCHER — STATE OF WASHINGTON — 40968 — REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	BJB	SLR
APPROVED	4/10/18 DATE	STAMPED
	DRAWING NO. AP2220	

HEAT RECOVERY UNIT SCHEDULE

MARK	AREA SERVED	MANUFACTURER / MODEL NO.	COIL MAX OA (CFM)	SF & RF			SUPPLY FAN MOTOR					RETURN FAN MOTOR					HEAT EXCHANGER					SUPPLY FILTER			RETURN FILTER			ELECTRICAL			PHYSICAL		MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
				FLOW (CFM)	ESP (IN WC)	RPM	BHP	HP	TYPE	RPM	SPEED CONTROL	BHP	HP	TYPE	RPM	SPEED CONTROL	TYPE	SUPPLY (CFM)	EXHAUST (CFM)	WINTER EFF. (%)	SUMMER EFF. (%)	TYPE	MERV RATING	QTY-WxHxD (#-INxINxIN)	TYPE	MERV RATING	QTY-WxHxD (#-INxINxIN)	VOLTAGE (V/Ø)	MCA	MOCP	LxWxH (INxINxIN)	WEIGHT (LBS)				
HRU-01	SHOP BAY SOUTH	RENEWAIRE 2XINH	1950	1950	0.5	1505	1.4	2.0	TEFC	1750	NONE	1.4	2.0	TEFC	1750	NONE	ENTHALPY CORE	1950	1950	50.0	50.0	PLEATED	8	4-20x20x2	PLEATED	8	4-20x20x2	460/3	6.5	15	61x43x36	500	SUSPENDED	4/M-2.0	1	HRU-0
HRU-02	SHOP BAY NORTH	RENEWAIRE 2XINH	1950	1950	0.5	1505	1.4	2.0	TEFC	1750	NONE	1.4	2.0	TEFC	1750	NONE	ENTHALPY CORE	1950	1950	50.0	50.0	PLEATED	8	4-20x20x2	PLEATED	8	4-20x20x2	460/3	6.5	15	61x43x36	500	SUSPENDED	4/M-2.0	1	HRU-0

NOTES
1. PROVIDE WITH OCCUPANCY SENSOR FURNISHED BY DIV 15, INSTALLED BY DIV 16. PROVIDE INTERNAL 24V TRANSFORMER TO POWER OCCUPANCY SENSORS. EQUIPMENT SHALL BE INTERLOCKED WITH OCCUPANCY SENSOR.

HYDRONIC BOILER SCHEDULE - ELECTRIC

MARK	LOCATION	SYSTEM SERVED	MANUFACTURER / MODEL NO.	TANK VOLUME (GAL)	EWT (°F)	LWT (°F)	HEATING OUTPUT (Kw)	STEPS (# - Kw)	BOILER HEAD LOSS (FT)	OPERATING PRESSURE	MAX OPERATING PRESSURE	RUNOUT SIZE (IN)	BOILER MAX FLOW	BOILER MIN FLOW	OPERATING FLOW (GPM)	ELECTRICAL - CIRCUIT 1		ELECTRICAL - CIRCUIT 2		PHYSICAL		MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
																V/Ø	POWER (Kw)	V/Ø	POWER (Kw)	LxWxH (INxINxIN)	WEIGHT (LBS)				
B-01	BOILER SHED	RADIANT FLOOR	LOCHINVAR / BWX1-040C	22	110	120	60	2-20	5	20	75	3	230 GPM	NONE	15	480/3	20	480/3	20	24x30x52	785	FLOOR	1/M-2.1	1, 2	B-01

NOTES
1. CONTROL PANEL SHALL BE PROVIDED WITH A VISIBLE NAMEPLATE INDICATING THE SHORT CIRCUIT CURRENT RATING (SCCR) IN ACCORDANCE WITH UL REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR MINIMUM RATINGS.
2. PROVIDE WITH 75 PSI PRESSURE RELIEF VALVE, MODULATING STEP CONTROL, OUTDOOR AIR RESET CONTROLLER, TACO #SR501 SINGLE ZONE SWITCHING RELAY (120V AC, 15A CIRCUIT).

HYDRONIC PUMP SCHEDULE

MARK	LOCATION	SYSTEM SERVED	MANUFACTURER / MODEL NO.	PUMP				MOTOR			PHYSICAL		MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
				TYPE	FLOW (GPM)	HEAD (FT)	EFF (%)	RPM	HP	V/Ø	LxWxH (INxINxIN)	WEIGHT (LBS)				
HWP-01	BOILER SHED	RADIANT FLOOR	GRUNDFOS UPS 32-160/2	INLINE	15	30	38	3450	.75	460/3	14x6x12	50	SUSPENDED	1 / M2.1	NOTE 1, 2	HWP-01

NOTES:
1. DO NOT SUPPORT PUMP FROM PIPING. PROVIDE ADDITIONAL HANGERS OR SUPPORTS AS REQUIRED TO SUPPORT PUMP INDEPENDENTLY.
2. DIV 16 SHALL PROVIDE MOTOR STARTER AND ALL WIRING FOR PUMP OPERATION. TACO #SR501 PANEL FURNISHED BY DIV 15. SHALL CONTROL MOTOR STARTER, DIV 16 SHALL PROVIDE WIRING FROM PANEL TO MOTOR STARTER.

AIR COMPRESSOR

MARK	LOCATION	MANUFACTURER / MODEL NO.	AIRFLOW RATE (SCFM)	AIR PRESS (PSIG)	MOTOR HP	MOTOR V/Ø	RECEIVER GAL	RECEIVER ORIENTATION	PHYSICAL LxWxH (INxINxIN)	PHYSICAL WEIGHT (LBS)	MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
AC-01	BOILER SHED	QUINCY / QTH-10-120	35	100	10	480/3	120	HORIZONTAL	78x28x55	850	FLOOR	3/M-2.0	1	AC-01

NOTES:
1. ALL COMPONENTS INCLDUING THE COMPRESSOR, FILTER, REGULATOR, ELECTRONIC DRAIN SHALL BE PROVIDED BY THE CONTRACTOR

FAN SCHEDULE

MARK	AREA SERVED	MANUFACTURER / MODEL NO.	FAN TYPE	AIRFLOW (CFM)	ESP (IN. WC)	FAN RPM	FAN MOTOR RPM	FAN MOTOR HP	FAN MOTOR V/Ø	SPEED CONTROL	BACKDRAFT DAMPER AT FAN	PHYSICAL LxWxH (INxINxIN)	PHYSICAL WEIGHT (LBS)	SOUND INLET (SONES)	MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
EF-01	WELDING BAY	GREENHECK SE1-16-VG	SIDEWALL	1800	0.25	1398	1725	0.75	115/1	VG	Y	23x23x36	115	14.7	IN WALL			EF-01
EF-02	TOILET ROOM	GREENHECK SP-A200	CEILING	110	0.45	794		33 W	115/1	Y	Y	14x12x11	25	2.5	CEILING			EF-02

NOTES:
1. FURNISH WITH MOTORIZED DAMPER, ECM MOTOR WITH 0-10 VDC INPUT, 24V TRANSFORMER, AND GREENHECK ACCESSORY REMOTE DIAL SPEED CONTROL FOR ECM MOTOR. DIV 16 SHALL POWER MOTORIZED DAMPER ON SAME CIRCUIT AS FAN.
2. DIV 15 SHALL FURNISH TORK #C506H 6 HOUR MAX TIMER WITH NO HOLD FEATURE (125VAC, 1HP), AND KELE #KCOC CARBON MONOXIDE SENSOR WITH OPTIONAL 24VAC RELAY SET TO NORMAL OPEN FAIL CLOSED, DIV 16 SHALL INSTALL. INTERLOCK WITH SWITCH AND CARBON MONOXIDE SENSOR.

CEILING FAN SCHEDULE

MARK	LOCATION	AREA SERVED	MANUFACTURER / MODEL NO.	FAN TYPE	AIRFLOW (CFM)	FAN RPM	FAN DIAMETER SIZE (IN)	FAN MOTOR RPM	FAN MOTOR WATTS	FAN MOTOR V/Ø	SPEED CONTROL	PHYSICAL LxWxH (INxINxIN)	PHYSICAL WEIGHT (LBS)	MOUNTING / SUPPORT	INTERLOCK DIV 15	INTERLOCK DIV 16	NOTES	MARK
CF-01	SHOP BAY	SHOP BAY SW	CANARM CP-56	CEILING	20,500	380	56	310	97	120/1	SEE NOTES	56x56x22	12	CEILING	N	Y	1	CF-01
CF-02	SHOP BAY	SHOP BAY NW	CANARM CP-56	CEILING	20,500	380	56	310	97	120/1	SEE NOTES	56x56x22	12	CEILING	N	Y	1	CF-02
CF-03	SHOP BAY	SHOP BAY NE	CANARM CP-56	CEILING	20,500	380	56	310	97	120/1	SEE NOTES	56x56x22	12	CEILING	N	Y	1	CF-03
CF-04	SHOP BAY	SHOP BAY SE	CANARM CP-56	CEILING	20,500	380	56	310	97	120/1	SEE NOTES	56x56x22	12	CEILING	N	Y	1	CF-04

NOTES
1. DIV 15 SHALL FURNISH TORK #C506H, 6 HOUR MAX, NO HOLD FEATURE, 125VAC, 1HP TIMER SWITCH AND DAYTON #IDGV2, 6A FAN SPEED CONTROL, DIV 16 SHALL INSTALL.

ELECTRIC DUCT HEATER SCHEDULE

MARK	AREA SERVED	MANUFACTURER / MODEL NO.	ASSOCIATED UNIT	AIRFLOW (CFM)	ELECTRIC HEATING COIL CAPACITY (KW)	ELECTRIC HEATING COIL V/Ø	EAT (DEG F)	LAT (DEG F)	MCA	MOP	MAX APD (IN WC)	CONTROL TYPE	PHYSICAL LxWxH (INxINxIN)	PHYSICAL WEIGHT (LBS)	MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
EDH-01	SHOP BAY SOUTH	INDEECO QUA	HRU-01	1950	45.0	460/3	44.0	65.0	56.5	60.0	0.20"	SCR	12x12x6	50	CEILING		1	EDH-01
EDH-02	SHOP BAY NORTH	INDEECO QUA	HRU-02	1950	45.0	460/3	44.0	65.0	56.5	60.0	0.20"	SCR	12x12x6	50	CEILING		1	EDH-02

NOTES:
1. PROVIDE WITH AIRFLOW SWITCH, FUSED DISCONNECT SWITCH AND DUST TIGHT CONTROL COMPARTMENT

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BRIAN J. BOETTCHER STATE OF WASHINGTON 40956 REGISTERED PROFESSIONAL ENGINEER

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING MECHANICAL SCHEDULES

REVIEWED

APPROVED

DESIGNED BJB

DRAWN SLR

4/10/18 DATE

STAMPED

DRAWING NO. AP2221

HYDRONIC EXPANSION TANK SCHEDULE

MARK	LOCATION	SYSTEM SERVED	MANUFACTURER / MODEL NO.	TYPE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	SYSTEM CONN. (IN)	PRE-CHARGE PRESSURE (PSIG)	SIZING CRITERIA					PHYSICAL		MOUNTING / SUPPORT	NOTES	MARK
									SYS. VOL. (GAL)	MAX TEMP (DEG F)	MIN TEMP (DEG F)	MAX PRESS (PSI)	MIN PRESS (PSI)	DIAxH (INxIN)	WEIGHT (LBS)			
ET-01	BOILER SHED	RADIANT FLOOR	AMTROL / AX-20V	DIAPHRAGM	10.9	2.4	1/2	20	100	130	60	30	12	12x26	65	FLOOR	NOTE 1	ET-01

NOTES
1. PROVIDE PRECHARGED BY MANUFACTURER AT PRESSURE LISTED, ADJUST AFTER RADIANT FLOOR SYSTEM HAS BEEN FILLED AND BALANCED.

AIR SEPARATOR SCHEDULE

MARK	LOCATION	SYSTEM SERVED	MANUFACTURER / MODEL NO.	TYPE	FLOW RATE (GPM)	VOLUME (GAL)	SYSTEM CONN. (IN.)	MAX PD (FT HD)	PHYSICAL		MOUNTING / SUPPORT	NOTES	MARK
									DIAxH (INxIN)	WEIGHT (LBS)			
AS-01	BOILER SHED	RADIANT FLOOR	SPIROTHERM / VDR150FT	AIR/DIRT	15	-	1-1/2	10	3x14	10	INLINE	NOTE 1	AS-01

NOTES
1. PROVIDE WITH INTEGRAL STRAINER AND BLOWDOWN VALVE

ELECTRIC INSTANTANEOUS WATER HEATER SCHEDULE

MARK	LOCATION	MANUFACTURER / MODEL NO.	TYPE	FLOW RATE (GPM)	TEMP RISE (F)	MIN FLOW (GPM)	MAX FLOW (GPM)	ELECTRICAL				PHYSICAL			MOUNTING / SUPPORT	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
								V/Ø	MCA	MOCP	KW	LxWxH (INxINxIN)	WEIGHT (LBS)	PIPE SIZE (IN)				
EIWH-1	RESTROOM SINK	CHRONOMITE SR-20L	TANKLESS	0.40	71.0	0.35	0.75	208/1	20.0	25.0	4.2	10x6x3	5	1/2	WALL		NOTE 1	EIWH-1
EIWH-2	RESTROOM EYEWASH	CHRONOMITE ER-42H	TANKLESS	3.70	34.0	2.30	5.00	480/3	24.0	30.0	20.0	15x18x6	26	3/4	WALL		NOTE 1	EIWH-2

NOTES:
1. PROVIDE WITH STAINLESS STEEL HOUSING

LOUVER SCHEDULE

MARK	LOCATION	EQUIPMENT SERVED	MANUFACTURER / MODEL NO.	TYPE	AIRFLOW (CFM)	FREE AREA (%)	APD (IN. WG)	PHYSICAL		DAMPER TYPE	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
								FRAME DEPTH (IN)	WxH (INxIN)				
L-1	SHOP BAY SOUTH	HRU-01	RUSKIN / ELF375DX	INTAKE	1950	54	0.1	4	28x28	MOTORIZED	6/M-2.0	1, 2, 3	L-1
L-2	SHOP BAY SOUTH	HRU-01	RUSKIN / ELF375DX	EXHAUST	1950	54	0.1	4	28x28	MOTORIZED	6/M-2.0	1, 2, 3	L-2
L-3	SHOP BAY NORTH	HRU-02	RUSKIN / ELF375DX	INTAKE	1950	54	0.1	4	28x28	MOTORIZED	6/M-2.0	1, 2, 3	L-3
L-4	SHOP BAY NORTH	HRU-02	RUSKIN / ELF375DX	EXHAUST	1950	54	0.1	4	28x28	MOTORIZED	6/M-2.0	1, 2, 3	L-4

GENERAL NOTES
SEE FAN SCHEDULE FOR MOTORIZED DAMPER CONNECTION NOTES.

NOTES
1. PROVIDE DRAINABLE BLADE AND BIRDSCREEN, COORDINATE COLOR WITH OWNER.
2. CONTRACTOR SHALL CONFIRM SIZE AND DIMENSIONS WITH OWNER/ENGINEER THROUGH SHOP DRAWINGS PRIOR TO ORDERING.
3. PROVIDE BACKDRAFT AND/OR MOTORIZED DAMPER INTERLOCKED WITH UNIT SERVED, AS INDICATED ON DRAWINGS. MOTORIZED DAMPERS SHALL BE 24V AND INTERLOCK WITH EQUIPMENT SERVED. DIV 16 SHALL PROVIDE RELAY AS REQUIRED FOR MOTORIZED DAMPER INTERLOCK.

AIR DEVICE SCHEDULE

MARK	MANUFACTURER / MODEL NO.	SUPPLY / RETURN / EXH	DESCRIPTION	TYPE (BORDER TYPE)	NECK SIZE (LxW) (IN)	FRAME TYPE	FINISH	MATERIAL	DETAIL / DIAGRAM REFERENCE	NOTES	MARK
G	TITUS 300RL	SUPPLY	DBL DEFLECTION SUPPLY GRILLE	SIDEWALL	PER PLANS	1	WHITE	STEEL		1	G
J	TITUS 33RL	RET/EXH	HEAVY DUTY RETURN GRILLE	SIDEWALL	SIDEWALL	1	WHITE	STEEL		1	J

NOTES:
1. NOT USED

PIPING SYSTEMS INSULATION SCHEDULE

TYPE OF PIPE	INSTALLATION LOCATION	INSULATION TYPE	PIPE SIZE (INCHES)	INSULATION THICKNESS (INCHES)	NOTES
COLD PLUMBING PIPING	INSIDE BUILDING ENVELOPE	FIBERGLASS	ALL SIZES	1" THICK	NOTE 2
	UNHEATED SPACES / OUTSIDE BUILDING ENVELOPE AND BURIED	ELASTOMERIC	ALL SIZES	1" THICK	NOTES 1, 3
RADIANT HEAT PIPING WITH TEMP. < 250 DEG F	INSIDE BUILDING ENVELOPE	FIBERGLASS	3 INCH AND SMALLER	2-1/2" THICK	
			4 INCH AND LARGER	3" THICK	

NOTES
1. INCREASE THICKNESS OF PIPE INSULATION BY 1/2 INCH WHERE PIPING IS LOCATED OUTDOORS OR OTHERWISE EXPOSED TO AMBIENT AIR.
2. INCLUDE POLYETHYLENE TUBING.
3. INCLUDE FACTORY APPLIED WEATHERABLE JACKET OR MANUFACTURER RECOMMENDED COATING.

DUCT SYSTEMS INSULATION SCHEDULE

LOCATION OF DUCT	DUCT SYSTEM TYPE	DUCT CONFIGURATION	INSULATION TYPE	MINIMUM R-VALUE, INSULATION THICKNESS	NOTES
DUCT WITHIN CONDITIONED SPACE	SUPPLY, RETURN, EXHAUST GENERATOR EXHAUST, RELIEF AND TRANSFER AIR DUCTS	RECTANGULAR - EXPOSED	RIGID BOARD	R-3.3, 1 INCH THICK	
		RECTANGULAR - CONCEALED	DUCT WRAP	R-3.3, 1 LAYER, 1-1/2 INCH THICK	
		ROUND AND OVAL	DUCT WRAP	R-3.3, 1 LAYER, 1-1/2 INCH THICK	
	MIXED AND OUTSIDE AIR DUCTS	RECTANGULAR - EXPOSED	RIGID BOARD	R-7, 1 LAYER, 2 INCH THICK	
		RECTANGULAR - CONCEALED	DUCT WRAP	R-7, 1 LAYER, 3 INCH THICK	
		ROUND AND OVAL	DUCT WRAP	R-7, 1 LAYER, 3 INCH THICK	
DUCTS AND PLENUMS WITHIN CONDITIONED SPACE FUNCTIONING AS PART OF BUILDING ENVELOPE	ALL DUCT TYPES	RECTANGULAR	RIGID BOARD	R-VALUE EQUAL TO BUILDING ENVELOPE, THINKNESS AS REQ.	NOTE 1
		ROUND AND OVAL	DUCT WRAP	R-VALUE EQUAL TO BUILDING ENVELOPE, THINKNESS AS REQ.	NOTE 1

NOTES
1. INSULATE AIR DUCTS FROM BUILDING ENVELOPE TO BACKDRAFT DAMPER WITH R-VALUE EQUAL TO BUILDING ENVELOPE THICKNESS.

PLUMBING FIXTURE AND DRAIN ROUGH-IN SCHEDULE

MARK	FIXTURE TYPE	WASTE (IN)	VENT (IN)	CW (IN)	HW (IN)	AIR (IN)	NOTES	MARK
WC-1	FLOOR MOUNTED WATER CLOSET	4"	2"	1"	-	-	NOTE 2	WC-1
UR-1	WALL HUNG URINAL	2"	1-1/2"	1"	-	-	NOTE 2	UR-1
LT-1	HAND WASH TUB	2"	1-1/2"	1/2"	1/2"	-	NOTE 2	LT-1
EW-1	EYEWASH	2"	1-1/2"	3/4"	-	-	NOTE 3	EW-1
AO-1	AIR OUTLET	-	-	-	-	3/4"		AO-1
HB-1	EXTERIOR HOSEBIBB	-	-	3/4"	-	-		HB-1

GENERAL NOTES:
A. PIPE SIZES LISTED MAY BE DIFFERENT THAN THE ACTUAL FIXTURE CONNECTION. PROVIDE BRANCH PIPE OF LISTED SIZE AND ALL PIPE FITTINGS AND OFFSETS REQUIRED FOR COMPLETE INSTALLATION.
B. PROVIDE FINAL CONNECTIONS TO ALL FIXTURES.
C. PROVIDE WALL CLEANOUTS FOR ALL SINKS, WATER CLOSETS, AND URINALS.

NOTES:
1. SIZE AS NOTED ON DRAWINGS.
2. ADA COMPLIANT WHERE INDICATED ON THE ARCHITECTURAL DRAWINGS. MOUNTING HEIGHT AS INDICATED ON SHEET A-1.5 (AP2209).
3. SUPPLY COLD WATER TO INSTANEOUS WATER HEATER AND EXTEND TEMPERED WATER FROM HEATER TO FIXTURE.

ELECTRIC DUCT HEATER SCHEDULE

MARK	AREA SERVED	MANUFACTURER / MODEL NO.	ASSOCIATED UNIT	AIRFLOW (CFM)	ELECTRIC HEATING COIL								PHYSICAL		MOUNTING / SUPPORT	NOTES	MARK
					CAPACITY (KW)	V/Ø	EAT (DEG F)	LAT (DEG F)	MCA	MOP	MAX APD	CONTROL TYPE	LxWxH (INxINxIN)	WEIGHT (LBS)			
EDH-01	SHOP BAY SOUTH	INDEECO QUA	HRU-01	1950	45.0	460/3	44.0	65.0	56.5	60.0	0.20"	SCR	12x12x6	50	CEILING		EDH-01
EDH-02	SHOP BAY NORTH	INDEECO QUA	HRU-02	1950	45.0	460/3	44.0	65.0	56.5	60.0	0.20"	SCR	12x12x6	50	CEILING		EDH-02

NOTES:
1. PROVIDE WITH AIRFLOW SWITCH, FUSED DISCONNECT SWITCH AND DUST TIGHT CONTROL COMPARTMENT

WARNING
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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

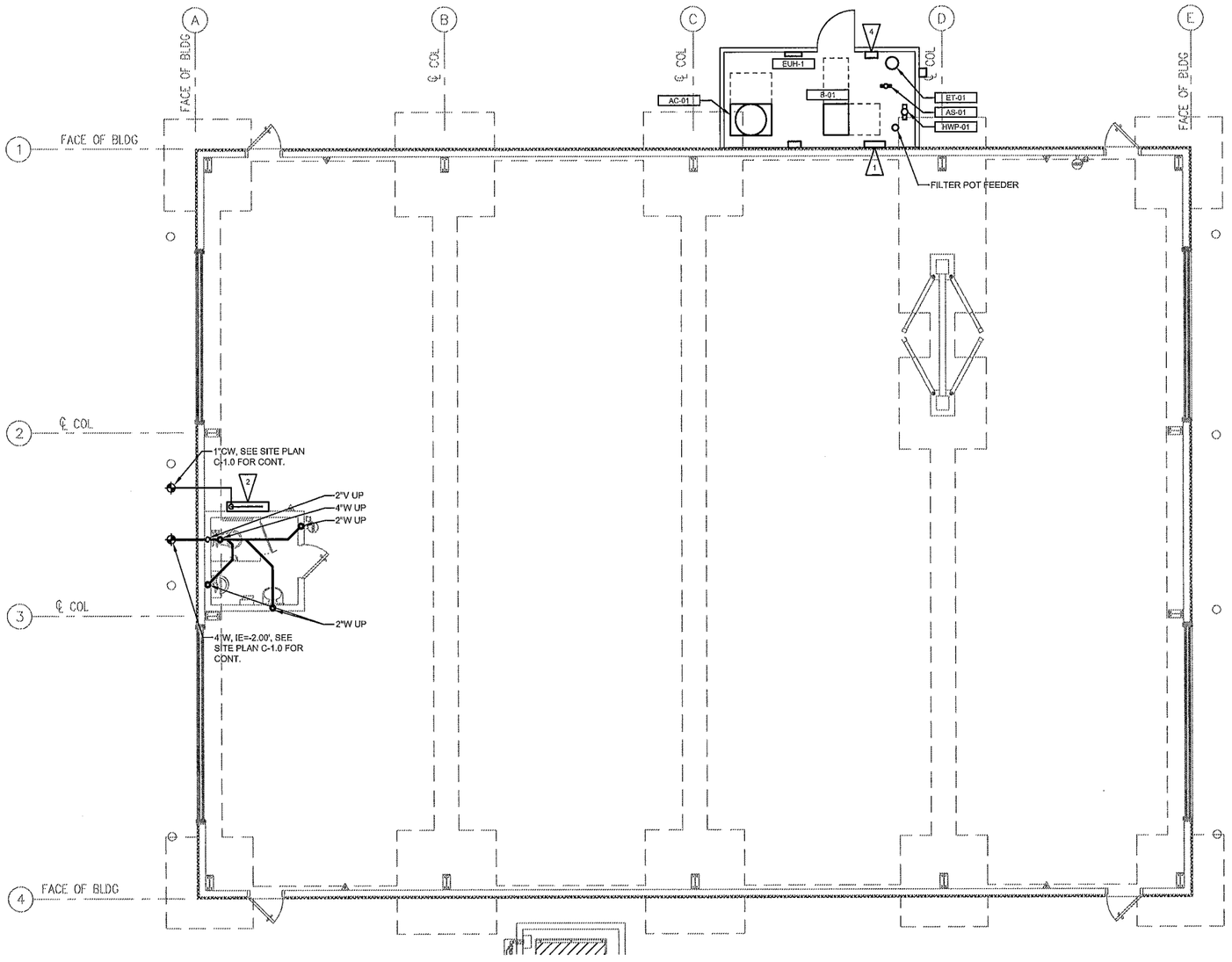
REV. NO. | DESCRIPTION | DATE

NISQUALLY PROJECT

LAGRANDE SHOP BUILDING
MECHANICAL SCHEDULES

BRIAN J. BOETTCHER — STATE OF WASHINGTON — 40988 — REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	BJB	SLR
APPROVED	4/10/18 DATE	STAMPED
	DRAWING NO. AP2222	



PIPING FLOOR PLAN

SCALE: 3/16"=1'-0"

SHEET NOTES

1. SEE DETAILS ON SHEETS M-2.0 (BP827), M-2.1 (BP828)
2. COORDINATE ELEVATION AND LOCATION OF ALL MECHANICAL EQUIPMENT WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.
3. SEE RADIANT FLOOR ZONING PLAN M-1.1 (BP824).

FLAG NOTES

1. MAKE-UP WATER STATION FOR RADIANT HEATING SYSTEM. SEE DETAIL 1/M-2.1
2. COLD WATER SERVICE HEADER. SEE DETAIL 3/M-2.1

WARNING
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CITY OF TACOMA
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LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
PIPING FOUNDATION PLAN

BRIAN J. BOBTOWER STATE OF WASHINGTON 40966 REGISTERED PROFESSIONAL ENGINEER

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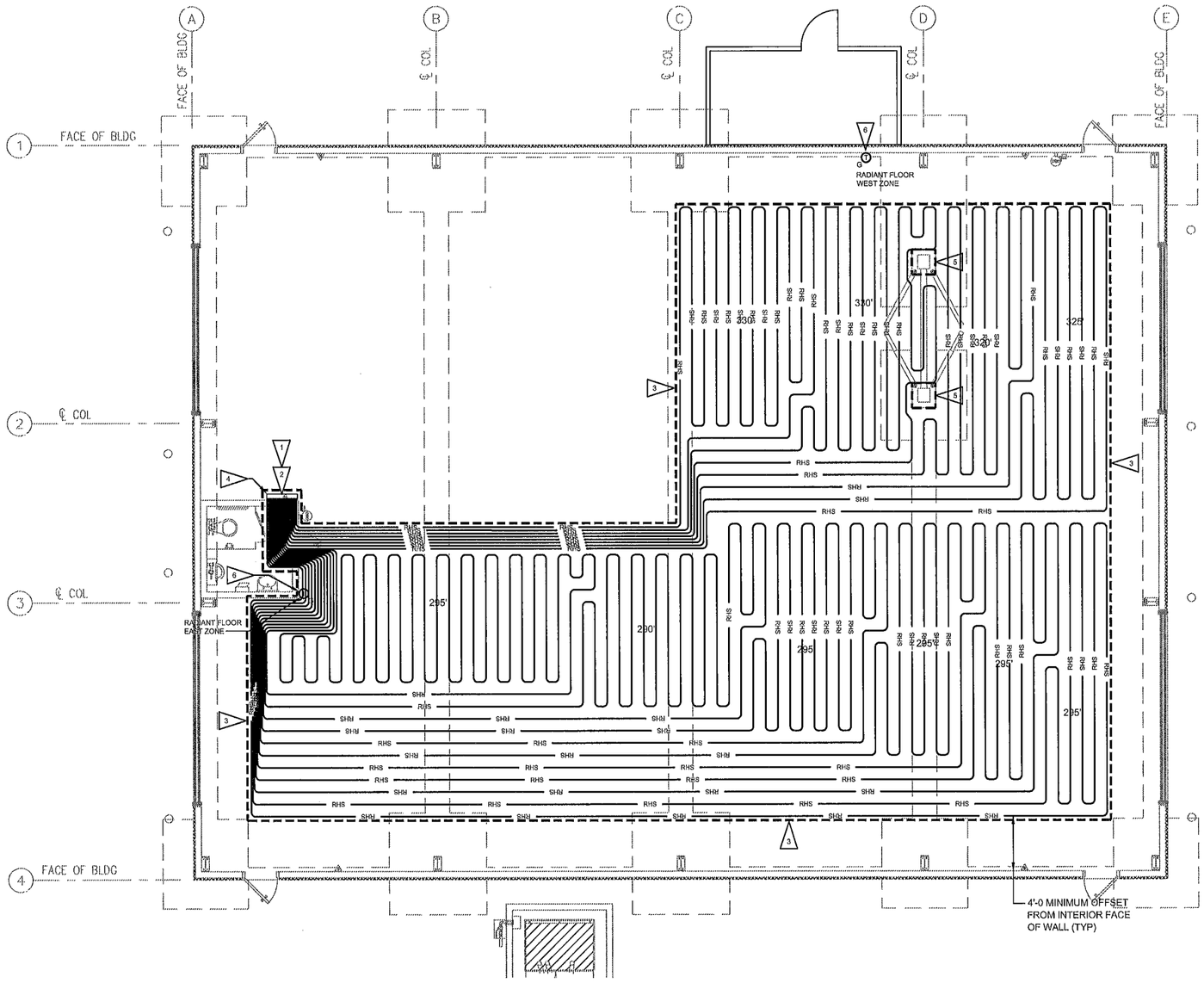

N 1 **RADIANT FLOOR ZONING PLAN**
SCALE: 3/16"=1'-0"

SHEET NOTES

1. SEE DETAILS ON SHEETS M-2.0, M-2.1
2. COORDINATE ELEVATION AND LOCATION OF ALL MECHANICAL EQUIPMENT WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.

FLAG NOTES

1. 10 ZONE SUPPLY RADIANT FLOOR MANIFOLD. SEE DETAIL 2/M-2.1
2. 10 ZONE RETURN RADIANT FLOOR MANIFOLD. SEE DETAIL 2/M-2.1
3. 1/2" RADIANT PEX PIPING TO BE INSTALLED WITH 12" OC SPACING TYPICAL. PIPE LENGTHS SHOWN ARE ESTIMATES. CONTRACTOR SHALL COORDINATE ACTUAL PIPE LENGTHS
4. 1/2" RADIANT PEX UP IN WALL TO RADIANT MANIFOLDS, (1) 4-PORT MANIFOLD & (1) 6-PORT MANIFOLD
5. COORDINATE EMBED LOCATIONS WITH RADIANT SLAB TUBING THIS AREA FOR VEHICLE LIFT
6. DIV 15 SHALL FURNISH HONEYWELL TL8100 THERMOSTAT, PROVIDE CORK PADS TO THERMALLY ISOLATE THERMOSTAT FROM WALL. DIV 16 SHALL WIRE FROM THERMOSTAT TO BOILER SYSTEM CONTROL, TACO #SR501.

WARNING
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CITY OF TACOMA
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LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
RADIANT FLOOR ZONING PLAN

BRIAN J. BOBETICH STATE OF WASHINGTON 40958 REGISTERED PROFESSIONAL ENGINEER

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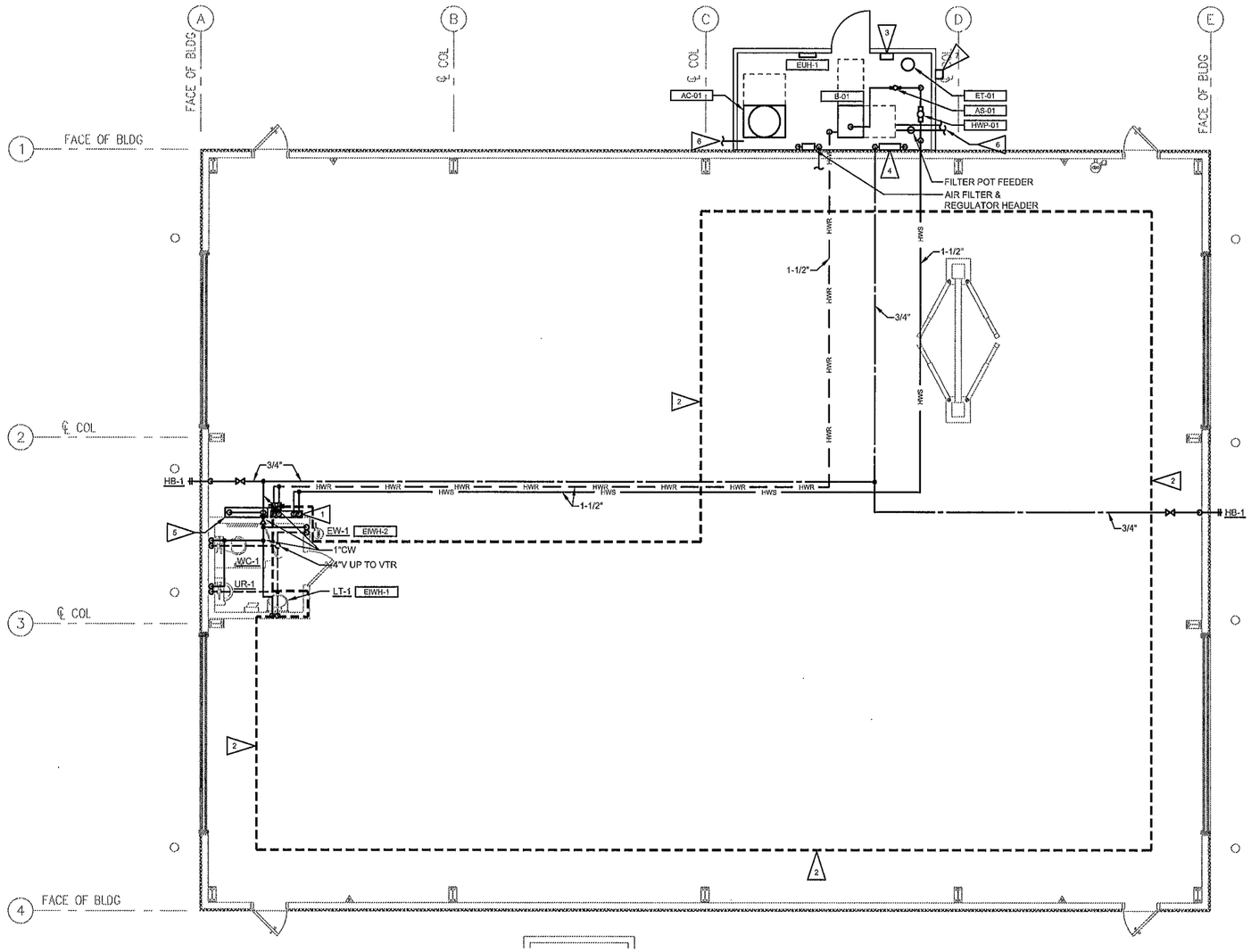
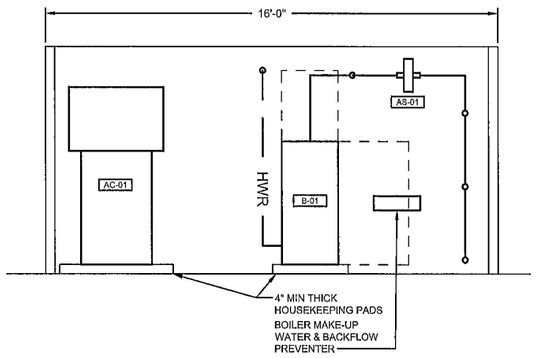


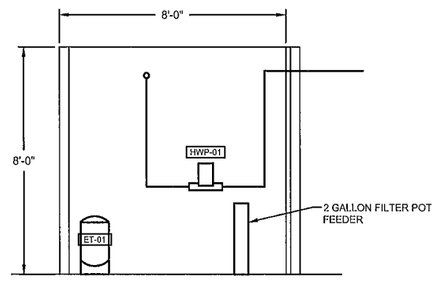
PIPING FLOOR PLAN

SCALE: 3/16"=1'-0"



BOILER COMPRESSOR ROOM ELEVATION LOOKING EAST

2 M1.0 SCALE: 3/8" = 1'-0"



BOILER COMPRESSOR ROOM ELEVATION LOOKING NORTH

3 M1.0 SCALE: 3/8" = 1'-0"

SHEET NOTES

1. SEE DETAILS ON SHEETS M-2.0 (BP827), M-2.1 (BP828)
2. COORDINATE ELEVATION AND LOCATION OF ALL MECHANICAL EQUIPMENT WITH ARCHITECTURAL AND ELECTRICAL DRAWINGS.
3. SEE RADIANT FLOOR ZONING PLAN M-1.1 (BP824).

FLAG NOTES

1. HWS/R PIPING DN TO RADIANT FLOOR MANIFOLDS IN RECESSED CABINET. (1) 4-PORT & (1) 6-PORT SEE DETAIL 2/M-2.1
2. RADIANT FLOOR HEATING SYSTEM. SEE M-1.1 FOR IN FLOOR PIPING LAYOUT.
3. SINGLE ZONE SWITCHING RELAY FOR BOILER SYSTEM CONTROL, TACO #SR501. DIV 16 SHALL PROVIDE 120V, 15A CIRCUIT.
4. MAKE-UP WATER STATION FOR RADIANT HEATING SYSTEM. SEE DETAIL 1/M-2.1
5. COLD WATER SERVICE HEADER. SEE DETAIL 3/M-2.1
6. ROUTE DRAIN AND RELIEF LINES TO EXTERIOR HERE AT 6"AFF. RELIEF AND DRAIN LINES TO DAYLIGHT TO GRADE. (2) 2" & (1) 2".
7. DIV 15 SHALL INSTALL OUTDOOR AIR SENSOR FOR BOILER ON NORTH WALL OF BUILDING AT +24" AFF. PROVIDE THERMAL ISOLATED MOUNTING BRACKET FOR SENSOR. PROVIDE WEATHER HOOD FOR SENSOR, PAINT WEATHER HOOD TO MATCH BUILDING.

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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
PIPING FLOOR PLAN

BRIAN J. BOBETOOER STATE OF WASHINGTON 40958 REGISTERED PROFESSIONAL ENGINEER

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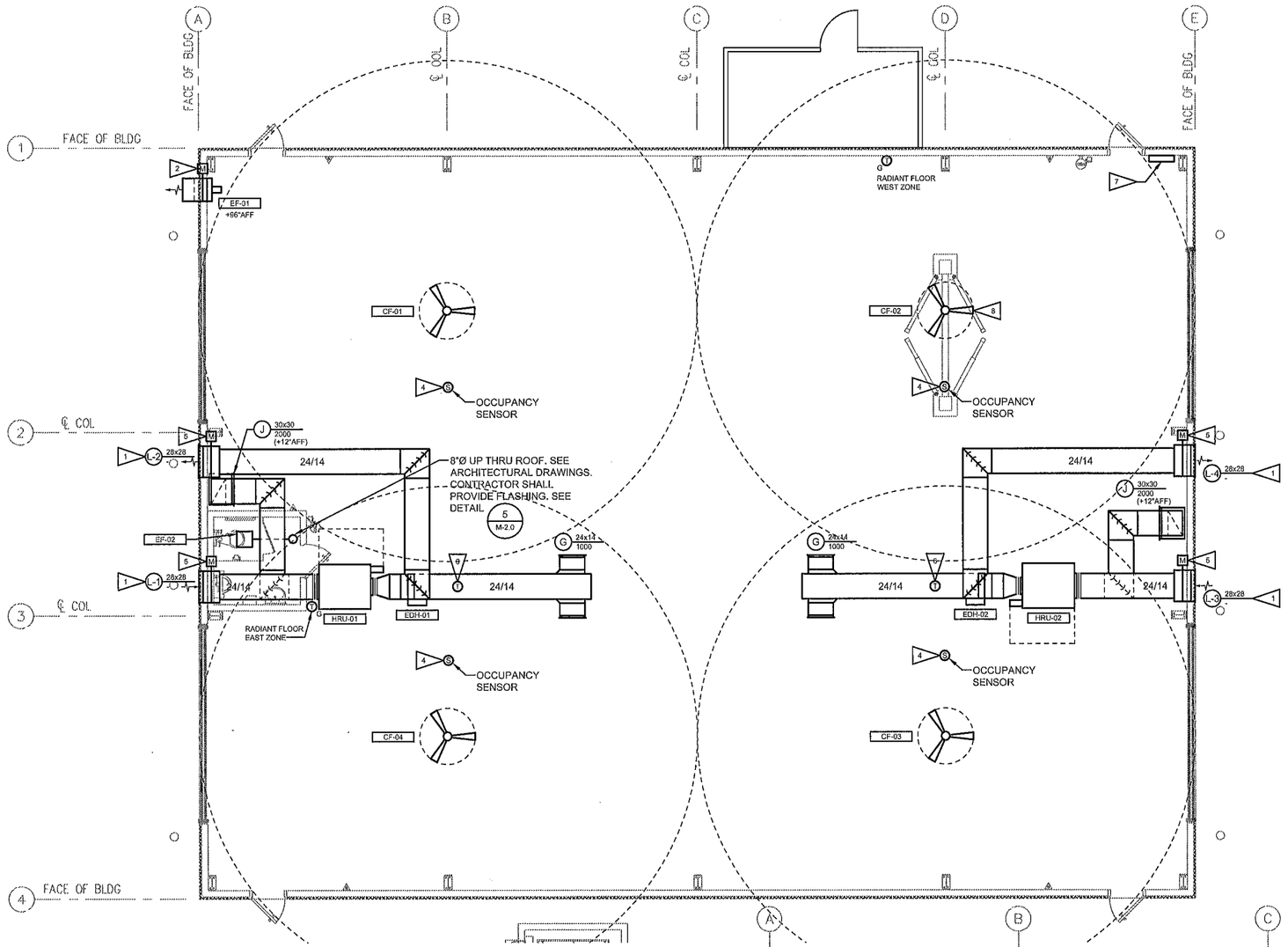
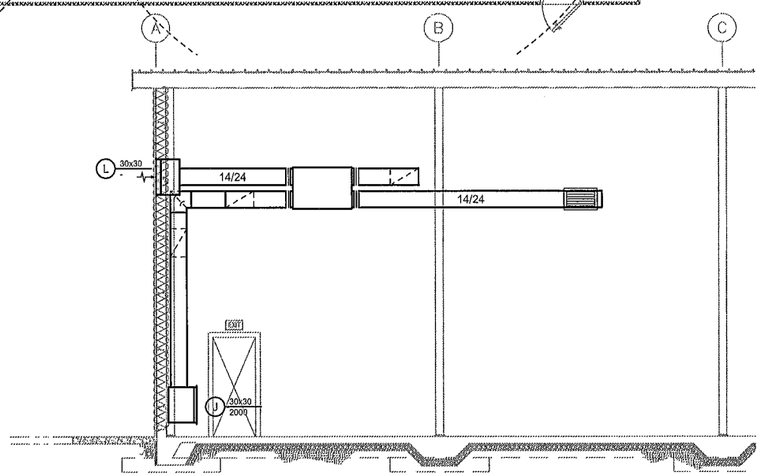


1 MECHANICAL FLOOR PLAN

SCALE: 3/16"=1'-0"



2 HVAC BUILDING SECTION

SCALE: 3/16" = 1'-0"

SHEET NOTES

1. SEE DETAILS ON SHEET M-2.0
2. COORDINATE ELEVATION AND LOCATION OF ALL MECHANICAL EQUIPMENT, LOUVERS, AND EXPOSED DUCTWORK WITH ARCHITECTURAL ELEVATIONS.
3. PROVIDE ALL EXPOSED DUCTWORK WITHOUT STANDING SEAMS OR FLANGES. SEAL ALL SEAMS WITH PAINTABLE SILICONE CAULK.
4. PROVIDE SINGLE GALVANIZED STEEL THREADED ROD DUCT HANGERS WITH SEISMIC BRACING WHERE REQUIRED BY CODE AT ALL EXPOSED DUCTWORK LOCATIONS.

FLAG NOTES

1. LOUVER. SEE ARCHITECTURAL FOR EXACT MOUNTING HEIGHT AND LOCATION. MINIMUM 54% FREE AREA. SEE DETAIL 4/M-2.0
2. PROVIDE MOTORIZED DAMPER INTERLOCKED WITH EXHAUST FAN EF-01. MOTORIZED DAMPER SHALL BE 24VAC, NORMALLY CLOSED, AND SHALL OPEN WHEN EF-01 IS IN OPERATION.
3. 4 HR TIMER SWITCH, FAN REMOTE DIAL WITH LOCKABLE GUARD, AND CO SENSOR FOR EF-01 OPERATION.
4. MOUNT OCCUPANCY SENSOR AT HIGH POINT OF INTERIOR STRUCTURE FACING DOWN.
5. PROVIDE MOTORIZED DAMPER INTERLOCKED WITH HRU-01. MOTORIZED DAMPER SHALL BE 120V/1Ø NORMALLY CLOSED, AND SHALL OPEN WHEN HRU-01 IS IN OPERATION. DIV 16 SHALL PROVIDE RELAY FOR INTERLOCK.
6. ELECTRIC DUCT HEATER TO MODULATE HEAT OUTPUT TO SATISFY DUCT DISCHARGE THERMOSTAT
7. INDIVIDUAL ON-OFF SWITCHES FOR THE FOLLOWING PIECES OF EQUIPMENT
   - CF-01, CF-02, CF-03 & CF-04
   - HRU-01 & HRU-02
   - EF-01
8. TOP OF HOIST EQUIPMENT IS 14'-2". CONTRACTOR SHALL COORDINATE FAN HEIGHT AND LOCATION TO AVOID CONFLICT WITH AUTO LIFT

WARNING
0 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

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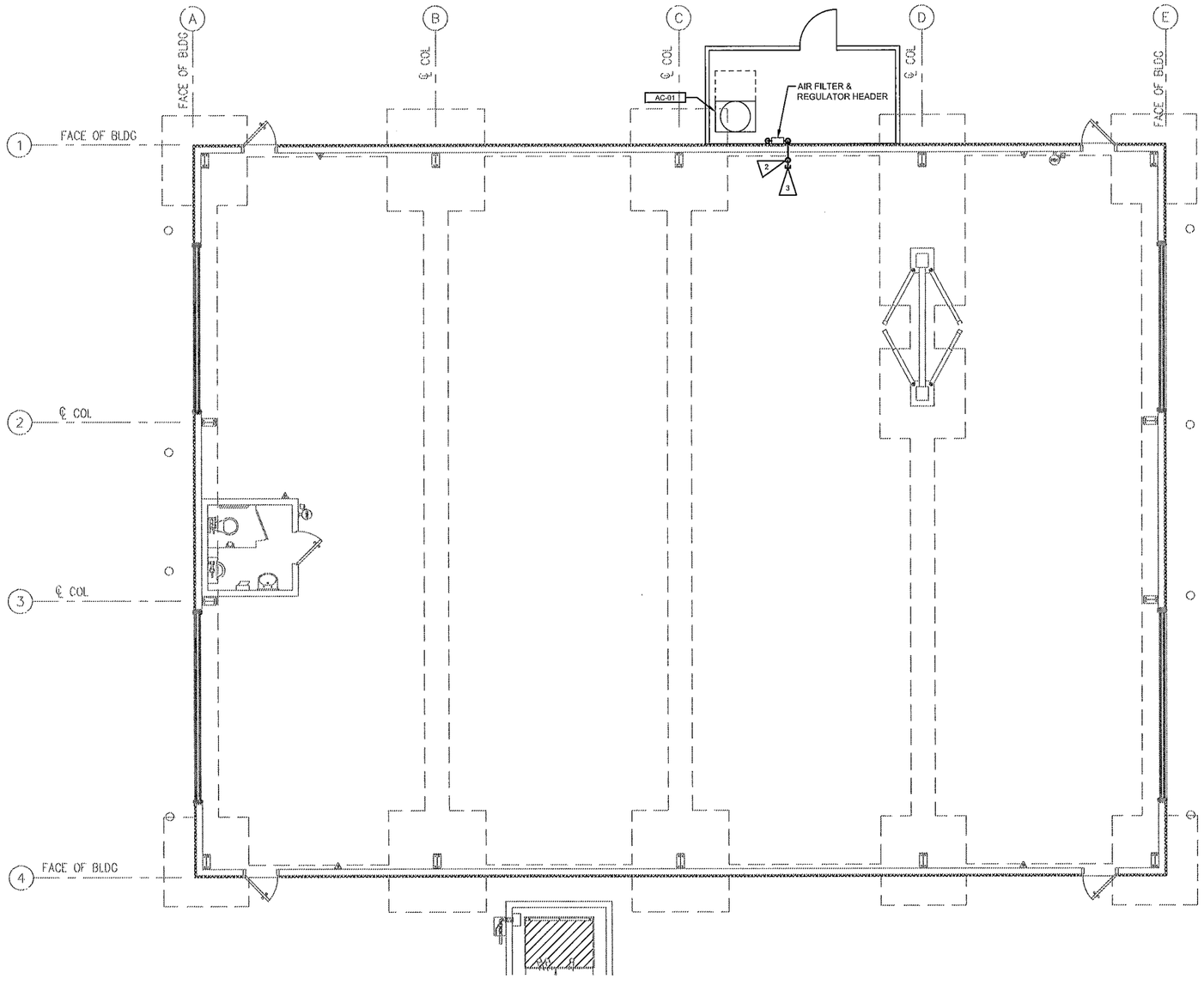
CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
MECHANICAL FLOOR PLAN

REV. NO. 0

BRIAN J. BOETTCHER STATE OF WASHINGTON 40958 REGISTERED PROFESSIONAL ENGINEER

REVIEWED	DESIGNED	DRAWN
	BJB	SLR
	4/10/18 DATE	STAMPED
APPROVED	DRAWING NO.	
	AP2226	



N 1 **COMPRESSED AIR FLOOR PLAN**
SCALE: 3/16"=1'-0"

SHEET NOTES

1. AIR COMPRESSOR AC-01 SHALL BE PROVIDED BY CONTRACTOR ALONG WITH AIR COMPRESSOR ACCESSORIES AS SCHEDULED, AND SHOWN ON DETAIL 3/M-2.0

FLAG NOTES

1. REFER TO DETAIL 2/M-2.0
2. ROUTE UP TIGHT TO WALL.
3. CAP 1" AIR PIPE FOR FUTURE CONNECTION AND EXTENSION

WARNING
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BRIAN J. BOETTCHER
STATE OF WASHINGTON
40958
REGISTERED
PROFESSIONAL ENGINEER

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
COMPRESSED AIR FLOOR PLAN

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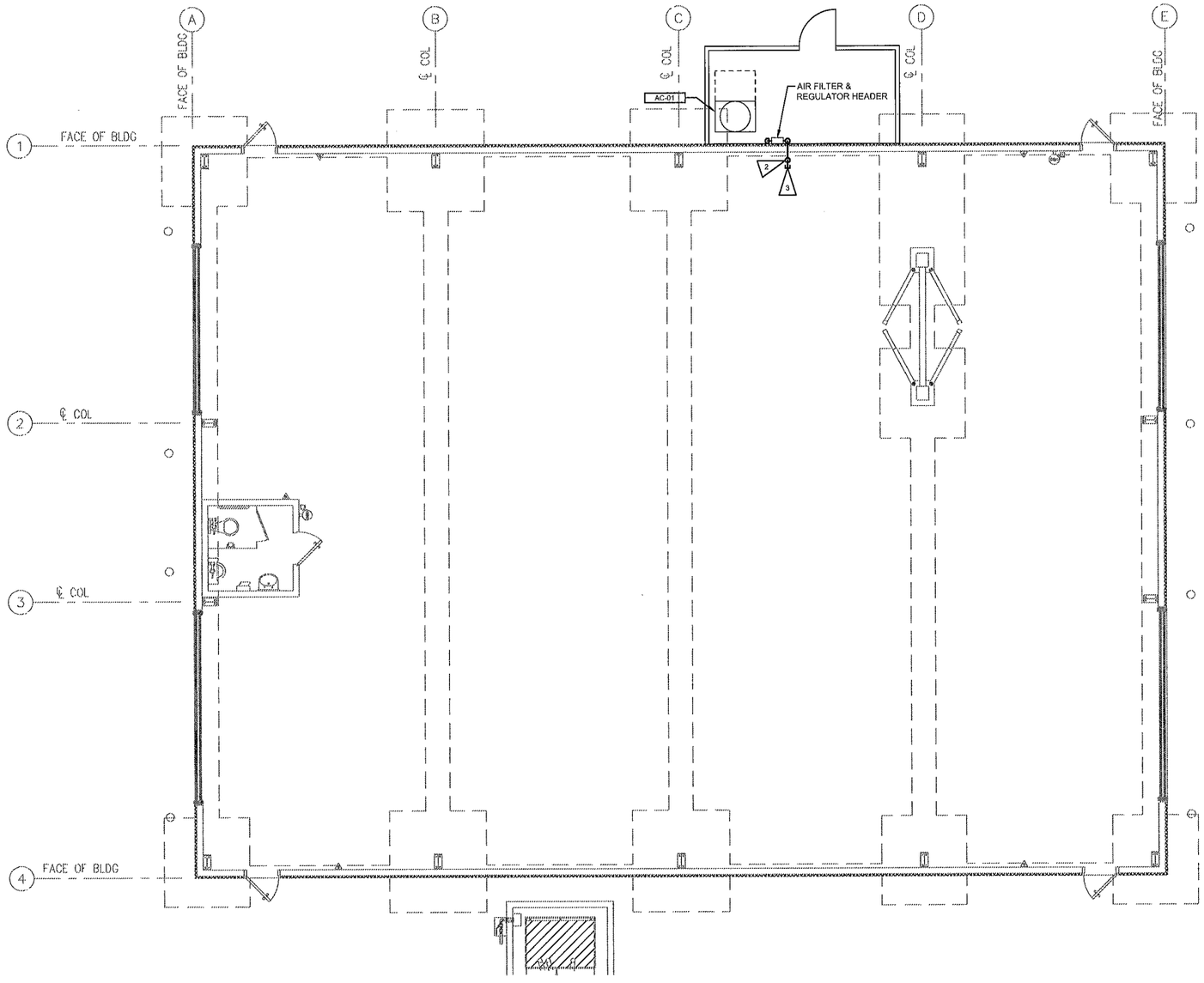
	DRAWING NO. AP2227	



N 1 **COMPRESSED AIR FLOOR PLAN**
SCALE: 3/16"=1'-0"

SHEET NOTES

1. AIR COMPRESSOR AC-01 SHALL BE PROVIDED BY CONTRACTOR ALONG WITH AIR COMPRESSOR ACCESSORIES AS SCHEDULED, AND SHOWN ON DETAIL 3/M-2.0

FLAG NOTES

1. REFER TO DETAIL 2/M-2.0
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CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
COMPRESSED AIR FLOOR PLAN

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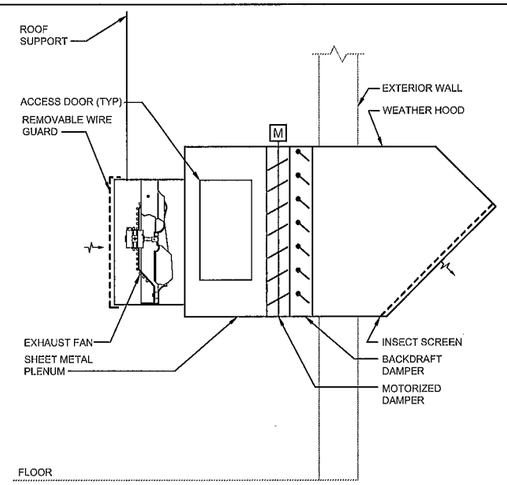
APPROVED	DRAWING NO.	
	AP2227	

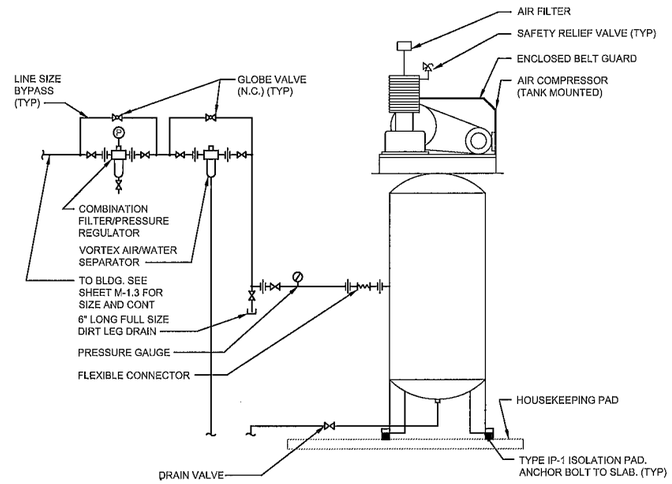
BRIAN J. BOETTCHER — STATE OF WASHINGTON — 40968 — REGISTERED PROFESSIONAL ENGINEER



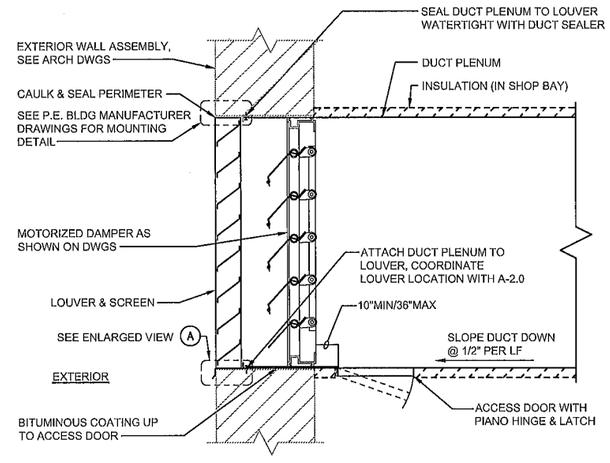
NOTES:
1. DIRECT DRIVE FAN SHOWN. BELT DRIVEN FAN SIMILAR.

1 M-2.0 DETAIL - WALL MOUNTED EXHAUST FAN
SCALE: NONE

2 M-2.0 DETAIL - NOT USED
SCALE: NONE

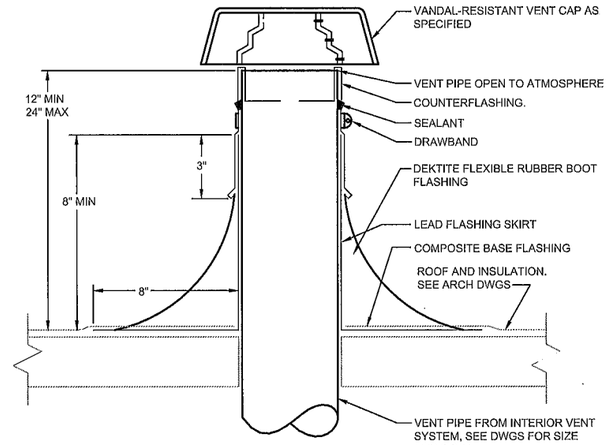


3 M-2.0 DIAGRAM - AIR COMPRESSOR (CA-01)
SCALE: NONE



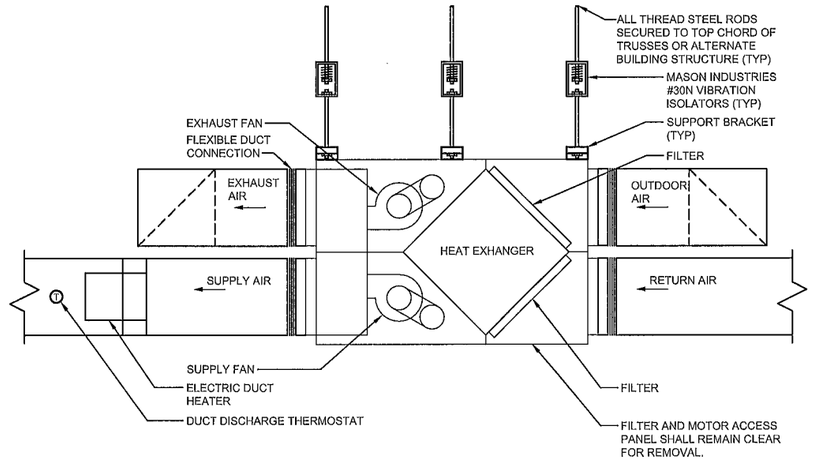
NOTES:
1. PLENUM DEPTH 18" MINIMUM UNLESS OTHERWISE NOTED ON DRAWINGS.

4 M-2.0 DETAIL - LOUVER
SCALE: NONE



NOTES:
1. PROVIDE DEKTITE FLASHING FOR METAL ROOFS. DETAIL SHOWS LEAD FLASHING FOR COMPOSITE MEMBRANE ROOFS.
2. DETAIL SHOWS PLUMBING VENT THROUGH ROOF PENETRATION. DETAIL ALSO APPLIES TO NATURAL GAS PIPING, LIQUEFIED PETROLEUM PIPING, AND SIMILAR PIPING THROUGH ROOF PENETRATIONS.

5 M-2.0 DETAIL - PLUMBING VENT THROUGH ROOF PENETRATION
SCALE: NONE



NOTES:
1. SEISMIC BRACING SHALL BE PROVIDED PER THE SPECIFICATIONS.

6 M-2.0 DETAIL - HEAT RECOVERY UNITS (HRU-01 & 02)
SCALE: NONE

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CITY OF TACOMA
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REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
MECHANICAL DETAILS

BRIAN L. BOETTCHER STATE OF WASHINGTON 40958 REGISTERED PROFESSIONAL ENGINEER

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	DRAWING NO. AP2228	

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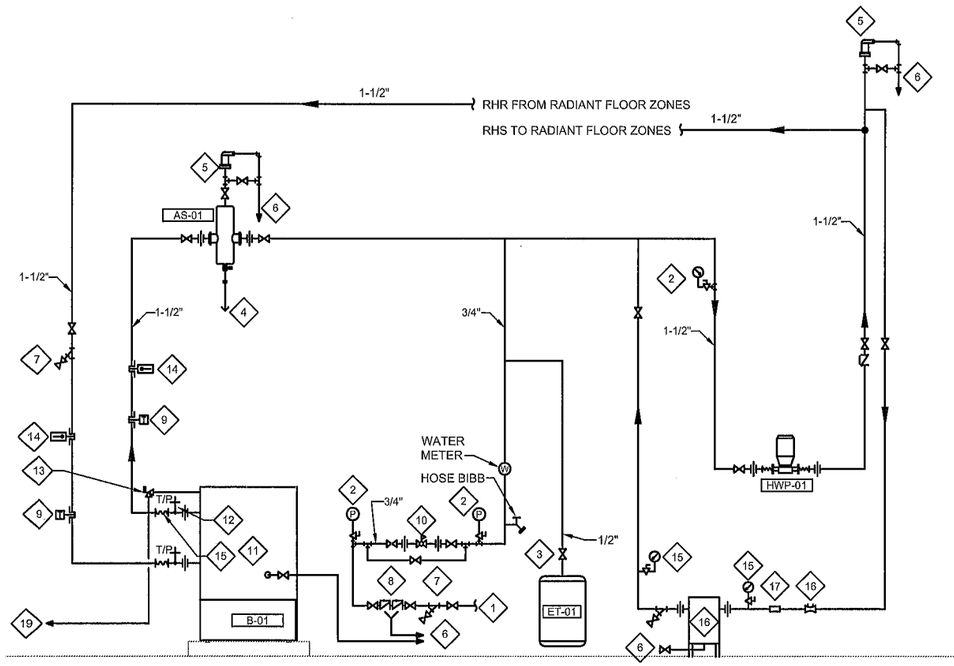
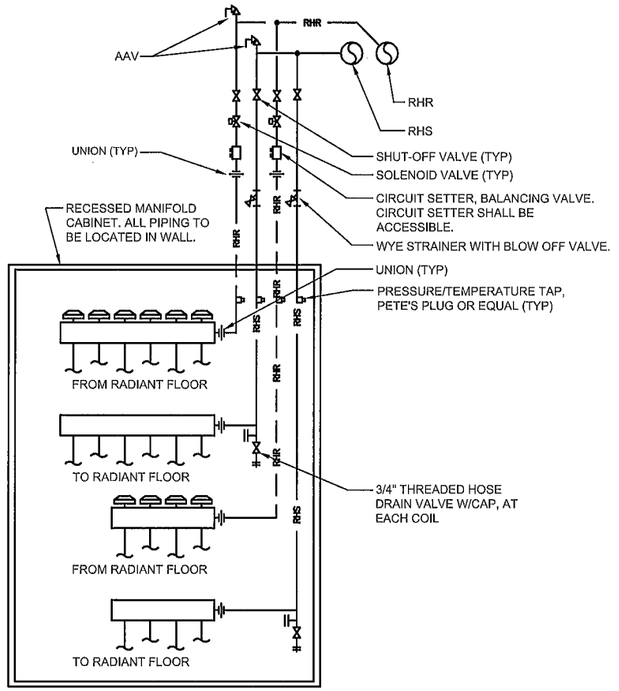


KEY NOTES:

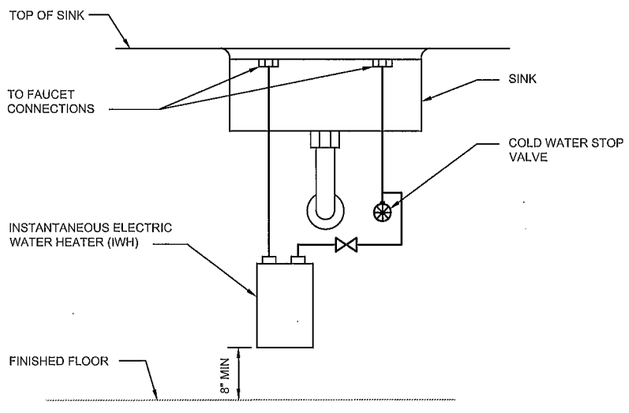
1. COLD WATER SERVICE.
2. DIAL TYPE PRESSURE GAUGE. RANGE = 0 TO 100 PSIG.
3. ISOLATION VALVE FOR VERIFICATION OF ET PRE-CHARGE ONLY. REMOVE VALVE HANDLE WITH ISOLATION VALVE IN FULLY OPEN POSITION PRIOR TO SYSTEM START-UP AND OPERATION.
4. BLOWDOWN FOR AIR SEPARATOR. 3/4" BALL VALVE W/ CAPPED HOSE THREAD FITTING ON OUTLET.
5. HIGH CAPACITY AUTOMATIC AIR VENT W/ 1/2" COPPER TUBING PIPED TO EXTERIOR. MANUAL AIR VENT VALVE BYPASS PIPED W/ 1/2" TUBING.
6. PIPE FULL SIZE TO STANDPIPE. ROUTE STAND PIPE TO DAYLIGHT AT EXTERIOR. SEE M-1.2 FOR CONT.
7. Y-STRAINER W/BLOWDOWN VALVE AND HOSE THREAD END CAP.
8. HYDRONIC SYSTEM BACKFLOW PREVENTER. PIPE DRAIN TO OUTSIDE. SEE BP823 FOR CONT.
9. IMMERSION TEMPERATURE SENSOR IN WELL
10. PRESSURE REGULATING VALVE, B&G MODEL B7-12 (SET FOR 12 PSI)
11. BOILER DRAIN VALVE. ROUTE FULL SIZE TO 3/4" BALL VALVE WITH CAPPED HOSE THREAD FITTING ON OUTLET.
12. TEMPERATURE/PRESSRE TEST PORT. TYPICAL.
13. SAFETY RELIEF VALVE. SET AT 75 PSIG.
14. STEM TYPE THERMOMETER IN WELL. RANGE 30°F TO 180°F.
15. PRESSURE GAUGE AS SPECIFIED. RANGE = 30 IN HG VAC TO 150 PSIG
16. 2 GALLON CHEMICAL FEEDER WITH INTEGRAL SUPPORT LEGS AND BAG TYPE FILTER WITH 10 MICRON NOMINAL RATING AND REPLACEABLE BAG TYPE ELEMENTS
17. GRISWOLD FLOW CONTROL VALVE OR APPROVED EQUAL. CAPACITY 2GPM, 2-32 PSI SPRING RANGE.
18. SITE FLOW INDICATOR
19. ROUTE BOILER T&P RELIEF VALVE TO DAYLIGHT TO EXTERIOR. SEE M-1.2 FOR CONT.

1 M-2.1 BOILER PIPING DIAGRAM
SCALE: NONE

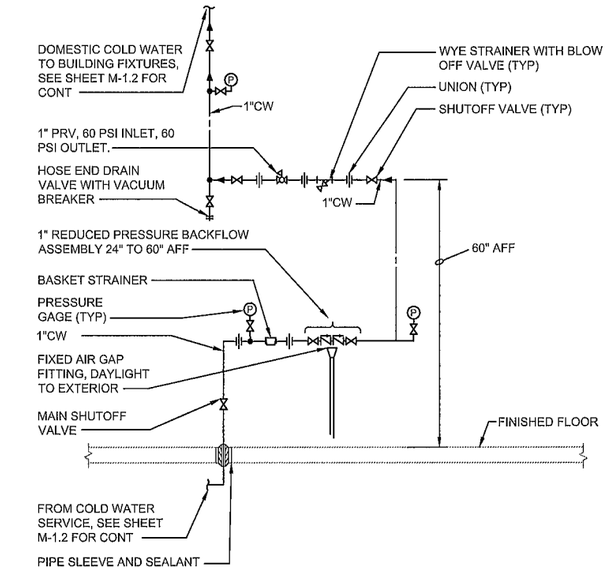


NOTES:
1. PROVIDE WITH PAINTED STEEL MANIFOLD ENCLOSURE AND COVER

2 M-2.1 DETAIL - RADIANT MANIFOLD W/ 2-WAY AUTOMATIC CONTROL VALVE
SCALE: NONE

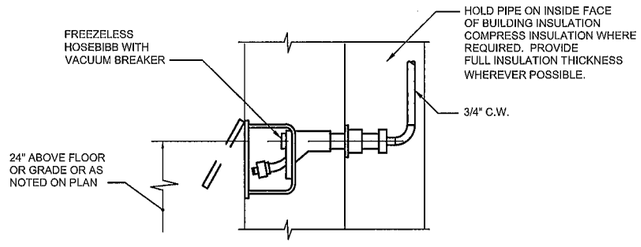


4 M-2.1 DETAIL- INSTANTANEOUS ELECTRIC WATER HEATER
SCALE: NONE



NOTES:
1. SUPPORT PIPE AS SPECIFIED AND PER MANUFACTURER'S INSTALLATION REQUIREMENTS.
2. SET SHUTOFF VALVE IN OPEN POSITION AND REMOVE HANDLE. STRAP HANDLE TO PIPE NEAR VALVE.

3 M-2.1 DIAGRAM - COLD WATER SERVICE HEADER
SCALE: NONE



5 M-2.1 DETAIL - TYPICAL FREEZEPROOF HOSEBIBB
SCALE: NONE

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DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
MECHANICAL DETAILS

BRIAN J. BOBT CHAIR — STATE OF WASHINGTON — 40958 — REGISTERED PROFESSIONAL ENGINEER

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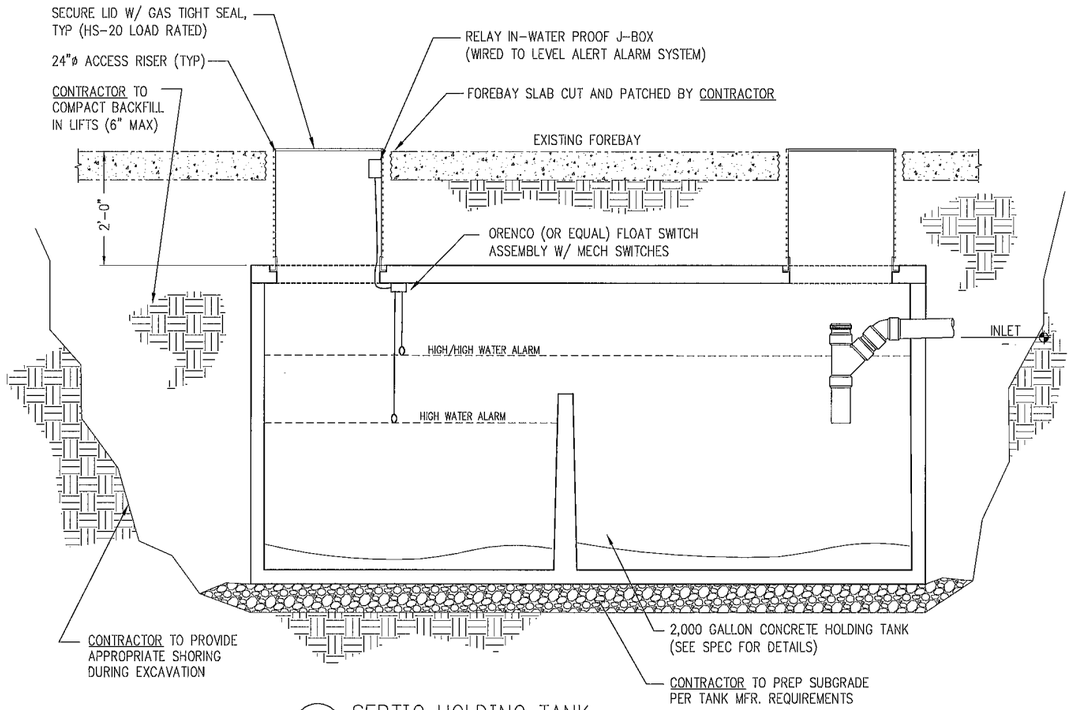
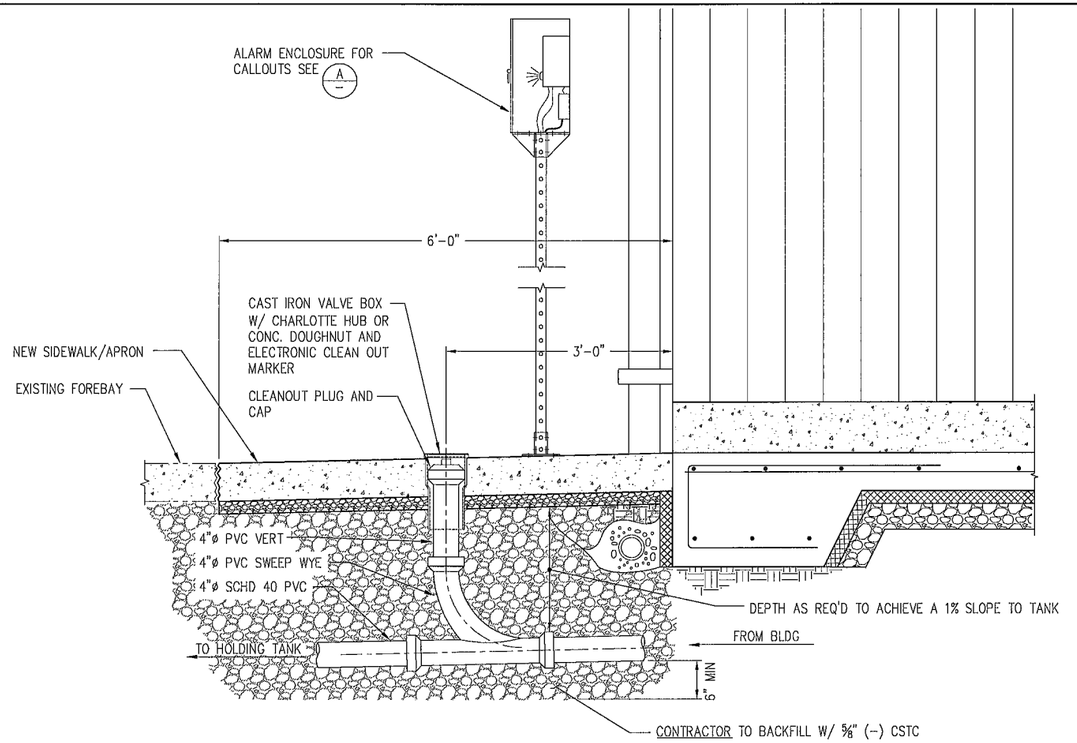
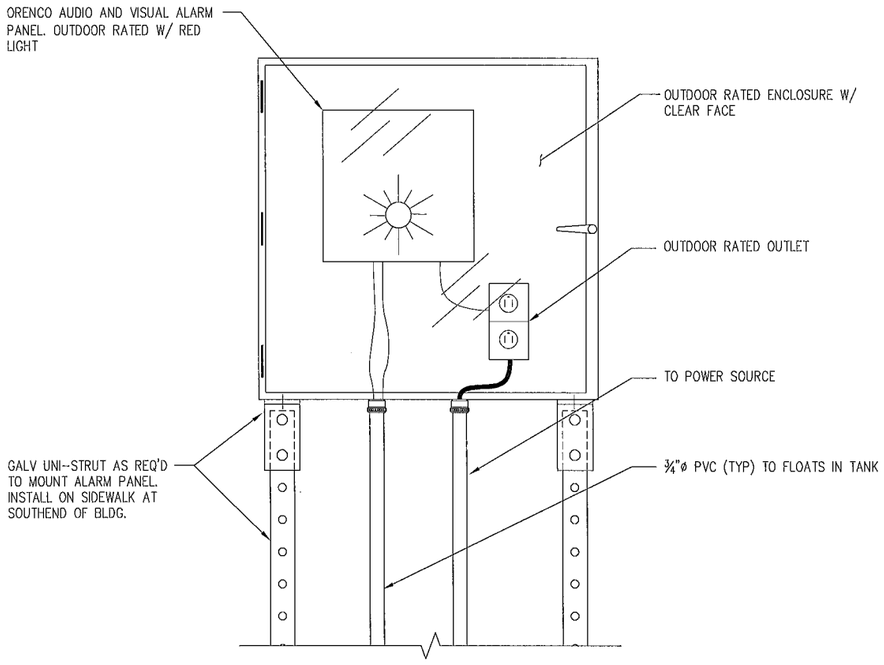


1 SEPTIC HOLDING TANK
SCALE: ¾" = 1'-0"



2 CLEANOUT
SCALE: 1" = 1'-0"



A ALARM SYSTEM DETAIL
SCALE: 3" = 1'-0"

NOTES:

1. CONTRACTOR SHALL BE CERTIFIED AND APPROVED BY PIERCE COUNTY TO INSTALL SEPTIC SYSTEM

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

REV. NO. 0

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
SEPTIC SYSTEM
DETAILS

STEPHEN D. FAIRCHILD — STATE OF WASHINGTON — 31204 — REGISTERED PROFESSIONAL ENGINEER

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	DRAWING NO. AP2230 M-1.6	

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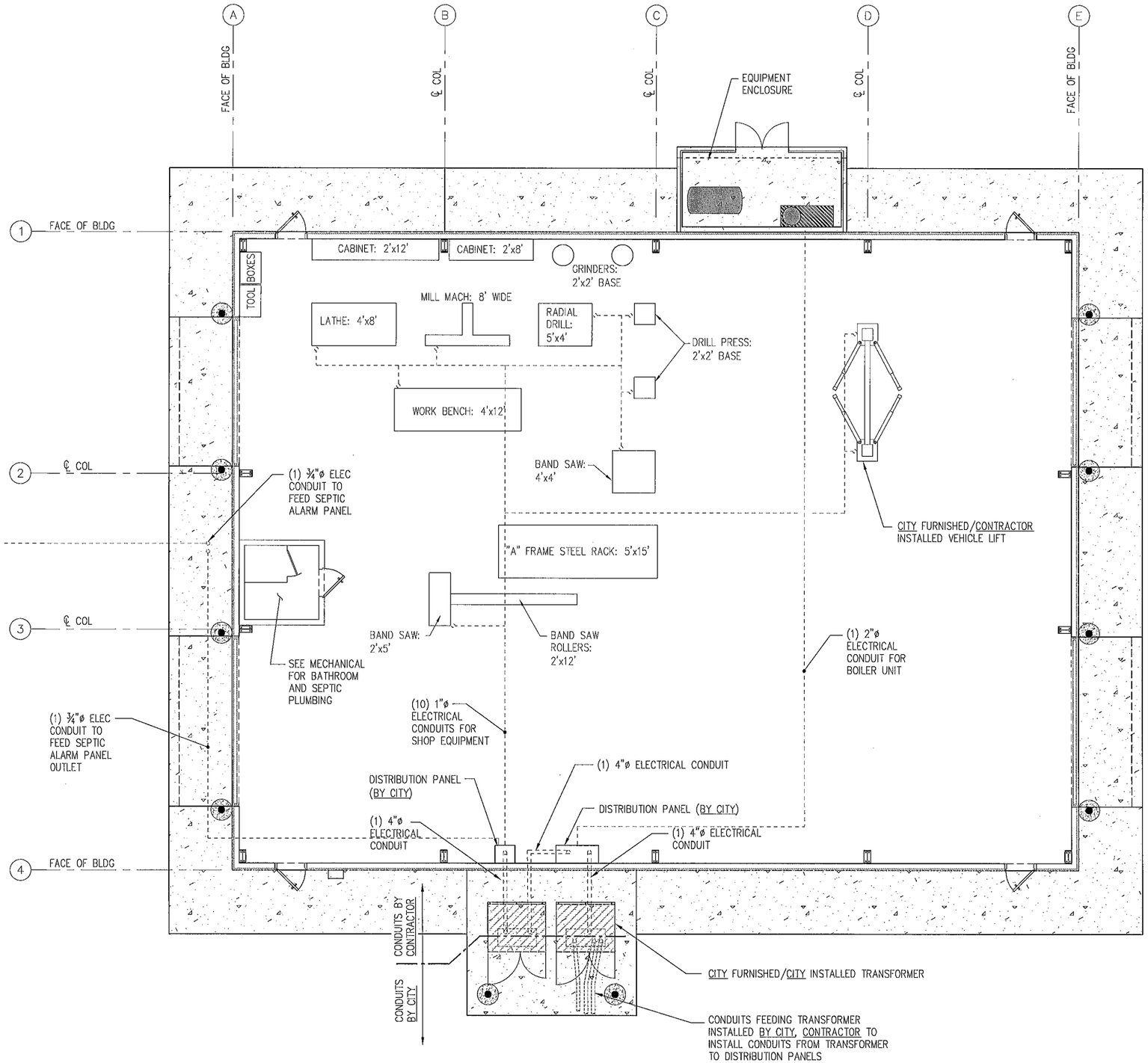

SLAB PLAN VIEW
SCALE: 3/16"=1'-0"

GENERAL NOTES:

1. MECHANICAL EMBEDS NOT SHOWN. SEE MECHANICAL DRAWINGS
2. THIS DRAWING IS PROVIDED FOR BIDDING PURPOSES TO ASSIST THE CONTRACTOR IN DEVELOPING A QUANTITY OF CONDUIT RUNS.
3. CONTRACTOR RESPONSIBLE FOR ALL CONDUITS FROM TRANSFORMER INTO BUILDING.
4. ALL ELECTRICAL WIRING TO BE INSTALLED BY CITY.

REV. NO. 0

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

CITY OF TACOMA
DEPARTMENT OF PUBLIC UTILITIES
LIGHT DIVISION

NISQUALLY PROJECT
LAGRANDE SHOP BUILDING UNDERSLAB ELECTRICAL LAYOUT

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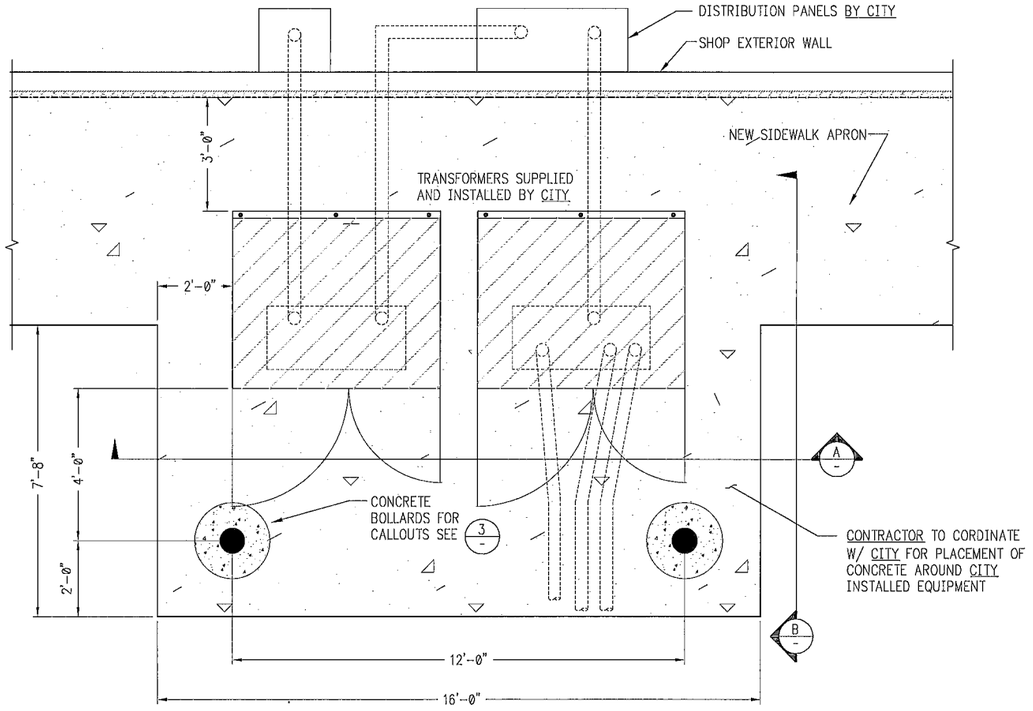
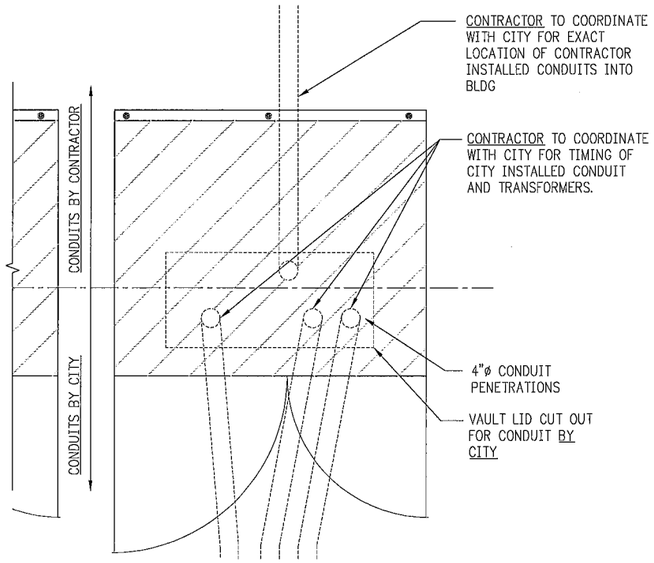
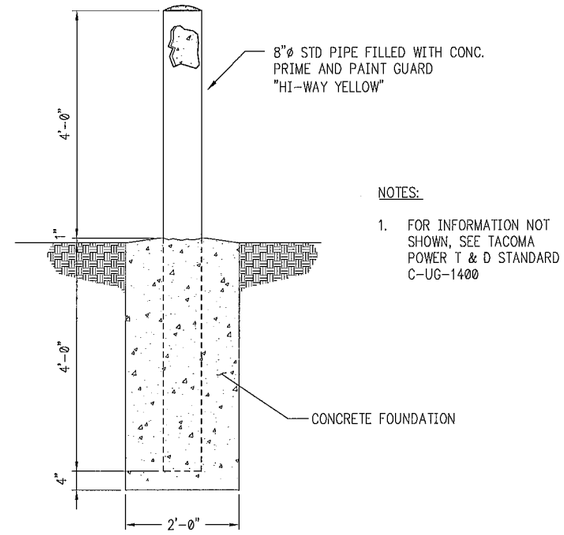


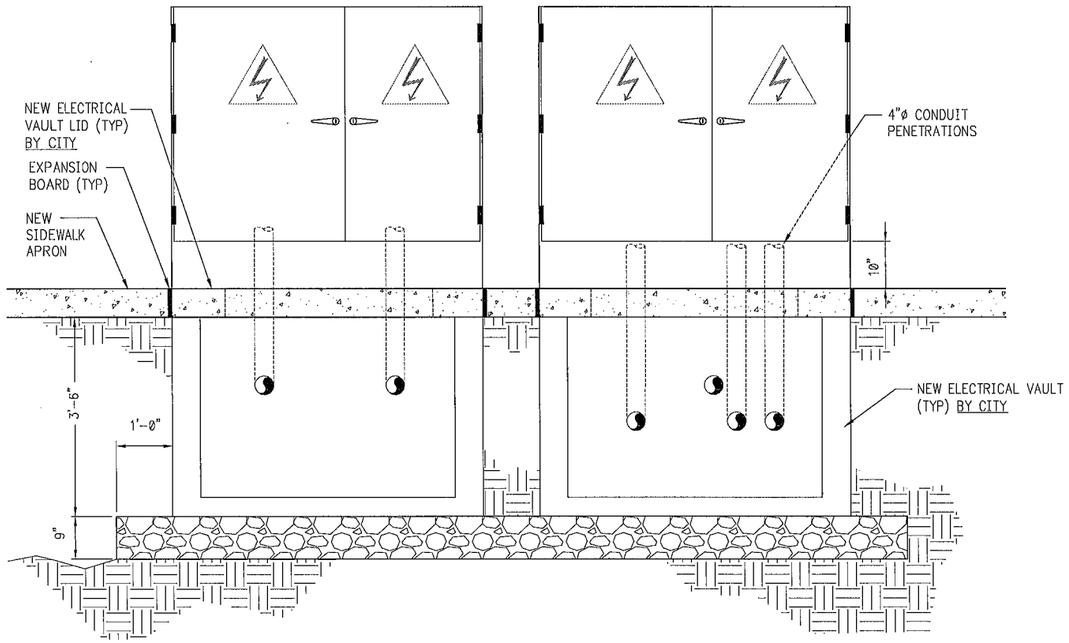
1 TRANSFORMERS
SCALE: 1/2" = 1'-0"



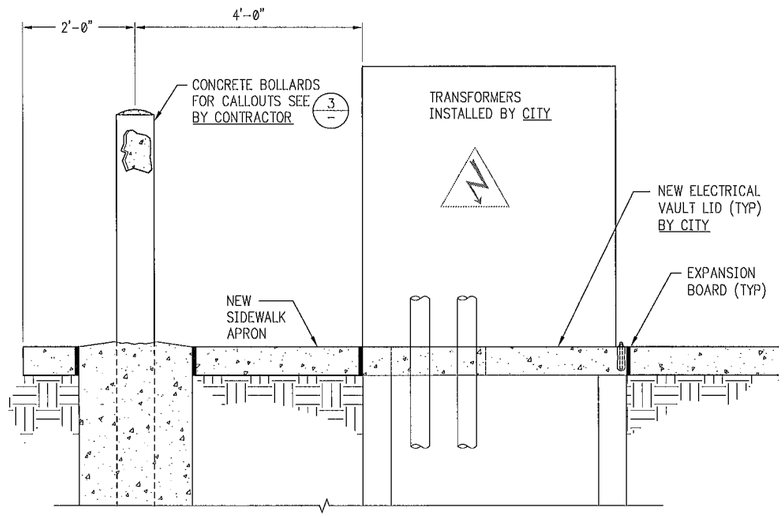
2 TRANSFORMER CONDUIT LOCATION
SCALE: 3/4" = 1'-0"



3 TYP BALLARD DETAIL (BY CONTRACTOR)
SCALE: 3/4" = 1'-0"



A SECTION
SCALE: 3/4" = 1'-0"



B SECTION
SCALE: 1" = 1'-0"

CITY OF TACOMA
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NISQUALLY PROJECT
LAGRANDE SHOP BUILDING
TRANSFORMER
DETAILS

REV. NO. 0

STEPHEN D. FAIRCHILD STATE OF WASHINGTON 31204 REGISTERED PROFESSIONAL ENGINEER

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