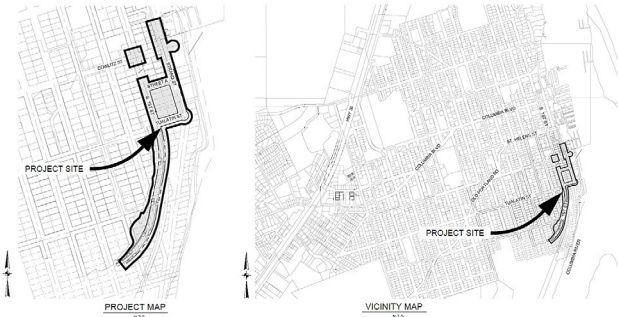




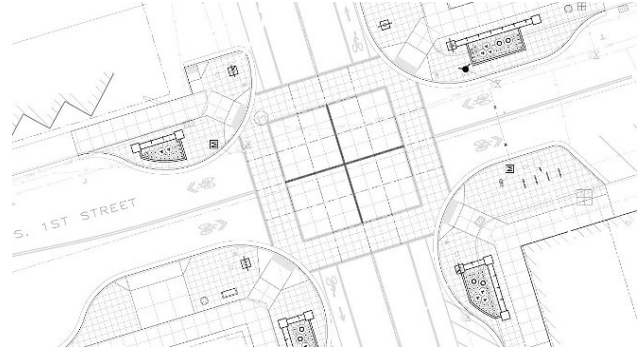
265 STRAND STREET, ST. HELENS, OR 97051 | (503) 397-6272 | [www.sthelensoregon.gov](http://www.sthelensoregon.gov)

# PROJECT BID DOCUMENTS

## S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525



## S. 1ST AT ST. HELENS STREET INTERSECTION IMPROVEMENTS PROJECT NO. R-685



OTAK Inc.  
808 SW Third Avenue  
Suite 800  
Portland, OR 97204  
(503) 287-6825



Kittelison & Associates  
851 SW 6th Avenue, Suite 600  
(503) 228-5230

PRE-BID MEETING: July 19, 2022, 10:00 AM  
Columbia Room, St. Helens City Hall, 265 Strand Street, St. Helens, Oregon 97051

**BIDS DUE: August 2, 2022, 2:00 PM**  
Columbia Room, St. Helens City Hall, 265 Strand Street, St. Helens, Oregon 97051

**CITY OF ST. HELENS  
NOTICE TO CONTRACTORS / INVITATION TO BID**

**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION  
PROJECT NO. P-525  
AND  
S 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
PROJECT NO. R-685**

Notice is hereby given that Sealed Bids for furnishing all materials, equipment, labor, and services for the **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525** and **S 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS PROJECT NO. R-685** for the City of St. Helens (City) will be accepted by the City Administrator at St. Helens City Hall, 265 Strand Street, St. Helens, Oregon until **2:00 pm August 2, 2022**. All bids received on or before this date and time and in proper form will be publicly opened and read in the Columbia Room at the time set forth above as the deadline for receipt of bids, and thereafter bid documents, shall be made available for public inspection. Bids received after this date and time will not be considered. First-tier Subcontracting Disclosure forms, per the instructions to bidders, are due within two (2) working hours after the bid submission deadline.

Prequalification of Contractors and/or Subcontractors     is         is not required.

A **Mandatory Pre-Bid Conference** will be held in the Columbia Room at the City of St. Helens City Hall at 265 Strand Street, St. Helens, Oregon 97051 on July 19, 2022, at 10:00 AM to provide prospective bidders with the opportunity visit the site and ask questions relating to bidding or constructing the work under this Contract. If deemed appropriate by the Engineer, questions that cannot be addressed by direct reference to the bidding documents will be the subject of an addendum issued to all plan holders.

Contractor is required to submit bids on both the S. 1st and Strand Street Road and Utilities Extension project and the S. 1st Street at St. Helens Street Intersection Improvements project. Award for the lowest responsive bid will be based on the combined bid total of both projects.

**The General Character of the Work under this Contract includes:**

**S. 1st and Strand Street Road and Utilities Extension, Project No. 525**

Base contract work includes street construction of S. 1st Street from Tualatin Street to Cowlitz Street, all Cowlitz Street improvements, and Strand Street from its existing southern terminus to the Courthouse, construction of new pump station, the pathway along the bluff (including lighting and landscaping), and two water quality swale facilities. Storm drain improvements within the street improvements described above, storm main construction within S. 1st Street (from Plymouth to Tualatin Street), Tualatin Street, and Strand Street (from Tualatin Street to existing southern terminus of Strand Street). Sewer construction includes the force main connection between the pump station and wastewater treatment plant with all the gravity sewer construction shown on the plans. Water line improvements within the street improvements and between Tualatin Street and Plymouth.

Add 1 work includes street construction of Tualatin Street, Street A, and Strand Street (from Tualatin Street to the existing southern terminus of Strand Street), including furnishings, lighting, and landscaping within the limits of Add 1. Construction of the waterline extension between the end of existing Strand Street and the intersection of S. 1st Street and Tualatin Street. Stormwater construction includes catch basins for new street construction of Strand Street and Tualatin Street as well as Street A.

**S. 1st Street at St. Helens Street Intersection Improvements , Project No. R-685**

Work is for intersection improvements at the S 1st Street - St. Helens Street intersections and includes new curb extensions, pedestrian crossings, signing, paving, striping, site furnishings, and landscaping.

**The Solicitation Schedule and Deadlines are generally as follows:**

Bid Submission Deadline/Bid Opening: August 2, 2022, 2:00 PM

Anticipated City Council Award: August 17, 2022

Anticipated Notice to Proceed: August 30, 2022

Project Final Completion: September 15, 2024

Contract Documents, including plans and specifications, may be examined after 2:00 pm June 29, 2022, at the following offices,

City of St. Helens City Hall	265 Strand Street, St. Helens, OR 97051	503-397-6272
Dodge Data & Analytics	3461 NW Yeon Ave., Portland, OR 97210	253-539-9335
Oregon Contractors Plan Center	5468 SE International Drive, Milwaukie, OR 97222	503-650-0148
Daily Journal of Commerce	www.djcoregon.com	503-274-0624
SW Washington Contractors Association	7017 NE Hwy 99, Suite #214, Vancouver, WA 98665	360-694-7922
Premier Builders Exchange	1902 NE 4th Street, Bend, OR 97701	541-389-0123
Salem Contractors Exchange Plan Center	2256 Judson St SE, Salem, OR 97309	503-362-7957
Seattle Daily Journal of Commerce	www.plancenter.com	206-219-6481

Copies of Contract Documents, including plans and specifications may be obtained on or after June 29, 2022 at St. Helens City Hall 265 Strand Street, St. Helens, Oregon for a nonrefundable fee of one hundred seventy-five dollars (\$175.00) per set. If ordered by mail, add a forty-five-dollar (\$45.00) processing and mailing charge. Plans may also be downloaded at no cost on the City's website at <https://www.sthelensoregon.gov/rfps>.

**Bids shall only be considered valid if Bidder is listed on the City's Official Plan Holder List.** The purchase of project Plans and Specifications from the City will place the Bidder on the Official Plan Holder List. Bidders who acquire Plans and Specifications from a website or a Plan Center must contact the City at (503) 397-6272 and request to be placed on the City's Official Plan Holder List for a nonrefundable fee of ten dollars (\$10.00).

The City reserves the right to make changes to the Notice to Contractors/Invitation to Bid and the resulting contract by written addenda, prior to the bid submission deadline and date. The City will not mail notice of addenda but shall publish notice of any addenda on the City's website, <https://www.sthelensoregon.gov/rfps>, and post the notice of addenda at City Hall. The addenda may be downloaded or picked up at City Hall. Check website and City Hall bulletin board frequently until the bid submission deadline because City may, in its discretion, provide additional notices.

No bid will be received or considered unless the bid is submitted in writing and received on the prescribed City Offer forms, mailed or delivered to the City Administrator, City Hall, City of St. Helens, 265 Strand Street St. Helens, Oregon 97051 in a sealed envelope plainly marked on the outside of the envelope "SEALED BID" and specifying the project name(s), **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525** and **S 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS PROJECT NO. R-685**, and bearing the name and address of the bidder, the bidder's telephone number and the bid opening date. All bids must be prepared and signed in ink by an authorized representative. Facsimile bids will not be accepted. No bid will be received or considered unless the bid contains a statement by the bidder, as part of their bid, that Contractor agrees to be bound by and will comply with the provisions of ORS 279C.838 or 279C.840 or 40 U.S.C. 3141 to 3148 (Davis- Bacon Act), as applicable. This project is for a public work and is subject to ORS 279C.800 to 279C.870, the Oregon Prevailing Wage Law.

No bid will be received or considered unless the bid contains a statement by the bidder, as part of their bid, identifying whether or not the bidder is a resident bidder as defined by ORS 279A.120.

Bidders  are  are not required to be licensed for asbestos removal under ORS 468A.720. The successful bidder is required to obtain a City business license. No bid will be received or considered unless the bidder is licensed by the Oregon Construction Contractor's Board or the State Landscape Contractors Board, whichever is applicable.

No bid will be received or considered unless the Offer is accompanied by a certified check, cashier's check, surety bond (bid bond), or irrevocable letter of credit issued by an insured institution as defined in ORS 706.008, in an amount equal to ten percent (10%) of the total amount bid.

The successful bidder will be required to furnish a faithful performance bond and a labor and material payment bond each in the amount of one hundred percent (100%) of the amount of the Contract and show proof that the Contractor has filed a public works bond in the amount of \$30,000 with Bureau of Labor and Industries (BOLI). Contractor will also be required to furnish evidence of insurance, including workers' compensation insurance before the Work shall commence.

The City shall investigate and determine the qualifications of the apparent low responsive bidder prior to awarding the Contract. The City shall reject any bid by a nonqualified or disqualified bidder. The City reserves the right to reject any bid not in compliance with all prescribed public bidding procedures and requirements and may reject all

bids for good cause upon a finding that it is in the public interest to do so. Evaluation of bids will be based on minimum requirements established by the specifications and compliance with conditions of the Notice to Contractors/Invitation to Bid and City's public contracting rules. Additional evaluation criteria are as follows: None Required

Pursuant to ORS 279A.120, awards shall be subject to preference for products produced or manufactured in Oregon, providing that price, fitness and quality are equal. In determining the lowest responsible bidder, City shall add a percent increase to each out-of-state bidder's bid price which is equal to the percent of preference given to local bidders in the bidder's home state, as set forth in the chart located at <https://www.oregon.gov/DAS/Procurement/Pages/Index.aspx> The deadline to file a written protest or request, pursuant to Instruction to Bidders to change Contract terms, conditions or specifications is not less than ten (10) calendar days prior to the bid submission deadline. The bid submission deadline may be extended by the City to consider a protest or request.

**Project Contact for the S. 1st and Strand Street Road and Utilities Extension, Project No. 525**

Keith Buisman, P.E., Otak Project Manager, (503) 287-6825, [keith.buisman@otak.com](mailto:keith.buisman@otak.com)

**Project Contact for the S. 1st Street at St. Helens Street Intersection Improvements , Project No. R-685**

Tony Roos, P.E., Kittelson & Associates Project Manager, (503) 535-7444, [troos@kittelson.com](mailto:troos@kittelson.com)

**City of St. Helens Project Contact:**

Mouhamad Zaher, City of St. Helens Public Works Director, (503) 366-8235, [mzaher@sthelensoregon.gov](mailto:mzaher@sthelensoregon.gov);

The City of St. Helens requires all contractors to comply with the City's adopted Nondiscrimination and Equal Opportunity Policies, a copy of which can be obtained from the City Project Manager, supra. The City's programs, services, employment opportunities, volunteer positions and contracts are open to all persons without regard to race, color, religion, sex, sexual orientation, national origin, marital status, or age if the individual is 18 years of age or older. Contractor shall comply with all federal, state, and local laws and ordinances applicable to the Work under this Contract, including, without limitation, ORS chapter 279A-C, and Title VI of the Civil Rights Act of 1964, Section V of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, ORS 659A.142, and all regulations and administrative rules established pursuant to those laws, and all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. Contractor shall certify that the Contractor has not discriminated against minorities, women, or emerging small businesses in obtaining any required subcontracts.

**S. 1st And Strand Street Road And Utilities Extension, Project No. P-525, and  
S 1st Street At St. Helens Street Intersection Improvements, Project No. R-685**

**PROJECT BID DOCUMENTS  
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**S. 1st And Strand Street Road And Utilities Extension, Project No. P-525**

- PART 1 BID DOCUMENTS
  - Firm Offer (Bid) And Schedule Of Prices
  - First-Tier Subcontractor Disclosure Form
  - First Tier Subcontractors
  - Standard Public Improvement Contract Bid Bond Surety
  
- PART 2 CONTRACT DOCUMENTS
  - Standard Public Improvement Contract
  - Contractor Data, Certification, and Signature
  - Standard Terms And Conditions for Public Improvement Contracts
  - Exhibit A - Statement of Work, Compensation, and Payment Schedule
  - Exhibit B - Public Improvement Contract Insurance Requirements
  - Exhibit C - Certification Statement for Corporation or Independent Contractor
  - Exhibit D - Bonds (Payment and Performance)
  - Exhibit E - Certificate of Substantial Completion
  - Exhibit F- Certificate of Compliance
  - Exhibit G - Contractor's Release of Liens and Claims
  - Exhibit H - Certificate of Final Completion
  - Exhibit I - Instructions to Bidders
  - Exhibit J - Oregon Prevailing Wage Rates
  
- PART 3 2021 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION  
(Accessible on online on the ODOT's website)
  
- PART 4 CITY OF ST. HELENS ENGINEERING STANDARDS MANUAL  
MUNICIPAL CODE TITLE 18 (Accessible on online on the City of St.  
Helens website)
  
- PART 5 SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS
  
- PART 6 SUPPLEMENTARY INFORMATION
  
- PART 7 CONSTRUCTION DRAWINGS

**S 1st Street At St. Helens Street Intersection Improvements, Project No. R-685**

- PART 1 BID DOCUMENTS
  - Firm Offer (Bid) And Schedule Of Prices
  - First-Tier Subcontractor Disclosure Form
  - First Tier Subcontractors

Standard Public Improvement Contract Bid Bond Surety

**PART 2 CONTRACT DOCUMENTS**

Standard Public Improvement Contract

Contractor Data, Certification, and Signature

Standard Terms And Conditions for Public Improvement Contracts

Exhibit A - Statement of Work, Compensation, and Payment Schedule

Exhibit B - Public Improvement Contract Insurance Requirements

Exhibit C - Certification Statement for Corporation or Independent Contractor

Exhibit D - Bonds (Payment and Performance)

Exhibit E - Certificate of Substantial Completion

Exhibit F- Certificate of Compliance

Exhibit G - Contractor's Release of Liens and Claims

Exhibit H - Certificate of Final Completion

Exhibit I - Instructions to Bidders

Exhibit J - Oregon Prevailing Wage Rates

**PART 3 2021 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION**  
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**PART 4 CITY OF ST. HELENS ENGINEERING STANDARDS MANUAL**  
**MUNICIPAL CODE TITLE 18** (Accessible on online on the City of St. Helens website)

**PART 5 SPECIAL PROVISIONS AND TECHNICAL SPECIFICATIONS**

**PART 6 SUPPLEMENTARY INFORMATION**

**PART 7 CONSTRUCTION DRAWINGS**

**SUBMIT THIS SHEET WITH YOUR BID**

**COMBINED BID FORM FOR**

S 1st Street - Strand Street Road and Utilities Extension  
Project P-525 and, S 1st Street - St. Helens Street Intersection  
Improvements Project R-685

S. 1st and Strand Street Road and Utilities Extension, Project No. 525

A. Base Bid is \_\_\_\_\_

B. Add 1 Bid is \_\_\_\_\_

S. 1st Street at St. Helens Street Intersection Improvements , Project No. R-685

C. Bid is \_\_\_\_\_

Add the bid prices from A, B, and C and write in the total price below.

Combined bid for the S. 1st and Strand Street Road and Utilities Extension, Project No. 525 and the S. 1st Street at St. Helens Street Intersection Improvements, Project No. R-685 is,

**S. 1ST AND STRAND STREET ROAD  
AND UTILITIES EXTENSION**

**PROJECT NO. P-525**



## INTRODUCTION AND TABLE OF CONTENTS

Contract Documents are listed below. Documents are either attached or bound separately and available from the Project Manager. All documents bound separately are incorporated into the Contract Documents and have the same force and effect as though set forth in full herein.

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EXHIBIT D	BONDS (PAYMENT AND PERFORMANCE)
EXHIBIT E	CERTIFICATE OF SUBSTANTIAL COMPLETION
EXHIBIT F	CERTIFICATE OF COMPLIANCE
EXHIBIT G	CONTRACTOR'S RELEASE OF LIENS AND CLAIMS
EXHIBIT H	CERTIFICATE OF FINAL COMPLETION
EXHIBIT I	INSTRUCTIONS TO BIDDERS
EXHIBIT J	OREGON PREVAILING WAGE RATES

**PART 3: 2021 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION**

..... Available online  
Bound

**PART 4: CITY OF ST. HELENS ENGINEERING STANDARDS MANUAL**

..... Available online

In the event of a conflict, Supplementary Conditions control over all Standard Specifications and other Contract Documents. To the extent Standard Specifications and other Contract Documents conflict, the more restrictive requirement or provision shall control, except where otherwise noted in the Contract Documents, addenda, or amendment.

**PART 5: TECHNICAL SPECIFICATIONS & SPECIAL PROVISIONS**

.....See Technical Specifications Table of Contents

**PART 6: SUPPLEMENTARY INFORMATION**

Bidder's Checklist  
Project Documentation Checklist

**PART 7: CONSTRUCTION DRAWINGS**

..... Separately Bound

Part 1

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# **Bid Documents**

**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION  
PROJECT NO. P-525  
FIRM OFFER (BID) AND SCHEDULE OF PRICES**

TO FURNISH ALL PERMITS, LABOR, TOOLS, MACHINERY, MATERIALS, TRANSPORTATION, EQUIPMENT AND SERVICES OF ALL KINDS REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT FOR THE CITY OF ST. HELENS, COLUMBIA COUNTY, OREGON, AS STATED IN THE COMPLETED SCHEDULE OF PRICES, ALL IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, PLANS, SPECIFICATIONS, AND DRAWINGS WHICH ARE ON FILE AT THE CITY OF ST. HELENS, CITY HALL, 265 STRAND STREET, ST. HELENS, OREGON 97051.

<b>NAME OF BIDDER:</b> _____
CONTACT: _____
ADDRESS: _____
CITY _____ STATE _____ ZIP _____
TELEPHONE NO.: _____
FAX NO.: _____
EMAIL ADDRESS: _____

To the Honorable Mayor and City Council  
City Hall  
City of St. Helens  
265 Strand Street  
St. Helens, Oregon 97051

In response to competitive bidding, this FIRM OFFER is submitted as an offer by the undersigned to enter into a contract with the City of St. Helens for furnishing all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, the construction of this Project for the City of St. Helens, Oregon, as shown in the Contract Documents on file at City Hall, 265 Strand Street, St. Helens, Oregon, and which are a condition of this Offer as though they were attached. This offer is subject to the following declarations as to the acts, intentions and understandings of the undersigned and the agreement of the City of St. Helens to the terms and prices herein submitted.

1. The undersigned has familiarized themselves with the nature and extent of the Contract Documents, project Work, site, locality, general nature of Work to be performed by City or others at the site that relates to the project Work required by the Contract Documents, local conditions, and federal state, and local Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the project Work.
2. The undersigned has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) examinations, investigation, exploration, tests, and studies which pertain to the conditions (subsurface or physical) at or contiguous to the site or otherwise and which may affect the cost, progress, performance, or furnishing of the project Work as Contractor deems necessary for the performance and furnishing of the project Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents; and no additional or supplementary examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by Contractor for such purposes.
3. All of the Contract Documents, including all plans, specifications, and drawings have been examined and an examination of the site of the proposed Work, together with such investigations as are necessary to determine the conditions to be encountered have been made by the undersigned and the terms and conditions of the Contract and solicitation documents are hereby accepted, and that if this Offer is accepted, the undersigned will contract with the City of St. Helens, Oregon, using the form attached and agrees to be bound to the terms and conditions of said Contract and solicitation documents.
4. It is understood that the contract drawings may be supplemented by additional drawings and specifications in explanation and elaboration thereof and, if they are not in conflict with those referred to in paragraph 1 above, they

shall have the same force and effect as though they were attached and they shall be accepted as part of the Contract when issued.

5. The undersigned agrees that upon written acceptance of this bid s/he/it will, within ten working days, of receipt of such notice, execute a formal contract agreement with the City. The undersigned further agrees that s/he/it will provide the following in order to execute the Contract:

- Performance Bond and Payment Bond, both in the amount equal to 100% of the awarded Contract;
- Proof of filing of a Public Works Bond in the required statutory amount with BOLI
- Certificates of Insurance for all required insurance coverages;
- Certificates of Coverage for Workman Compensation and unemployment insurance; and
- All other bonds, permits, licenses, etc. as required in the Contract Documents.

6. The quantities stated in the Schedule of Prices are approximate only and payment will be made at the unit prices stated for the actual quantities incorporated in the completed Work. If there is an increase in the total payment for an item covered by a lump sum price, it shall be computed on the basis of extra work for which an increase in payment will have been earned; and if there is a decrease in a lump sum payment for any such items, it shall be made only as the result of negotiation between the undersigned and the City.

**P-525 BID SCHEDULE OF PRICES FORM CAN BE FOUND SEPARATELY  
ON THE PROJECT WEBSITE**

The following **Base Bid** of \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_) and the following **Add 1 Bid** of \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for a **Total Bid** of  
\_\_\_\_\_ Dollars (\$ \_\_\_\_\_) is  
proposed for the project as described in the Contract Documents.

7. All items in the Schedule of Prices have been completed in full by showing a unit or lump sum price or prices for each and every item thereof. The price per item shall be clearly shown in the space provided. The pricing shall be extended to show the total when required.
8. The undersigned submits the unit prices as those at which he will perform the Work involved. The extensions of the column headed "ITEM TOTAL" are made for the sole purpose of facilitating bid comparisons and if there are any discrepancies between the unit prices and the total amount shown, the unit prices shall govern.
9. The undersigned agrees to furnish labor, tools, machinery, materials, transportations, equipment and services of all kinds required for, necessary for, or reasonably incidental to, construction of this Project with all appurtenant Work as required by the plans and specifications of this Offer for the unit or lump sum prices in the "SCHEDULE OF PRICES".
10. In stating prices, it is understood that the prices include all materials and Work required to complete the Contract in accordance with the plans and specifications. If any material, item or service required by the plans and specifications has not been mentioned specifically in the "SCHEDULE OF PRICES", the same shall be furnished and placed with the understanding that the full cost to the City has been merged with the several prices stated in the "SCHEDULE OF PRICES".
11. The undersigned shall furnish bonds required by the specifications and comply with the laws of the State of Oregon which are pertinent to construction contracts of this nature even though such laws may not have been quoted or referred to in the specifications.

12. Accompanying this Offer is a certified check, cashier's check or a bid bond, in the sum of \$ [REDACTED], payable to the City of St. Helens, Oregon, this being an amount for ten percent (10%) of the total bid based upon the estimate of quantities at the above price according to the conditions of the advertisement. If this Offer is accepted by the City and the undersigned fails to execute a satisfactory contract and bonds as stated in the Advertisement within ten (10) working days from the date of notification, then the City may, at its option, determine that the undersigned has abandoned the contract and there upon this Offer shall be considered null and void, and the bid security accompanying this Offer shall be forfeited to and become the property of the City of St. Helens. If bid is not accepted, bid security accompanying this Offer shall be returned to the undersigned.
13. The undersigned agrees to be bound by and will comply with the provisions of ORS 279C.838 or 279C.840 or 40 U.S.C. 3141 to 3148, the Oregon Prevailing Wage law or the Federal Davis Bacon Act, as applicable.
14. The undersigned certifies that the undersigned Contractor is not ineligible to receive a contract for a public work pursuant to ORS 279C.860. Bidder further agrees, if awarded a contract, that every subcontractor will be eligible to receive a contract for a public work pursuant to ORS 279C.860.
15. The undersigned certifies that he undersigned Contractor has not discriminated against minority, women or emerging small businesses enterprises in obtaining any required subcontracts. The bidder understands and acknowledges that it may be disqualified from bidding on this public improvement project as set forth in OAR 137-049-0370, including but not limited to City discovery a misrepresentation or sham regarding a subcontract or that the Bidder has violated any requirement of ORS 279A.110 or the administrative rules implementing the Statute.
16. The undersigned agrees that the time of completion shall be defined in the specifications, and further, the undersigned agrees to initiate and complete this Project by the date stated below.

The Work shall be commenced within five working days after receipt of the written Notice to Proceed.  
The Work shall be completed in all respects within 680 calendar days following issuance of the Notice to Proceed and shall be completed no later than September 15, 2024.
17. The undersigned bidder is licensed by the Oregon Construction Contractors Board, the registration is current and valid, and the bidder's registration number is stated below.
18. If applicable, the undersigned bidder is licensed by the State Landscape Contractors Board, the license is current and valid, and the bidder's registration number is stated below.
19. The undersigned acknowledges that, in determining the lowest responsible bidder, City shall, for the purpose of awarding the Contract, add a percent increase to each out-of-state bidder's bid price which is equal to the percent of preference given to local bidders in the bidder's home state, as set forth in the chart located at [www.oregon.gov/DAS/EGS/ps/Pages/RecipPref/detail\\_a\\_main\\_page.aspx](http://www.oregon.gov/DAS/EGS/ps/Pages/RecipPref/detail_a_main_page.aspx). "Resident bidder" of Oregon means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid that the bidder is a "resident bidder" of the State of Oregon. The undersigned represents him/her/it in this bid to be either a Resident or a Nonresident bidder by completing the appropriate blank below.
20. The undersigned hereby represents that no Commissioner, officer, agency or employee of the City of St. Helens is personally interested directly or indirectly in this Contract or the compensation to be paid hereunder and that no representation, statement or statements, oral or in writing, of the City, its Councilors, officers, agents or employees had induced him/her to enter into this Contract, and the documents made a part of its terms.
21. The undersigned has not directly or indirectly induced or solicited any person to submit a false or sham bid or refrain from bidding. The undersigned certifies that this bid has been arrived at independently and submitted without connection with any person, firm or corporation making a bid for the same project and is, in all respects, fair and without collusion or fraud.
22. The undersigned confirms that this firm has a Qualified Drug Testing Program for employees in place and will demonstrate this prior to award of Contract.

- 23. The undersigned confirms that if this Contract involves asbestos abatement or removal, the bidder is licensed under ORS 468A.710 for asbestos removal. Asbestos abatement is not implicated in this Contract.
- 24. The City of St. Helens may waive minor informalities, reject any bid not in compliance with all prescribed public bidding procedures and requirements, and may reject for good cause any or all bids upon a finding that it is in the public interest to do so.
- 25. The undersigned confirms that this offer is not contingent upon City's acceptance of any terms and conditions other than those contained in the Solicitation and Contract Documents.
- 26. The bidder acknowledges that the Addendum(s) listed below have been reviewed online or a copy obtained and considered as part of the submittal of this Offer and Schedule of Prices.

**ADDENDA NUMBERED [REDACTED] THROUGH [REDACTED] HAVE BEEN REVIEWED.**

- 27. Bidder information and signature.

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**NAME OF BIDDER**

**BIDDER IS A RESIDENT OF THE STATE OF** \_\_\_\_\_

(See ORS 279A.120)

**CONSTRUCTION CONTRACTORS BOARD LICENSE NO** \_\_\_\_\_

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**SIGNATURE OF BIDDER'S AUTHORIZED REPRESENTATIVE**

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**OFFICIAL TITLE OF BIDDER'S AUTHORIZED REPRESENTATIVE**

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**DATE BID IS SIGNED**

**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION**

**Project No. P-525**

**City of St. Helens, Oregon**

Person designated to receive form: John Walsh, City Administrator Phone #: 503-397-6272

**BID SUBMISSION DEADLINE** Date: August 2, 2022 Time: 2:00pm AM PM

If the bid is more than \$100,000 this form must be submitted at the location specified in the Invitation to Bid on the advertised bid submission deadline and within two (2) working hours after the advertised bid submission deadline.

List below the Name, Dollar Value and Category of Work of each subcontractor that will be furnishing labor or labor and materials and that is required to be disclosed, the dollar value of the subcontract and the category of work that the subcontractor will be performing. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED).

SUBCONTRACTOR NAME	DOLLAR VALUE	CATEGORY OF WORK

The above listed first-tier subcontractor(s) are providing labor or labor and materials with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, or \$15,000 whichever is greater (including all alternates). If the Dollar Value is less than \$15,000 do not list the subcontractor above; or
- b) \$350,000 regardless of the percentage of the total Contract Price.

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award. THIS DOCUMENT SHALL NOT BE FAXED. IT IS THE RESPONSIBILITY OF BIDDERS TO SUBMIT THIS DISCLOSURE FORM AND ANY ADDITIONAL SHEETS BY THE DEADLINE. SEE INSTRUCTIONS TO BIDDERS.

Deliver form to: City Administrator  
City Hall, City of St. Helens  
265 Strand Street  
St. Helens, OR 97051

Form Submitted by (Bidder Name): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone Number: \_\_\_\_\_



## FIRST TIER SUBCONTRACTORS

Each first-tier subcontractor must disclose the following information before the Notice To Proceed shall be issued:

(Make additional copies as needed for each subcontractor)

**Subcontractor/Address:** \_\_\_\_\_

For: \_\_\_\_\_

\$ \_\_\_\_\_

Builders Board No. \_\_\_\_\_ Expires \_\_\_\_\_

Worker's Comp. Verified:       Yes       No

Insurance Company \_\_\_\_\_ Policy No. \_\_\_\_\_ Expires \_\_\_\_\_

City of St Helens Business License \_\_\_\_\_

**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT CONTRACT  
BID BOND SURETY**

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as "PRINCIPAL", and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as "SURETY",

hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (OBLIGEE) the sum of:  
(\$ \_\_\_\_\_)

\_\_\_\_\_ Dollars.

The condition of the obligation of this bond, is that the PRINCIPAL herein has in response to City's *Notice to Contractors and Invitation to Bid*, submitted its Offer for the **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525**, which Offer is incorporated herein and made a part hereof by this reference, and Principal is required to furnish bid security in an amount equal to ten (10%) percent of the total amount of the bid pursuant to ORS 279C.365 and the City's public contracting rules and contract documents.

NOW THEREFORE, if the Offer, submitted by PRINCIPAL, is accepted, and if the Contract pursuant to the Offer is awarded to the PRINCIPAL, and if the PRINCIPAL executes such Contract and furnishes such good and sufficient Performance and Payment Bonds as required by the Bidding and Contract Documents within the time specified and fixed by the Documents, then this obligation shall be void; otherwise it shall remain in full force and effect. If the PRINCIPAL shall fail to execute the proposed Contract and to furnish the Performance and Payment Bonds, the SURETY hereby agrees to pay the OBLIGEE the surety bond sum as liquidated damages within ten (10) days of such failure.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Surety

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

By: \_\_\_\_\_  
[A certified copy of the Agent's Power of Attorney must be attached hereto.]

By: \_\_\_\_\_ Attorney-in-Fact

Part 2

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# Contract Documents



**CITY OF ST. HELENS, OREGON  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT**

**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION**

**Project No. P-525**

This Contract is between the CITY OF ST. HELENS, a municipal corporation of the State of Oregon (City) and \_\_\_\_\_ (Contractor). The City's Project Manager for this Contract is Mouhamad Zaher.

**1. Effective Date and Duration**

This Contract is effective on \_\_\_\_\_, 20\_\_\_\_, or on the date at which every party has signed this Contract, whichever is later. The Work under this Contract shall, unless otherwise terminated or extended, be completed on or before September 15, 2024.

**2. Statement of Work**

The General Character of the Work includes but is not limited to: the extension of S. 1st St from Cowlitz St south to Plymouth St with multiple mid-block crossings; the extension of Strand St south and west from Columbia View Park to intersect S. 1st St opposite the Tualatin pedestrian stairway; Construction of new intersections for S. 1st and Strand St, S. 1st/Street A, and Strand/Street A; Intersection improvements at the Cowlitz/S. 1st St and Cowlitz/Strand St intersections; New public utility extensions of water, sanitary sewer, and storm drainage; Construction of a new sanitary sewer lift station and abandonment of an existing sewer lift station; Construction of new pedestrian pathway along bluff including lighting and landscaping; and the construction of two water quality swale facilities.

Base Contract includes street construction of S. 1st Street from Tualatin Street to Cowlitz Street, all Cowlitz Street improvements, and Strand Street from its existing southern terminus to the Courthouse, construction of new pump station, the pathway along the bluff (including lighting and landscaping), and two water quality swale facilities. Storm drain improvements within the street improvements described above, storm main construction within S. 1st Street (from Plymouth to Tualatin Street), Tualatin Street, and Strand Street (from Tualatin Street to existing southern terminus of Strand Street). Sewer construction includes the force main connection between the pump station and wastewater treatment plant with all the gravity sewer construction shown on the plans. Water line improvements within the street improvements and between Tualatin Street and Plymouth.

Add 1 includes street construction of Tualatin Street, Street A, and Strand Street (from Tualatin Street to the existing southern terminus of Strand Street), including furnishings, lighting, and landscaping within the limits of Add 1. Construction of the waterline extension between the end of existing Strand Street and the intersection of S. 1st Street and Tualatin Street. Stormwater construction includes catch basins for new street construction of Strand Street and Tualatin Street as well as Street A.

The Work is fully described in the Contract Documents, which are hereby incorporated herein and made a part hereof by this reference. The statement of work, including the delivery schedule for the Work, is contained in **Exhibit A**. Contractor shall, at its own risk and expense, perform the Work described in the Contract Documents and furnish all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, performance of the Work, that is, the construction of this Project for the City of St. Helens, Oregon, as shown in the Contract Documents. Contractor shall secure all Municipal, County, State, or Federal Permits or licenses including but not limited to payment of permit fees, license fees and royalties necessary or incident to performance of the Work on this Contract. The risk of loss for such Work shall not shift to the City until written acceptance of the Work by the City.

### 3. Consideration

- a. City agrees to pay Contractor, at the times and in the manner provided in the Contract Documents, the sum of \_\_\_\_\_ (\$ \_\_\_\_\_) for accomplishing all the Work required by this Contract and the Contract Documents.
- b. Any progress payments to Contractor shall be made only in accordance with the schedule and requirements in **Exhibit A**, if applicable, and Section 21 of the Standard Terms and Conditions for Public Improvement Contracts.
- c. City certifies that sufficient funds have been appropriated to make payments required by this Contract during the current fiscal year. Payment for Work performed after June 30 of any given year is subject to funds being appropriated by the St. Helens City Council. If funds are not appropriated, the City may terminate this Contract for convenience by notice to the Contractor.

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**CONTRACTOR DATA, CERTIFICATION, AND SIGNATURE**

Business Name (Please Print): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_

Social Security #: \_\_\_\_\_ St. Helens Business License #: \_\_\_\_\_

Federal Tax ID#: \_\_\_\_\_ State Tax ID #: \_\_\_\_\_

Construction Contractors Board #: \_\_\_\_\_

Citizenship: Nonresident Alien  Yes  No

Business Designation (check one):  Individual  Sole Proprietorship  Partnership  
 Corporation  Government/Nonprofit

The above information must be provided prior to contract approval. Payment information will be reported to the Internal Revenue Service (IRS) under the name and taxpayer I.D. number provided above. (See IRS 1099 for additional instructions regarding taxpayer ID numbers.) Information not matching IRS records could subject you to withholding.

I, the undersigned, understand that the Standard Terms and Conditions For Public Improvement Contracts and Exhibits A through J together with all other Contract Documents as described in Section 5 of the Standard Terms and Conditions For Public Improvement Contracts, and the separately bound 2021 Oregon Standard Specifications for Construction, and the City Public Facilities Construction Standards Manual, are an integral part of this Contract and agree to perform the Work described in the Contract Documents, including but not limited to Exhibit A, in accordance with the terms and conditions of this Contract. I further understand the City is prohibited from entering into a contract when the contractor has neglected or refused to file any return, pay any tax, or properly contest a tax, pursuant to ORS305.385; I hereby certify, under penalty of perjury and false swearing, that I/my business am/is not in violation of any Oregon Tax Laws; I further certify that I am an independent contractor as defined in ORS 670.600.

Signed by Contractor:

\_\_\_\_\_  
Signature/Title Date

*NOTICE TO CONTRACTOR: This Contract does not bind the City of St. Helens unless and until it has been executed by the Mayor after authorization by the City Council at a public meeting.*

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**CITY OF ST. HELENS SIGNATURE**

Approved: \_\_\_\_\_  
Mayor Rick Scholl Date  
Authorized by the full Council on \_\_\_\_\_

Attest: \_\_\_\_\_  
City Recorder Date

Reviewed: \_\_\_\_\_  
City Attorney Date

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**CITY OF ST. HELENS**  
**STANDARD TERMS AND CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS**

**1. Contractor is Independent Contractor**

- a. Contractor shall perform the Work required by this Contract as an independent contractor. Although the City reserves the right (i) to specify the desired results; (ii) to determine (and modify) the delivery schedule for the Work to be performed; and (iii) to evaluate the quality of the completed performance, the City cannot and will not control the means, methods or manner of the Contractor's performance. The Contractor is responsible for determining the appropriate means, methods and manner of performing the Work.
- b. The Contractor represents and warrants that Contractor (i) is not currently an employee of the federal government or the State of Oregon, and (ii) meets the specific independent contractor standards of ORS 670.600, as certified on the Independent Contractor Certification Statement attached as Exhibit C.
- c. Contractor will be responsible for any federal, state or local taxes applicable to any compensation or payment paid to Contractor under this Contract.
- d. Contractor is not eligible for any federal Social Security, unemployment insurance, state Public Employees' Retirement System, or workers' compensation benefits from compensation or payments to Contractor under this Contract.

**2. Subcontracts and Assignment**

Contractor shall not subcontract any of the Work required by this contract, or assign, sell, dispose of, or transfer any of its interest in this contract, nor delegate duties under the contract, either in whole or in part, without the prior written consent of the City. Such consent, if provided, shall not relieve the Contractor of any of the obligations under the contract. Any assignee or transferee shall be considered the agent of the Contractor and be bound to abide by all provisions of the Contract. Contractor agrees that if subcontractors are employed in the performance of this contract, the Contractor and its subcontractors are subject to the requirements and sanction of ORS Chapter 656, Workers' Compensation.

Use of Subcontractors, material suppliers or equipment suppliers shall in no way release Contractor from any obligations of the Contract with City. Contractor will provide in all subcontract agreements that the Subcontractor, material supplier and equipment supplier will be bound by the terms and conditions of this Contract to the extent that they relate to the Subcontractor's work, material or equipment. All subcontracts are assignable to the City at City's option, in the event this agreement is terminated for default of Contractor.

**3. No Third Party Beneficiaries**

City and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

**4. Successors in Interest**

The provisions of this Contract shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and approved assigns, if any.

**5. Contract Documents**

The Contract Documents, which comprise the entire Contract between the City and Contractor, include all sections or parts of the bid package however denominated, including all documents and plans attached or referenced therein, the Notice to Contractors - Invitation to Bid, Offer, First-Tier Subcontractors Disclosure Form, Surety Bid Bond, Public Improvement Contract, Contract Standard Terms and Conditions and Exhibits thereto, Performance Bond, Payment Bond, Special Provisions, Plans entitled **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525**, Construction Drawings, Standard Drawings, and Contract Addendums, all attached hereto, and incorporated herein by this reference, together with the Prevailing Wage (BOLI) if applicable AND any other separately bound reference, 2021 Oregon Standard Specifications for Construction, the City of St. Helens Engineering Department Public

Facilities Construction Standards Manual Appendix to St. Helens Community Development Code, incorporated herein by this reference. All exhibits, schedules and lists attached to the Contract Documents, or delivered pursuant to the Contract Documents, shall be deemed a part of the Contract Documents and incorporated herein, where applicable, as if fully set forth herein.

#### **6. Contractor's Representations**

By executing this Contract, the Contractor hereby certifies that the representations made by the Contractor in the Contract Documents, including specifically the Offer, are true and correct and are incorporated herein by this reference. Contractor further certifies that Contractor has given the City written notice of conflicts, errors, ambiguities, or discrepancies that it has discovered in the Contract Documents, and the written resolution thereof by the City is acceptable to the Contractor, and the Contract Documents are generally sufficient to indicate and convey understanding of terms and conditions for performing and furnishing the Project Work.

#### **7. Drug Testing**

Contractor shall demonstrate to the City that it has a drug-testing program in place.

#### **8. Notice to Proceed**

Written Notice to Proceed will be given by the City after the Contract has been executed and the performance bond, payment bond, public works bond and all required insurance documents approved, and a pre-construction meeting has been held with the Contractor's and City's key personnel. Notice to proceed shall not be unreasonably delayed and shall generally occur within thirty (30) days of the Contract Date. Reasonable delay may be occasioned by the need to obtain necessary permits or easements or utility relocation. The Contractor shall commence the project Work within five (5) days of the date of the written Notice to Proceed. Contractor is not to commence Work under the Contract prior to such written notice.

#### **9. Suspension of the Work**

The City, and its authorized representatives, may suspend portions or all of the project Work due to causes including, but not limited to:

- a. Failure of the Contractor to correct unsafe conditions;
- b. Failure of the Contractor to carry out any provision of the Contract;
- c. Failure of the Contractor to carry out orders;
- d. Conditions, in the opinion of the City, which are unsuitable for performing the project Work;
- e. Allowance of time required to investigate differing site conditions;
- f. Any reason considered to be in the public interest.

The Contract Time will not be extended, nor will the Contractor be entitled to any additional compensation, if the Work is suspended pursuant to subsections (a), (b) or (c). If the Project Work is suspended pursuant to subsection (f), the Contractor is entitled to a reasonable extension of the contract time and reasonable compensation for all verified costs resulting from the suspension plus a reasonable allowance for overhead with respect to such costs. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such suspension. The foregoing provision concerning compensation in the event of a suspension of Work of this Contract shall not apply if such suspension occurs as a result of the Contractor's violation of any Federal, State, or Local statutes, ordinances, rules or regulations, or as a result of any violation by the Contractor of the terms of this Contract, including a determination by the City that the Contractor has not progressed satisfactorily with the Work in accordance with specifications.

#### **10. Early Termination**

The City and the Contractor, by mutual written agreement, may terminate this Contract at any time.



The City may terminate this Contract, in whole or in part, at any time for any reason considered by the City, in the exercise of its sole discretion, to be in the public interest. The City will provide the Contractor, and the Contractor's surety, seven (7) days prior written notice of a termination for convenience.

The City may terminate this Contract in the event of a material breach of the Contract by the Contractor. Prior to such default termination, however, the City shall give to the Contractor written notice of the breach and the intent to terminate for default. If the Party has not cured the breach within 15 days of the date of the notice (or if the breach cannot be cured in 15 days, Contractor has provided a cure plan that has been accepted by City and is making substantial progress in curing), then the City may terminate the Contract for default by giving a written notice of termination for default.

Any termination for default that is found to be improper for any reason shall be converted to a termination for convenience and Contractor's remedies shall be limited as if the termination had been one for convenience at inception.

#### **11. Payment on Early Termination**

- a. If this Contract is terminated by mutual agreement, the City shall pay the Contractor for Work performed in accordance with the Contract prior to the termination date in an amount agreed to by the parties as part of the termination agreement. Contractor shall not be entitled to any amount for overhead or profit on uncompleted Work.
- b. If this Contract is terminated by the City for convenience, City shall pay the Contractor for Work properly completed before the termination for convenience, along with costs incurred by Contractor due to the termination. Contractor shall not be entitled to any amount for overhead or profit on uncompleted Work. Contractor shall remain liable for Work performed prior to the termination for convenience.
- c. If this Contract is terminated by the City for default due to a material, uncured breach by the Contractor, then the City shall pay the Contractor, if applicable, as provided Section 12, Remedies for Default. Contractor shall remain liable for Work performed prior to the termination for default.

#### **12. Remedies for Default**

In the event of a termination for default by City due to a material, uncured breach by the Contractor, payment to Contractor will be immediately suspended. The City may proceed to complete the Work either itself, by agreement with another contractor, or by a combination thereof. In the event the cost of completing the Work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then the Contractor shall pay to the City the amount of the excess procurement costs within 14 days of written demand. To the extent that the procurement costs are lower than the remaining unpaid balance under this Contract, the City shall pay such difference to Contractor. After notice of termination for default, the Contractor and the Contractor's surety shall provide the City with immediate and peaceful possession of the Project site and premises, and materials located on and off the Project site and premises for which the Contractor received progress payment.

The remedies provided to the City under this Contract for a material, uncured breach by the Contractor shall not be exclusive. The City also shall be entitled to any other contractual, equitable or legal remedies that are available.

#### **13. Access to Records**

Contractor shall maintain and the City and its authorized representatives shall have access to all books, documents, papers and records of Contractor which relate to this Contract for the purpose of making audit, examination, excerpts, and transcripts for a period of ten years after final payment. Contractor shall follow generally accepted accounting principles. Copies of applicable records shall be made available upon request at no charge to City. Failure to keep records for the required period shall be deemed a spoliation of evidence.

#### **14. Ownership of Work Product**

All work products of the Contractor that result from this Contract, including but not limited to background data, documentation and staff work that is preliminary to final reports, are the property of City. Draft documents and preliminary work submitted to the City for review and comment shall not be considered as owned, used or retained by the City until the final document is submitted.

The City shall own all proprietary rights, including but not limited to copyrights, trade secrets, patents and all other intellectual or other property rights in and to such work products. Preexisting trade secrets of the Contractor shall be noted as such and shall not be considered as a work product of this Contract. All such work products shall be considered "works made for hire" under the provisions of the United States Copyright Act and all other equivalent laws.

Use of any work product of the Contractor by the City for any purpose other than the use intended by this contract is at the risk of the City. Use of any work product by Contractor for other than this Project is prohibited without the written consent of the City.

### **15. Compliance with Applicable Law**

Contractor shall comply and require all Subcontractors to comply with all federal, state, and local laws and ordinances, and City contracting rules applicable to the work under this contract, including without limitation ORS Chapter 279A-C and specifically ORS 279A.110, 279A.120, 279A.125, 279C.365, 279C.370, 279C.375, 279C.380, 279C.505, 279C.510, 279C.515, 279C.520, 279C.525, 279C.527, 279C.528, 279C.530, 279C.540, 279C.545, 279C.555, 279C.560, 279C.565, 279C.570, 279C.580, 279C.585, 279C.600 to 279C.625, 279C.650 to 279C.670, and ORS 279C.800 to 279C.870, if applicable.

- a. Contractor shall:
  - 1) Make payment promptly, as due, to all persons supplying to the Contractor labor or material for the performance of the Work provided for in the Contract;
  - 2) Pay all contributions or amounts due the Industrial Accident Fund from the Contractor or subcontractor incurred in the performance of the Contract;
  - 3) Not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished;
  - 4) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167;
  - 5) Demonstrate that an employee drug testing program is in place;
  - 6) To the extent the Work includes demolition, salvage or recycle construction and demolition debris, if feasible and cost-effective;
  - 7) To the extent the Work includes lawn and landscape maintenance, compost or mulch yard waste material at an approved site, if feasible and cost-effective.
- b. If the Contractor fails, neglects or refuses to pay promptly a person's claim for labor or services that the person provides to the contractor or a subcontractor in connection with the Contract as the claim becomes due, City may pay the amount of the claim to the person that provides the labor or services and charge the amount of the payment against funds due or to become due the Contractor by reason of the Contract.
- c. If the Contractor or its subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the Contract within 30 days after receiving payment from City, Contractor or its subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period within which payment is due under ORS 279C.580 (4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.
- d. If Contractor or its subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
- e. Paying a claim in the manner authorized (b) through (d) above does not relieve the Contractor or the Contractor's surety from obligation with respect to an unpaid claim .
- f. No person may not be employed for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires it, and in such cases the employee shall be paid at least time and a half pay:
  - 1)
    - i. For all overtime in excess of eight hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or

- ii. For all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
- 2) For all work performed on Saturday and on any legal holiday specified in ORS 279C.540.
- g. Contractor shall give notice in writing to employees who work on Work covered by the Contract, either at the time of hire or before commencement of work on the Contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work.
- h. Contractor shall promptly, as due, make payment to any person, copartnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums that the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.
- i. Contractor shall comply with ORS 656.017 unless exempt under ORS 656.126.
- j. The withholding of retainage by Contractor and its subcontractors shall be in accordance with ORS 701.420.
- k. In accordance with ORS 279C.560, unless City finds in writing that accepting a bond, security or other instrument poses an extraordinary risk that is not typically associated with the bond, security or other instrument, City will approve the Contractor's written request to deposit bonds, securities or other instruments with the City or in a custodial account or other account satisfactory to City with an approved bank or trust company, to be held instead of cash retainage for the benefit of City. In such event, City will reduce the cash retainage by an amount equal to the value of the bonds, securities and other instruments. Interest or earnings on the bonds, securities and other instruments shall accrue to the Contractor. Bonds, securities and other instruments deposited instead of cash retainage shall be assigned to or made payable to City and shall be of a kind approved by the Director of the Oregon Department of Administrative Services, including but not limited to: Bills, certificates, notes or bonds of the United States; Other obligations of the United States or agencies of the United States; Obligations of a corporation wholly owned by the federal government; Indebtedness of the Federal National Mortgage Association; General obligation bonds of the State of Oregon or a political subdivision of the State of Oregon; or Irrevocable letters of credit issued by an insured institution, as defined in ORS 706.008. The Contractor shall execute and provide such documentation and instructions respecting the bonds, securities and other instruments as City may require to protect its interests. When City determines that all requirements for the protection of City's interest have been fulfilled, the bonds and securities deposited instead of cash retainage will be released to the Contractor. If City accepts a surety bond from Contractor in lieu of retainage, Contractor shall accept like bonds from its subcontractors or suppliers from which Contractor has retainage. Contractor shall then reduce the moneys Contractor holds as retainage in an amount equal to the value of the bond and pay the amount of the reduction to the subcontractor or supplier.
- l. City shall make progress payments on the Contract monthly as work progresses. Payments shall be based upon estimates of work completed that are approved by City. A progress payment is not considered acceptance or approval of any work or waiver of any defects therein. City shall pay to Contractor interest on the progress payment, not including retainage, due the Contractor. The interest shall commence 30 days after receipt of the invoice from the Contractor or 15 days after the payment is approved by City, whichever is the earlier date. The rate of interest charged to City on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after receipt of the invoice from Contractor or 15 days after the payment is approved by City, whichever is the earlier date, but the rate of interest may not exceed 30 percent. Interest shall be paid automatically when payments become overdue. City shall document, calculate and pay any interest due when payment is made on the principal. Interest payments shall accompany payment of net due on the Contract. City will not require Contractor to petition, invoice, bill or wait additional days to receive interest due. When an invoice is filled out incorrectly, when there is any defect or impropriety in any submitted invoice or when there is a good faith dispute, City shall so notify Contractor within 15 days stating the reason or reasons the invoice is defective or improper or the

reasons for the dispute. A defective or improper invoice, if corrected by Contractor within seven days of being notified by City, may not cause a payment to be made later than specified in this section unless interest is also paid. If requested in writing by a subcontractor, Contractor, within 10 days after receiving the request, shall send to the subcontractor a copy of that portion of any invoice, request for payment submitted to City or pay document provided by City to Contractor specifically related to any labor or materials supplied by the subcontractor. Payment of interest may be postponed when payment on the principal is delayed because of disagreement between City and Contractor.

- m. City will reserve as retainage from all progress payment five percent (5%) of the payment. As work progresses, City may (but is not required) reduce the amount of the retainage and City may (but is not required) eliminate retainage on any remaining monthly contract payments after 50 percent of the Work under the Contract is completed if, in City's opinion, such work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by Contractor, and the application shall include written approval of Contractor's surety. However, when the contract work is 97.5 percent completed, City may, at the City's sole discretion and without application by Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of a written application by Contractor, the City shall respond in writing within a reasonable time. The retainage held by City shall be included in and paid to Contractor as part of the final payment of the Contract Price. City shall pay to Contractor interest at the rate of 1.5 percent per month on the final payment due Contractor, interest to commence 30 days after the work under the Agreement has been completed and accepted and to run until the date when the final payment is tendered to Contractor. Contractor shall notify City in writing when the contractor considers the work complete and Owner shall, within 15 days after receiving the written notice, either accept the work or notify Contractor of work yet to be performed on the Contract. If City does not, within the time allowed, notify Contractor of work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run 30 days after the end of the 15-day period.
- n. Contractor shall include in each subcontract for property or services the Contractor enters into with a subcontractor, including a material supplier, for the purpose of performing this Contract:
  - 1) A payment clause that obligates Contractor to pay subcontractor for satisfactory performance under the subcontract within 10 days out of amounts the City pays to Contractor under the Contract.
  - 2) A clause that requires Contractor to provide subcontractor with a standard form that the subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from Contractor.
  - 3) A clause that requires Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. Contractor may change the form or the regular administrative procedures Contractor uses for processing payments if Contractor: (i) Notifies the subcontractor in writing at least 45 days before the date on which the contractor makes the change; and (ii) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.
  - 4) An interest penalty clause that obligates Contractor, if the Contractor does not pay the subcontractor within 30 days after receiving payment from City, to pay subcontractor an interest penalty on amounts due in each payment Contractor does not make in accordance with the payment clause included in the subcontract under paragraph 1) of this subsection. Contractor or subcontractor is not obligated to pay an interest penalty if the only reason that Contractor or subcontractor did not make payment when payment was due is that Contractor or subcontractor did not receive payment from City or Contractor when payment was due. The interest penalty: (i) Applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and (ii) Is computed at the rate specified in ORS 279C.515 (2).
- o. Contractor shall, in each of the Contractor's subcontracts, require the first-tier subcontractor to include a payment clause and an interest penalty clause that conforms to the standards of subsection (n) of this section in each of the first-tier subcontractor's subcontracts and to require each of the first-tier subcontractor's subcontractors to include such clauses in the first-tier subcontractors' subcontracts with each lower-tier subcontractor or supplier.

The requirements applicable to contractors set forth in these sections are all incorporated into this contract by this reference as though set forth herein in their entirety. Contractor also expressly agrees to comply with: (i) Title VI of the Civil Rights Act of 1964; (ii) Section V of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1990, as amended (iv) ORS 659A.142, (v) all regulations and administrative rules established pursuant to those laws; and (vi) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. In addition, Contractor expressly agrees to comply with all federal and state tax laws. A condition or clause required by law to be in this contract shall be considered included and incorporated into the Contract and made a part as if set forth herein in its entirety.

#### **16. Licensing with Construction Contractor's Board**

The Contractor hereby certifies that the Contractor is licensed with the Construction Contractors Board in accordance with ORS 701.021 to 701.042 and, further, that all subcontractors performing work under this contract, unless exempt, shall also be licensed with the Construction Contractors Board before the subcontractors commence work under the contract.

#### **17. Prevailing Wages**

Contractor expressly agrees to be bound by and comply with prevailing rate of wage laws applicable to Contractor's Work in accordance with ORS 279C.800 et seq. The prevailing wage rates in effect when this Project was first advertised are hereby expressly incorporated into this Agreement by reference. Information on BOLI Prevailing Wage Rates may be obtained at the following site: [www.oregon.gov/BOLI/WHD/PWR/pwr\\_state.shtml](http://www.oregon.gov/BOLI/WHD/PWR/pwr_state.shtml). A copy of these rates may be requested by calling the Bureau of Labor and Industries directly (Bureau of Labor and Industries – (971) 673-0838). Information on the Federal Davis-Bacon Act rates may be obtained at the following site: [www.oregon.gov/ODOT/HWY/SPECS/wages.shtml](http://www.oregon.gov/ODOT/HWY/SPECS/wages.shtml). Contractor's workers must be paid not less than the specified minimum hourly rate of wage in accordance with ORS 279C.838 and 279C.840.

Contractor shall have a public works bond filed with the Construction Contractors Board and shall provide Owner with a copy of such bond before starting work unless Contractor is exempt under ORS 279C.836(4), (7), (8) or (9). Contractor shall include a similar provision in any subcontract.

Contractor shall keep the prevailing rates of wage for Project posted in a conspicuous and accessible place in or about the Project and, if it provides a health and welfare plan or pension plan or both, shall post a notice describing the plan, including information on how and where to make claims and where to obtain further information, in a conspicuous and accessible place in or about the Project.

Contractor shall furnish to City a weekly affidavit with supporting detailed exhibits in a form that complies with the certified statement requirements of ORS 279C.845, certifying wages paid and to whom during each proceeding weekly payroll period, for itself and all subcontractor who are required to submit such certified statements under ORS 279C.845. If Contractor has failed to timely submit a required certified statement, City, pursuant to ORS 279C.845(8), shall withhold twenty-five percent (25%) from any amount owed to Contractor until Contractor provides the required certified statement.

#### **18. Change Orders/Extra Work**

The Contractor agrees to complete this Contract in accordance with the attached specifications and requirements, including any change orders. A change order submitted by the City must be agreed upon by the Contractor and the City, and in the event of failure to so agree, the City may then proceed with any additional work in any manner the City may choose. A decision by the City to proceed to have work done by another party shall in no way relieve either the Contractor or City of this Contract and neither will such action be cause for collection of damages by either party to the contract, one from the other. Only the City Council or designated Contracting Officer with delegated contracting authority can authorize extra (and/or changed) work and compensation. Such authorization must be in writing. The parties expressly recognize that City personnel are not authorized to order extra (and/or) changed work or to waive contract requirements or authorize additional compensation. Failure of the Contractor to secure City authorization for extra work shall constitute a waiver of any and all claims or rights to adjustment in the Contract Price or Contract Time due to such unauthorized extra work and thereafter Contractor shall be entitled to no compensation whatsoever for the performance of such work. Contractor further expressly waives any and all right or remedy by way of restitution and quantum meruit for any and all extra work performed by Contractor without express and prior authorization of the City.

If Contractor proposes an alternative material, process or system to City, or supplies City with specifications or plans for use in the Project, Contractor warrants to City that such alternative material, process or system is adequate, accurate, complete, fit for its intended purpose, and, if accepted by City, that an acceptable result will be achieved. Contractor, at its own cost, will remedy, any Work that violates this warranty until an acceptable result is achieved.

#### **19. Inspection and Acceptance**

Inspection and acceptance of all work required under this contract shall be performed by the City. The Contractor shall be advised of the acceptance or of any deficiencies in the deliverable items.

#### **20. Liquidated Damages**

City and Contractor recognize that time is of the essence of this Contract and that City will suffer substantial financial loss if the project work is not completed within the timeframe specified in Section (1) of the Public Improvement Contract. City and Contractor also recognize the difficulties involved in proving in a legal or other dispute resolution preceding the actual loss suffered by City if the project work is not completed on time. Accordingly, instead of requiring any such proof, City and Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay the City two thousand two hundred dollars per day (\$2,200/day) for each and every day that elapses in excess of the Contract Time. This amount is a genuine pre-estimation of the damages expected because of a delay in the completion of this project.

Any sums due as liquidated damages shall be deducted from any money due or which may become due to the Contractor under this Contract. Payment of liquidated damages shall not release the Contractor from obligations in respect to the fulfillment of the entire contract, nor shall the payment of such liquidated damages constitute a waiver of the City's right to collect any additional damages which may be sustained by failure of the Contractor to complete the work on time. Permitting the Contractor to continue and finish the project work or any part thereof after the Contract Time has expired shall in no way operate as a waiver on the part of the City or any of its rights under this Contract. The City may in its discretion grant the Contractor an extension of time upon a showing made by the Contractor that the work has been unavoidably delayed by conditions beyond the control of Contractor.

#### **21. Liability, Indemnity and Hold Harmless**

Contractor warrants that all its work will be performed in accordance with the Contract Documents, in accordance with generally accepted practices and standards, as well as in accordance with the requirements of applicable federal, state, and local laws. Acceptance of Contractor's work by City shall not operate as a waiver or release.

The Contractor shall hold harmless, indemnify, and defend City, its officers, agents, and employees from any and all liability, actions, claims, losses, damages or other costs of whatsoever nature, including attorney's fees and witness costs (at both trial and appeal level, whether or not a trial or appeal ever takes place) that may be asserted by any person or entity arising from, during or in connection with the performance of the Work, actions or failure to perform actions, and other activities of Contractor or its officers, employees, subcontractors or agents, under this Contract, including the negligent professional acts, errors, or omissions of Contractor or its officers, employees, subcontractors, or agents. Such indemnification shall also cover claims brought against City under state or federal workers compensation laws. This indemnity provision excludes liability arising out of the sole negligence of the City and its employees.

The Contractor shall assume all responsibility for the work and shall bear all losses and damages directly or indirectly resulting to the Contractor, to the City, to the Engineer, and to their officers, agents, and employees on account of (a) the character or performance of the work, (b) unforeseen difficulties, (c) accidents, or (d) any other cause whatsoever. The Contractor shall assume this responsibility even if (a) fault is the basis of the claim, and (b) any act, omission or conduct of the City connected with the Contract is a condition or contributory cause of the claim, loss, damage or injury.

Contractor waives any and all statutory or common law rights of defense and indemnification by the City.

Contractor shall also defend and indemnify City from all loss or damage that may result from Contractor's wrongful or unauthorized use of any patented article or process.

If any aspect of the above indemnities shall be found to be illegal or invalid for any reason whatsoever, such illegality or invalidity shall be stricken to the extent illegal or invalid, with the remaining terms continuing to be valid, and such shall not affect the validity of the remainder of this indemnification.

Any specific duty or liability imposed or assumed by the Contractor as may be otherwise set forth in the Contract documents shall not be construed as a limitation or restriction of the general liability or duty imposed upon the Contractor by this section.

In the event any such action or claim is brought against the City, the Contractor shall, if the City so elects and upon tender by the City, defend the same at the Contractor's sole cost and expense, promptly satisfy any judgment adverse to the City or to the City and the Contractor jointly, and reimburse the City for any loss, cost, damage, or expense, including attorney fees, suffered or incurred by the City.

## **22. Insurance**

The Contractor shall provide and maintain during the life of this Contract the insurance coverage as described in Exhibit B. All costs for such insurance shall be borne by the Contractor and shall be included in the Contract Price. In case of the breach of any provision of this section, the City may elect to take out and maintain at the expense of the Contractor such insurance as the City may deem proper. The City may deduct the cost of such insurance from any monies that may be due or become due the Contractor under this Contract. Failure to maintain insurance as provided is a material breach and cause for default termination of the Contract. Contractor shall furnish City certificates of insurance acceptable to City prior to execution by the City and before Contractor or any subcontractor commences work under this Contract. The certificate shall show the name of the insurance carrier, coverage, type, amount (or limits), policy numbers, effective and expiration dates and a description of operations covered. The certificate will include the deductible or retention level and required endorsements. Insuring companies or entities are subject to City's acceptance. If requested, copies of insurance policies shall be provided to the City. Contractor shall be responsible for all deductibles, self-insured retention's, and/or self-insurance. Approval of the insurance shall not relieve or decrease the liability of the Contractor hereunder.

## **23. Bonds / Notice of Bond Claims**

At the time of execution of the Contract, the Contractor shall furnish Performance and Payment Bonds written by a corporate surety or other financial assurance in an amount equal to the amount of the Contract Price based upon the estimate of quantities or lump sum as set forth in the Contract. The bonds shall be continuous in effect and shall remain in full force and effect until compliance with and fulfillment of all terms and provisions of the Contract, including the warranty obligation of Section 24, all applicable laws and the prompt payment of all persons supplying labor and/or material for prosecution of the work. The bonds or other financial assurance is subject to approval by the City.

## **24. Two-Year Warranty**

- a. In addition to and not in lieu of any other warranties required under the Contract, Contractor shall make all necessary repairs and replacements to remedy, in a manner satisfactory to the City and at no cost to the City, any and all defects, breaks or failures of the Work occurring within two years following the date of final completion due to faulty or inadequate materials or workmanship. Contractor shall also repair any damage or disturbances to other improvements under, within, or adjacent to the Work, whether or not caused by settling, washing, or slipping, when such damage or disturbance is caused, in whole or in part, from activities of the Contractor in performing its duties and obligations under this Contract when such defects or damage occur within the warranty period. The two-year warranty period shall, with relation to such required repair, be extended two years from the date of completion of such repair.
- b. If Contractor, after written notice, fails within ten days to proceed to comply with the terms of this section, City may have the defects corrected, and the Contractor and Contractor's surety shall be liable for all expense incurred. If Contractor, after two attempts, fails to make all necessary repairs and replacements to remedy, in a manner satisfactory to the City, any identified defect, break or failure of the Work, Contractor will be deemed to be in breach of warranty and City may have the defects corrected, and the Contractor and Contractor's surety shall be liable for all expense incurred. In case of an emergency where, in the opinion of the City, delay would cause serious loss or damage, repairs may be made without notice being given to Contractor and Contractor or Surety shall pay the cost of repairs. Failure of the City to act in case of an emergency shall not relieve Contractor or Surety from liability and payment of all such costs.

**25. Nondiscrimination in Labor**

Contractor shall comply with provisions of City's Equal Opportunity Policy and comply with ORS Chapter 659 and ORS Chapter 659A relating to unlawful employment practices and discrimination by employers against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, national origin, marital status or age if the individual is 18 years of age or older, or because of the race, color, religion, sex, sexual orientation, national origin, marital status or age of any other person with whom the individual associates, or because of an individual's juvenile record that has been expunged pursuant to ORS 419A.260 and 419A.262 or to refuse to hire or employ or to bar or discharge from employment such individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment.

**26. Environmental Regulations**

- a. Pursuant to ORS 279C.525(1), the following is a list of federal, state and local agencies which have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the Contract.

**Federal Agencies:**

- Agriculture, Department of Forest Service, Soil Conservation Service
- Defense, Department of Army Corps of Engineers Energy, Department of
- Federal Energy Regulatory Commission Environmental Protection Agency
- Health and Human Services, Department of
- Housing and Urban Development, Department of
- Solar Energy and Energy Conservation Bank
- Interior, Department of
- Bureau of Land Management, Bureau of Indian Affairs , Bureau of Mines , Bureau of Reclamation
- Geological Survey, Minerals Management Service
- U.S. Fish and Wildlife Service
- Labor, Department of Mine Safety and Health Administration Occupational Safety and Health Administration
- Transportation, Department of Coast Guard
- Federal Highway Administration
- Water Resources Council

**State Agencies:**

- Administrative Services, Department of
- Agriculture, Department of Columbia River Gorge
- Commission Consumer & Business Services, Department of
- Oregon Occupational Safety & Health Division
- Energy, Department of Environmental Quality, Department of Fish and Wildlife, Department of
- Forestry, Department of
- Geology and Mineral Industries, Department of
- Human Resources, Department of
- Land Conservation and Development Commission
- Parks and Recreation, Department of
- Soil and Water Conservation Commission
- State Engineer
- State Land Board (Lands, Division of State)
- Water Resources Department

**Local Agencies:**

- City of St. Helens City Council
- City Councils
  - County Courts
  - County Commissioners of Columbia County
  - Port Districts
  - County Service Districts
  - Sanitary Districts
  - Water Districts
  - Fire Protection Districts
  - Historical Preservation Commissions
  - Planning Commissions



If the Contractor awarded the project is delayed or must undertake additional Work by reason of the enactment of new statutes, ordinances, rules or regulations relating to the prevention of environmental pollution and the preservation of natural resources or the amendment of existing statutes, ordinances, rules or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the submission of the successful bid, the City may:

- i. Terminate the contract;
  - ii. Complete the work itself;
  - iii. Use non-city forces already under contract with the City;
  - iv. Require that the underlying property owner be responsible for cleanup;
  - v. Solicit bids for a new contractor to provide the necessary services; or
  - vi. Issue the Contractor a change order setting forth the additional work that must be undertaken.
- b. The solicitation documents make specific reference to known conditions at the construction site that may require the Contractor to comply with the ordinances, rules or regulations identified above. If Contractor encounters a condition not referred to in the solicitation documents, not caused by the Contractor and not discoverable by a reasonable pre-bid visual site inspection, and the condition requires compliance with the ordinances, rules or regulations enacted by the governmental entities identified above, Contractor shall immediately give written notice of the condition to the City. Except in the case of an emergency and except as may otherwise be required by any environmental or natural resource ordinance, rule or regulation, the Contractor shall not commence work nor incur any additional job site costs in regard to the condition encountered and described in this section without written direction from City. Upon request by the City, the Contractor shall estimate the emergency or regulatory compliance costs as well as the anticipated delay and costs resulting from the encountered condition. This cost estimate shall be promptly delivered to the City for resolution. Within a reasonable period of time following delivery of an estimate of this section, the City may:
- i. Terminate the contract;
  - ii. Complete the work itself;
  - iii. Use non-city forces already under contract with the City;
  - iv. Require that the underlying property owner be responsible for cleanup;
  - v. Solicit bids for a new contractor to provide the necessary services; or
  - vi. Issue the Contractor a change order setting forth the additional work that must be undertaken.
- c. If the City chooses to terminate the contract under this section, the termination shall be treated as a termination for convenience with Contractor's remedies so limited. If the contracting agency causes work to be done by another contractor, Contractor may not be held liable for actions or omissions of the other contractor. If a change order is issued, the change order shall include an appropriate extension of Contract Time and compensate the Contractor for additional costs reasonably incurred as a result of complying with the applicable statutes, ordinances, rules or regulations. The City shall have access to the Contractor's bid documents when making the contracting agency's determination of any additional compensation due to the Contractor.

Notwithstanding the above, the City has allocated all or a portion of the known environmental and natural resource risks to a Contractor by listing such environmental and natural resource risks with specificity in the solicitation documents.

## **27. Waiver**

The failure of the City to enforce any provision of this contract shall not constitute a waiver by the City of that or any other provision. City shall not be precluded or estopped by any measurement, estimate or certificate made either before or after completion and acceptance of work or payment therefore, from showing the true amount and character of work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate or certificate is untrue or incorrectly made, or that Work or materials do not conform in fact to the Contract Documents. City shall not be precluded or estopped, notwithstanding any such measurement, estimate or certificate, or payment in accordance therewith, from recovering from the Contractor and their Sureties such damages as it may sustain by reason of their failure to comply with terms of the Contract, or from enforcing compliance with the Contract. Neither acceptance by City, or by any representative or agent of the City, of the whole or any part of the work, nor any extension of time, nor any possession taken by City, nor any payment for all or any part of the project, shall operate as a

waiver of any portion of the Contract or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other breach. All waivers by City must be in writing and signed by City.

**28. Errors**

The Contractor shall perform such additional work as may be necessary to correct its errors in the Work without undue delays and without additional cost.

**29. Governing Law**

The provisions of this Contract shall be construed in accordance with the laws of the State of Oregon and ordinances of the City of St. Helens, Oregon. Any action or suits involving any question arising under this Contract must be brought in the appropriate court in Columbia County, Oregon. If the claim must be brought in a federal forum, then it shall be brought and conducted in the United States District Court for the District of Oregon (Portland).

**30. Severability**

If any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular term or provision held invalid.

**31. Attorney's Fees**

If a suit or action is filed to enforce any of the terms of this Contract, the prevailing party shall be entitled to recover from the other party, in addition to costs and disbursements provided by statute, its reasonable attorney's fees and expert expenses.

**32. Business License**

The Contractor shall obtain a City of St. Helens business license as required by City Ordinance prior to beginning work under this Contract. The Contractor shall provide a business license number in the space provided on page one herein.

**33. Notices/Bills/Payments**

All notices, bills, and payments shall be made in writing and may be given by personal delivery or by mail. Notices, bills, and payments sent by mail should be addressed as follows:

City: City Administrator  
City of St. Helens  
265 Strand Street  
St. Helens, OR 97051  
(503) 397-6272

Contractor:


And when so addressed, shall be deemed received three (3) days after deposit in the United States Mail, postage prepaid. In all other instances, notices, bills, and payments shall be deemed given at the time of actual delivery. Changes may be made in the names and addresses of the person to whom notices, bills, and payments are to be given by giving notice pursuant to this paragraph.

**34. Conflict of Interest**

Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its services. The Contractor further covenants that in the performance of this Contract no person having any such interest shall be employed.

**35. Merger Clause**

THIS CONTRACT AND ATTACHED EXHIBITS CONSTITUTE THE ENTIRE AGREEMENT BETWEEN THE PARTIES. NO WAIVER, CONSENT, MODIFICATION OR CHANGE OF TERMS OF THIS CONTRACT SHALL BIND EITHER PARTY UNLESS IN WRITING AND SIGNED BY BOTH PARTIES. SUCH WAIVER, CONSENT, MODIFICATION OR CHANGE, IF MADE, SHALL BE EFFECTIVE ONLY IN THE SPECIFIC INSTANCE AND FOR THE SPECIFIC PURPOSE GIVEN. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, OR REPRESENTATIONS, ORAL OR WRITTEN, NOT SPECIFIED HEREIN REGARDING THIS CONTRACT. BY ITS SIGNATURE, CONTRACTOR ACKNOWLEDGES IT HAS READ AND UNDERSTANDS THIS CONTRACT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.



**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION  
PROJECT NO. P-525**

**LIST OF EXHIBITS**

<b>EXHIBIT A</b>	STATEMENT OF WORK, COMPENSATION, AND PAYMENT SCHEDULE
<b>EXHIBIT B</b>	PUBLIC IMPROVEMENT CONTRACT INSURANCE REQUIREMENTS
<b>EXHIBIT C</b>	CERTIFICATION STATEMENT FOR CORPORATION OR INDEPENDENT CONTRACTOR
<b>EXHIBIT D</b>	BONDS (PAYMENT AND PERFORMANCE)
<b>EXHIBIT E</b>	CERTIFICATE OF SUBSTANTIAL COMPLETION
<b>EXHIBIT F</b>	CERTIFICATE OF COMPLIANCE
<b>EXHIBIT G</b>	CONTRACTOR'S RELEASE OF LIENS AND CLAIMS
<b>EXHIBIT H</b>	CERTIFICATE OF FINAL COMPLETION
<b>EXHIBIT I</b>	INSTRUCTIONS TO BIDDERS
<b>EXHIBIT J</b>	OREGON PREVAILING WAGE RATES

# **EXHIBIT A**

## **STATEMENT OF WORK, COMPENSATION and PAYMENT SCHEDULE**



**See Plans and Specifications titled**

**S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION  
PROJECT NO. P-525**

# EXHIBIT B

## PUBLIC IMPROVEMENT CONTRACT INSURANCE REQUIREMENTS

To: Insurance Agent. Please provide Certificates of Insurance to the Project Manager. During the term of the Contract, please provide Certificates of Insurance prior to each renewal. Insurance shall be without prejudice to coverage otherwise existing. During the term of this Contract, Contractor shall maintain in force at its own expense all insurance noted below:

**Workers Compensation** insurance in compliance with ORS 656.017. All employers, including Contractor and any subcontractors, that employ subject workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.

The Contractor shall defend, indemnify and hold harmless, the City and the City's officers, agents, and employees against any liability that may be imposed upon them by reason of the Contractor's or subcontractor's failure to provide workers' compensation and employers liability coverage.

**Commercial General Liability** insurance on an occurrence basis, with a combined single limit of not less than  \$1,000,000 or  \$3,000,000 for each occurrence of bodily injury, personal injury and property damage. It shall include coverage for broad form contractual liability; broad form property damage; personal and advertising injury; owners and contractor protective; premises/operations; and products/completed operations. Coverage shall not exclude excavation, collapse, underground, or explosion hazards. Aggregate limits shall apply on a per-project basis.

Required by City     Not required by City    By: P.M. \_\_\_\_\_  
(Mayor signature required)    Mayor \_\_\_\_\_

**Commercial Automobile Liability** insurance with a combined single limit, or the equivalent of not less than  \$1,000,000 or  \$3,000,000 for each accident for Bodily Injury and Property Damage, including coverage for owned, hired and non-owned vehicles. "Symbol One" coverage shall be designated.

Required by City     Not required by City    By: P.M. \_\_\_\_\_  
(Mayor signature required)    Mayor \_\_\_\_\_

Builders Risk (*Check here if required*) insurance during construction to the extent of 100 percent of the value of the Work for the benefit of the parties to the Contract as their interest may appear. Coverage shall also include: (1) formwork in place; (2) form lumber on site; (3) temporary structures; (4) equipment; and (5) supplies related to the work while at the site.

**Notice of Cancellation or Change.** There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without 30 days written notice from the Contractor or its insurer(s) to the City. This notice provision shall be by endorsement physically attached to the certificate of insurance.

**Additional Insured.** For general liability insurance and automobile liability insurance the City, and its agents, officers, and employees will be Additional Insureds, but only with respect to Contractor's services to be provided under this Contract. This coverage shall be by endorsement physically attached to the certificate of insurance.

**Certificates of Insurance.** Contractor shall furnish insurance certificates acceptable to City prior to commencing Work. The certificate will include the deductible or retention level and required endorsements. Insuring companies or entities are subject to City approval. If requested, copies of insurance policies shall be provided to the City. Contractor shall be responsible for all deductibles, self-insured retention's, and/or self-insurance.

# EXHIBIT C

## CERTIFICATION STATEMENT FOR CORPORATION OR INDEPENDENT CONTRACTOR

### A. CONTRACTOR IS A CORPORATION

**CORPORATION CERTIFICATION:** I am authorized to act on behalf of the entity named below, and certify under penalty of perjury that it is a corporation.

Entity

Signature

Date

### B. CONTRACTOR IS INDEPENDENT

**Independent Contractor Standards.** As used in various provisions of ORS Chapters including but not limited to 316, 656, 657, and 701, an individual or business entity that performs labor or services for remuneration shall be considered to perform the labor or services as an “independent contractor” if the standards of ORS 670.600 are met.

Contractor and Project Manager certify that the Contractor meets the following standards:

1. Contractor is free from direction and control over the means and manner of providing the labor or services, subject only to the specifications of the desired results.
2. Contractor is responsible for obtaining all assumed business registrations or professional occupation licenses required by state law or local ordinances.
3. Contractor furnishes the tools or equipment necessary for the contracted labor or services.
4. Contractor has the authority to hire and fire employees to perform the labor or services.
5. Payment to the Contractor is made upon completion of the performance or is made on the basis of a periodic retainer.
6. Contractor is licensed under ORS chapter 701, if the Contractor provides labor or services for which such license is required.
7. Contractor has filed federal and state income tax returns in the name of the business or a business Schedule C as part of the personal income tax return, for the previous year, for labor or services performed as an independent contractor in the previous year.
8. Contractor represents to the public that the labor or services are to be provided by an independently established business as four or more of the following circumstances exist.

(Check all of the following that apply (must be a minimum of four):)

- The labor or services are primarily carried out at a location that is separate from Contractors residence or is primarily carried out in a specific portion of Contractors residence, which is set aside as the location of the business.
- Commercial advertising or business cards are purchased for the business, or Contractor has a trade association membership.
- Telephone listing is used for the business that is separate from the personal residence listing.
- Labor or services are performed only pursuant to written contracts.
- Labor or services are performed for two or more different persons within a period of one year.

Contractor assumes financial responsibility for defective workmanship or for service not provided as evidenced by the ownership of performance bonds, warranties, errors and omissions insurance or liability insurance relating to the labor or services to be provided.

**If any action is taken by a person or enforcement agency relating to Contractor's independent contractor status in connection with this contract, Contractor shall defend, hold harmless and indemnify the City of St. Helens, its elected and appointed officials, employees, volunteers and agents from any such action, claim, judgment, fine, penalty, or order to pay. Contractor shall pay any additional costs incurred by the City in defending such action or incurred as a result of such action. This indemnification is in addition to any indemnification otherwise in this agreement.**

\_\_\_\_\_

Contractor Signature

Date

\_\_\_\_\_

Project Manager Signature

Date



# EXHIBIT D

## BONDS





**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT PAYMENT BOND**

Bond No.: \_\_\_\_\_  
Project Name **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION**  
and No.: **PROJECT NO. P-525**

\_\_\_\_\_ (Surety)      Bond Amount      \$ \_\_\_\_\_  
\_\_\_\_\_ (Surety)      Bond Amount      \$ \_\_\_\_\_

**Total Penal Sum of Bond**      \$ \_\_\_\_\_

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as **"PRINCIPAL,"** and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact surety business in the State of Oregon, as **"SURETY,"** and,

We, the above named Principal and Surety(ies), hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (**OBLIGEE**) the sum of (\$ \_\_\_\_\_) ( \_\_\_\_\_ ) dollars, lawful money of the United States. [Provided, we the Sureties bind ourselves in such sum "Jointly and Severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety above), and

WHEREAS, the Principal has entered into a Contract with the City of St. Helens, the specifications, terms and conditions of which are contained in the Contract Documents for the above identified Project; and

WHEREAS, the terms and conditions of the Contract Documents, as defined in the Contract, are made a part of this performance bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans, specifications, and schedule of contract prices which are set forth in the contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the

sureties, including the requirements of ORS Chapter 279A-C, including specifically the conditions in ORS 279C.500 to 279C.530, and shall indemnify and save harmless the City of St. Helens, Oregon, its officers, employees, agents and assigns, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the Work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractor in connection with the performance of the Contract; and shall pay over to the Oregon Department of Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the City on account of any labor or materials furnished; and shall do all things required of the Contractor by the laws of this State, and the laws of the City of St. Helens, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of St. Helens be obligated for the payment of any premiums.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dates this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

---

Surety

By: \_\_\_\_\_  
(Attorney-in-Fact) (Address) (Telephone)

---

Principal

By: \_\_\_\_\_  
(Address) (Telephone)



**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT PERFORMANCE BOND**

Bond No.: \_\_\_\_\_  
Project Name **S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION**  
and No.: **PROJECT NO. P-525**

\_\_\_\_\_ (Surety)      Bond Amount      \$ \_\_\_\_\_  
\_\_\_\_\_ (Surety)      Bond Amount      \$ \_\_\_\_\_

**Total Bond Amount**      \$ \_\_\_\_\_

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as **"PRINCIPAL,"** and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact surety business in the State of Oregon, as **"SURETY,"** and,

We, the above named Principal and Surety(ies), hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (**OBLIGEE**) the sum of (\$ \_\_\_\_\_) ( \_\_\_\_\_ ) dollars, lawful money of the United States. [Provided, we the Sureties bind ourselves in such sum "Jointly and Severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety above), and

WHEREAS, the Principal has entered into a Contract with the City of St. Helens, the specifications, terms and conditions of which are contained in the Contract Documents for the above identified Project; and

WHEREAS, the terms and conditions of the Contract Documents, as defined in the Contract, are made a part of this performance bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans, specifications, and schedule of contract prices which are set forth in the contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the

sureties, including the requirements of ORS Chapter 279A-C, including specifically the conditions in ORS 279C.500 to 279C.530, and shall indemnify and save harmless the City of St. Helens, Oregon, its officers, employees, agents and assigns, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall in all respects perform said Contract, and shall permit no lien nor claim to be filed or prosecuted against the City on account of any labor or materials furnished; and shall do all things required of the Contractor by the laws of this State, and the laws of the City of St. Helens, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of St. Helens be obligated for the payment of any premiums.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dates this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Surety

By: \_\_\_\_\_  
(Attorney-in-Fact) (Address) (Telephone)

\_\_\_\_\_  
Principal

By: \_\_\_\_\_  
(Address) (Telephone)



# EXHIBIT E

## CERTIFICATE OF SUBSTANTIAL COMPLETION

CITY'S Project No. P-525 ENGINEER'S Project No. N/A

S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION

CONTRACTOR: \_\_\_\_\_

Contract For: \_\_\_\_\_ Contract Date \_\_\_\_\_

This Certificate of Substantial Completion applies to:

- All Work under the Contract Documents, or
- To the following specified parts thereof:

The Work to which this Certificate applies has been inspected by authorized representatives of CITY, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

\_\_\_\_\_ DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within \_\_\_\_\_ Days of the above date of Substantial Completion.

The following documents are attached to and made a part of this Certificate:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Effective as of the last date set forth below, the responsibilities between CITY and CONTRACTOR shall be as follows:

- |             |  |  |
|-------------|--|--|
| Security    | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |
| Operation   | <input checked="" type="checkbox"/> City | <input type="checkbox"/> Contractor            |
| Safety      | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |
| Maintenance | <input checked="" type="checkbox"/> City | <input type="checkbox"/> Contractor            |
| Heat        | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Utilities   | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Insurance   | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Warranties  | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |

Other Responsibilities:

City		Contractor

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of CONTRACTOR'S obligation to complete the Work in accordance with the Contract Documents.

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_\_

By: \_\_\_\_\_

CITY accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_\_

By: \_\_\_\_\_

File:



# EXHIBIT F

## CERTIFICATE OF COMPLIANCE

### S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION

---

CIP Number: Project No. P-525

Contractor: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, (We) hereby certify that all Work has been performed and materials supplied in accordance with the plans, specifications and Contract Documents for the above Project, and that:

1. Not less than the prevailing rates of wages have been paid to laborers, workmen and mechanics employed on this work.
2. There have been no unauthorized substitutions of materials; substitutions or assignment of subcontractors; nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the City prior to the start of such subcontracted work.
3. All claims and indebtedness for material and labor and other service performed in connection with these specifications have been paid.
4. All moneys due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Department of Revenue (ORS 316.162 to 316.212) hospital associations and/or others (ORS 279C.530) have been paid.
5. All private property and easement areas have been satisfactorily restored in accordance with the Contract.
6. If Contractor is not domiciled in or registered to business in the State of Oregon, Contractor has reported to the Oregon Department of Revenue such information and in the manner as required by ORS 279A.120(3).

Contractor: \_\_\_\_\_

By: \_\_\_\_\_ Date \_\_\_\_\_

Title: \_\_\_\_\_





# EXHIBIT G

## CONTRACTOR'S RELEASE OF LIENS AND CLAIMS [PREREQUISITE TO CERTIFICATE OF FINAL COMPLETION]

To: City of St. Helens  
265 Strand Street  
St. Helens, OR 97051

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT: S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION  
PROJECT NO: P-525

In connection with our request for final payment for the above Project, I, \_\_\_\_\_, hereby state that:

- all subcontractors and suppliers on this Project have been paid in full, all obligations on the Project have been satisfied,
- all monetary claims and indebtedness on this Project have been paid, and all disputes with property owners have been resolved.
- There are no liens or claims of any kind outstanding or threatened against the Project.

Furthermore, I agree to indemnify and hold harmless City of St. Helens from any and all claims for labor or materials furnished under the Contract for the above Project.

### SWORN STATEMENT

**I hereby certify, under penalty of perjury and false swearing, that the foregoing statements are true and correct as I verily believe.**

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Contractor:  
By: \_\_\_\_\_  
Title: \_\_\_\_\_

STATE OF OREGON

\_\_\_\_\_) )  
\_\_\_\_\_) ss  
County of \_\_\_\_\_)

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, before me personally appeared

\_\_\_\_\_,  
\_\_\_\_\_ Whom I know personally  
\_\_\_\_\_ Whose identity proved on the basis of  
\_\_\_\_\_  
\_\_\_\_\_ Whose identity I proved on the oath/affirmation of  
\_\_\_\_\_, a credible witness to be the signer of the above document, and he/she  
acknowledged that he/she executed the same under oath/affirmation.

\_\_\_\_\_  
Notary Public for Oregon



# EXHIBIT H

## CERTIFICATE OF FINAL COMPLETION

Project Number: P-525

Project: S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION

Contractor: \_\_\_\_\_

Contract Signed: \_\_\_\_\_ Contract Expires: \_\_\_\_\_

Contract Completed: \_\_\_\_\_ Delinquent: \_\_\_\_\_

I hereby certify that I have completed my Contract, furnished the materials, and performed the Work as shown by the final estimate, according to the Contract Documents.

\_\_\_\_\_  
*Contractor* Title Date

The City has determined the Project is 100% complete in compliance with all Contract Documents.

\_\_\_\_\_  
*Inspector/Supervisor* Date

\_\_\_\_\_  
*Project Engineer* Date

\_\_\_\_\_  
*City of St. Helens* City Administrator Title Date

Unless otherwise provided as a Special Provision, when City accepts the Certificate of Final Completion, the date the Contractor signs the Certificate of Final Completion shall be the date the City accepts ownership of the work and the start date of the warranty period.



# EXHIBIT I

## INSTRUCTION TO BIDDERS

The provisions of Oregon Administrative Rules Chapter 137, Divisions 46 and 49, apply to all bids and contracts which incorporate the Public Works Standards of the City of St. Helens into the contract documents of a project. The OAR provisions control over any conflicting language in the Public Works Standards and the OAR provisions are incorporated herein by this reference.

### 1. SCOPE OF WORK

The work contemplated under this contract includes all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, the completion of all the work in connection with the project described in the contract documents, including the general conditions, all applicable special conditions, plans, specifications, or any supplemental documents.

### 2. EEO AFFIRMATIVE ACTION

Bidders must comply with the City of St. Helens Equal Opportunity Policy for Contractors. The policy is included in and made a part of these Contract Documents and is attached hereto and made a part hereof as Attachment A. Contractor shall not discriminate against minorities, women or emerging small business enterprises in the awarding of subcontracts.

### 3. BID PROVISIONS

- a. Each bid must contain a completed Bid including the following:
  - A. A Bid and Schedule of Prices.
  - B. Acknowledgement that the bidder has received and reviewed all Addenda for the bid.
  - C. A statement that all applicable provisions of ORS Chapters 279A-C, including ORS 279C.800 to 279C.870 (Contracting and Prevailing Wages) shall be complied with.
  - D. A statement by the bidder, as part of their bid, that the bidder agrees to be bound by and will comply with the provisions of ORS 279C.838 or 279C.840 or 40 U.S.C. 3141 to 3148, as applicable.
  - E. A statement as to whether the bidder is a resident bidder as defined in ORS 279A.120.
  - F. A statement as to whether or not the bidder is licensed under ORS 468A.720 for asbestos removal if applicable.
  - G. A statement that the bidder has a current and valid license with the Construction Contractor's Board and/or the State Landscape Contractors Board as required by ORS 671.530.
  - H. A statement confirming that the bidder has a Qualified Drug-testing Program for employees in place.
  - I. First Tier Subcontractor form for the project on the City form (physically received by City within 2 working hours of the bid submission deadline).
  - J. A Surety Bond, Cashier's check or Certified check in the amount of 10 percent of the submitted bid.
  - K. Certification: Non-discrimination
  - L. Certification: No Conflict of Interest
  - M. Certification: Not ineligible for Public Works Contracts
- b. The City will not mail notice of addenda but will publish notice of any addenda on City's website and post the notice of addenda at City Hall at <https://www.ci.st-helens.or.us/rfps>. The addenda may be downloaded or picked up at City Hall. Check the website and City Hall bulletin board frequently until the bid submission deadline.
- c. No bid will be received or considered by the City of St. Helens unless the bid contains a statement by the bidder as a part of its bid that the Contractor shall be bound by and will comply with the provisions of ORS 279C.838, 279C.840 or 40 U.S.C. 3141 to 3148. The statement shall be included in the Bid form. The existing prevailing rate of wage in the form of a BOLI document is included in the bid documents.

- d. Each Bidder must identify in the Bid whether the Bidder is a “resident bidder” as defined in ORS 279A.120.
- e. Unless specified in the ITB, and Contract Special Provisions, the bidder or subcontractor need not be licensed under ORS 468A.720 relating to asbestos abatement.
- f. No bid for a construction contract shall be received or considered by the City of St. Helens unless the bidder is licensed with the Construction Contractors Board or licensed by the State Landscape Contractors Board as required by ORS 671.530.
- g. Each Bidder must demonstrate that its firm has a Qualified Drug Testing Program for employees in place and demonstrate compliance prior to award.
- h. Instructions for First-Tier Subcontractors Disclosure. Bidders are required to disclose information about certain first-tier subcontractors when the contract value for a Public Improvement is greater than \$100,000.

Specifically, when the contact amount of a first-tier subcontractor furnishing labor or labor and materials would be greater than or equal to (i) 5% of the project bid, but at least \$15,000, or (ii) \$350,000 regardless of the percentage, the bidder must disclose the following information about that subcontract in its bid submission or within two (2) working hours after bid submission deadline:

- A. The subcontractor’s name,
- B. The dollar value of the subcontract, and
- C. The category of work that the subcontractor would be performing.

If the bidder will not be using any subcontractors that are subject to the above disclosure requirements, the bidder is required to indicate “NONE” on the accompanying form. Disclosure forms will be available for public inspection after the opening of the bids.

**THE CITY OF ST. HELENS MUST REJECT A BID AS NON-RESPONSIVE IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THE REQUIRED INFORMATION BY THE STATED DEADLINE.**

- i. Bid Security. No bid will be received or considered unless the Bid is accompanied by a certified check, cashier's check, (payable to the City of St. Helens), surety bond (in approved form)(f/k/a/ bid bond), or irrevocable letter of credit issued by an insured institution (in an approved form) in an amount equal to ten percent (10%) of the total amount bid. The successful bidder will be required to furnish a faithful performance bond and a labor and material payment bond each in the amount of one hundred percent (100%) of the amount of the contract. Said security shall be irrevocable for 60 days, unless specified otherwise. The bid security shall be forfeited, at the City’s option, as fixed and liquidated damages, if the bidder fails or neglects to furnish the required performance bond, the insurance, or to execute the contract within 10 working days after receiving the contract from the City for execution. When a bond is used for bid security, the bond shall be executed by a surety company authorized to transact business in the State of Oregon. **THE BIDDER SHALL HAVE THE SURETY USE THE SURETY BOND FORM PROVIDED HEREIN. IF THIS FORM IS NOT USED, THE BID WILL BE DEEMED NON-RESPONSIVE AND SHALL BE REJECTED.**

All such certified checks or surety bonds will be returned to the respective bidders within 10 working days after the bids are opened, except those of the two low bidders. The bid security of the two low bidders will be held by the City until the selected bidder has accomplished the following:

- A. Executed a formal contract;
- B. Executed and delivered to the City a Performance Bond and Payment Bond, both in the amount equal to 100% of the Contract Price;
- C. Furnish proof of public works bond filed with BOLI; and

D. Furnish the required Certificates of Insurance.

Upon the execution and delivery to the City of St. Helens of the Contract and Performance Bond and Payment Bond and furnishing proof of a public works bond filed with BOLI by the successful bidder, the bid security shall be returned to the bidder. The bidder who has been awarded a contract and who fails or neglects to promptly and properly execute the contract or bonds shall forfeit the bid security that accompanied the bid. It is hereby specially provided that a forfeiture of said bid security be declared by the Council if the contract and performance bond and payment bond are not executed and delivered to the City within ten (10) working days of the day of the receipt by the successful bidder of the prepared contract. The Council, at its option, may determine that the bidder has abandoned the submitted accepted bid, in which case the bid security shall become the sole property of the City and shall be considered as liquidated damages and not as a penalty for failure of the bidder to execute the contract and bond. The security of unsuccessful bidders shall be returned to them after the contract has been awarded and duly signed.

- j. A Bidder submitting a bid thereby certifies that no officer, agent, or employee of the City who has a pecuniary interest in this bid has participated in the contract negotiations on the part of the City, that the Bid is made in good faith without fraud, collusion, or connection of any kind with any other Bidder for the same call for bids, and that the Bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.
- k. The Bidder, in submitting the bid, certifies that the Bidder has not been disqualified and is eligible to receive a contract for a public work pursuant to ORS 279C.860 as well as the disqualification provisions of ORS 279C.440 and OAR 137-049-0370. Bidder agrees, if awarded a contract, that every subcontractor will not be ineligible to receive a contract for a public work pursuant to ORS 279C.860 and will otherwise not be disqualified under ORS 279C.440 and OAR 137-049-0370.

**4. PREOFFER CONFERENCE AND PREQUALIFICATION OF BIDDERS**

If a pre-bid conference is scheduled, notice will be provided in accordance with OAR 137-049-0200(1)(a)(B). If prequalification will be required it will be specifically stated in the Notice to Contractors and Invitation to Bid, including the date prequalification applications must be filed under ORS 279C.430 and the class or classes of work for which bidders must be pre-qualified. For example, the requirement for ODOT Prequalification reads as follows:

Bidders must be pre-qualified with the Oregon Department of Transportation or General Service per ORS 279C.435 to perform the type and size of work contemplated herein and shall submit, to the City upon request. The City will investigate and determine the qualifications for the apparent low bidder prior to awarding the contract.

Applications submitted without being designated for a project advertised for bid by the City will be considered as a general prequalification application and processed pursuant to ORS 279C.430 to 279C.450, and notice of prequalification status will be given within thirty (30) days of the receipt of the application. A notice of disqualification can be given orally. An oral disqualification notice will be followed by written notice and bear the date of the oral notice. (NOTE: No person may engage in any business within the City without first obtaining a City Business License and paying the fee prescribed pursuant to City of St. Helens Ordinance 1392 as amended.)

**5. FORM OF BID**

- a. Bids shall be submitted in sealed envelopes to:  
City Administrator  
City of St. Helens  
265 Strand Street  
St. Helens, Oregon 97051  
Attention: John Walsh

The outside of the transmittal envelope shall bear the following information:

- Name of Bidder
- Address and telephone number of Bidder
- Title of Project
- Date of opening
- The words "Sealed Bid"

If the sealed bid is forwarded by mail or messenger service, the sealed envelope containing the bid, and marked as above, must be enclosed in another envelope addressed as noted above. Facsimile and Electronic Data Interchange bids shall not be accepted unless otherwise specified in the Special Provisions. No bid will be received or considered by the City unless the bid contains all the Required Bid Documents and Certifications.

- b. All bids must be clearly and distinctly typed or written with ink or indelible pencil and be on the Bid form furnished by Owner. The bid must be signed by the Contractor or a duly authorized agent. If erasures or other changes appear on the form, they shall be initialed in ink by the person who signs the bid. The bidder shall not alter, modify or change the Bid forms except as directed by addendum. All applicable blanks giving general information must be completed, in addition to necessary unit price items and total prices in the column of totals to make a complete bid. The Bid is the bidder's offer to enter into a contract which, if the Bid is accepted for award, binds the bidder to a contract and the terms and conditions contained in the Bid, as well as the Solicitation Documents. A bidder shall not make the Bid contingent upon the City's acceptance of specifications or contract terms which conflict with or are in addition to those advertised in the Notice to Contractors and Invitation to Bid. Any statement accompanying and tending to qualify a bid may cause rejection of such bid, unless such statement is required in a bid embracing alternative bids.
- c. Unless otherwise specified, Bidders shall bid on all bid items included in the bid and the low Bidder shall be determined. Except as provided herein, bids which are incomplete, or fail to reply to all items required in the bid may be rejected.
- d. Bidders shall state whether business is being done as an individual, a co-partnership, a corporation, or a combination thereof, and if incorporated, in what state, and if a co-partnership, state names of all partners. The person signing on behalf of a corporation, a co-partnership or combination thereof shall state their position with the firm or corporation, and state whether the corporation is licensed to do business in the State of Oregon.

#### **6. LATE BIDS**

Bids received after the scheduled bid submission deadline set forth in the invitation for bids will be rejected. Bids will be time and date stamped by City Hall personnel upon receipt. Such time and date stamps will govern the determination of on-time submission of bids. Bids received after the time so fixed are late bids. Late bids will be time and date stamped at the time of receipt by City personnel, marked as "Rejected as Late Bid" and will be returned, unopened, to the submitted.

#### **7. INTERPRETATION OF CONTRACT AND ADDENDA**

If a bidder finds error, discrepancies in, or omissions from the plans, specifications or contract documents, or has doubt as to their interpretation or meaning, the bidder shall at once notify the City Contact Person. The City will investigate and determine if an addendum will be issued.

If it should appear to a Bidder that the work to be done or matters relative thereto are not sufficiently described or explained in the Contract Documents or that Contract Documents are not definite and clear, or the Bidder needs additional information or an interpretation of the contract, the Bidder may make written inquiry regarding same to the Engineer at least ten (10) days, unless otherwise specified, before the scheduled bid submission deadline for submission of bids.

If, in the opinion of the Engineer, additional information or interpretation is required, an addendum will be issued to all known specification holders.

Any addendum or addenda issued by the City which may include changes, corrections, additions, interpretations or information, and issued seventy-two (72) hours or more before the scheduled bid submission deadline for submission of bids, Saturday, Sunday and legal holidays not included, shall be binding upon the Bidder. City shall supply copies of such Addenda will not be mailed but will be posted on the website and available at City Hall; failure of the Contractor to receive or obtain such addenda shall not excuse them from compliance therewith if they are awarded the contract.

**ORAL INSTRUCTIONS OR INFORMATION CONCERNING THE CONTRACT OR THE PROJECT GIVEN OUT BY OFFICERS, EMPLOYEES OR AGENTS OF THE CITY TO PROSPECTIVE BIDDERS SHALL NOT BIND THE CITY.**

**8. EXAMINATION OF CONTRACT, SITE OF WORK AND SUBSURFACE DATA**

- a. Prior to submitting a bid, it is the responsibility of each Bidder to:
  - A. Examine the plans, specifications and contract documents thoroughly.
  - B. Become fully informed as to the quality and quantity of materials and the character of the work required.
  - C. Visit the site to become familiar with local conditions that may affect cost, progress, or performance of the work and sources and supply of materials.
  - D. Consider all federal, state and local laws, ordinances, rules and regulations that may affect cost, progress, or performance of the work, including environmental and natural resource ordinance and regulations
  - E. Consider identified site conditions and conduct pre-bid inspection to address environmental and natural resource laws implicated by the project.
  - F. Study and correlate the Bidder's observations, especially as regards site conditions with the Contract Documents.
  - G. Notify the Contact Person of all conflicts, errors, ambiguities or discrepancies discovered in the Contract Documents.
  
- b. Bidders shall determine for themselves all the conditions and circumstances affecting the project or the cost of the proposed work, including without limitation utility interferences, by personal examination of the site, careful review of the Contract and by such other means as the Bidder feels may be necessary. It is understood and agreed that information regarding subsurface or other conditions, or obstructions indicated in the Contract Documents, is provided by Owner only for the convenience of Bidders and may not be complete or accurate and such information is not expressly or tacitly warranted to accurately represent actual conditions. Bidder's use of such information shall be at Bidder's sole risk, and Bidder is responsible to confirm any information provided from such independent sources as Bidder feels may be necessary.
  
- c. Logs of test holes, test pits, soils reports, ground-water levels and other supplementary subsurface information are offered as information of underlying materials and conditions at the locations actually tested. Owner will not be liable for any loss sustained by the Bidder as a result of any variance between conditions contained in or interpretations of test reports and the actual conditions encountered during progress of the work.
  
- d. The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the site subsurface conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract.
  
- e. The City will not pay any costs incurred by any Bidder in the submission of a Bid, or in making necessary studies or designs for the preparation thereof, or for procuring or contracting for the items to be furnished under the invitation to bid. When submitting a bid, the Bidder agrees that consideration has been given to the requirements and conditions contained throughout these bid documents.
  
- f. Notice: It is further understood that a bid awarded hereunder is subject to the City being able to comply with all zoning and land development ordinances or obtain rezoning of the property where necessary, and comply with local building code restrictions and conditions for structures contemplated in the project, any or all of which conditions may be contained in the contract or contract Special Provisions and if such conditions are not satisfied may result in termination of the contract.

**9. FAMILIARITY WITH LAWS AND ORDINANCES**

- a. The Bidder is presumed to be familiar with all Federal, State, and local laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials or equipment used in the proposed construction, or which in any way affect the conduct of the work. If the Bidder, or Contractor, shall discover any provision in the Contract which is contrary to or inconsistent with any law, ordinance or regulation, it shall immediately be reported to the Owner in writing.

- b. No person may engage in any business within the City without first obtaining a City business license and paying the fee prescribed pursuant to City of St. Helens Ordinance. The Contractor and their subcontractors shall obtain a City of St. Helens business license prior to beginning any work within the City of St. Helens.

**10. UNIT BIDS**

- a. The estimate of quantities of work to be done under unit price bids is approximate and is given only as a basis of calculation for comparison of bids and award of the Contract. The City does not warrant that the actual amount of work will correspond to the amount as shown or estimated. Payment will be made at unit prices under a contract, only for work actually performed or materials actually furnished according to actual measurement that were necessary to complete the work.
- b. Bidders must include in their bid prices the entire cost of each item of work set forth in the bid, and when, in the opinion of the City, the prices in any bid are obviously unbalanced, such bid may be rejected.
- c. The unit contract prices for the various bid items of the contract shall be full compensation for all labor, materials, supplies, equipment, tools and all things of whatsoever nature are required for the complete incorporation of the item into the work the same as though the item were to read "In Place."

**11. WITHDRAWAL, MODIFICATION OR ALTERATION OF BID**

- a. Bids may be withdrawn on written request received from the bidders prior to the time fixed for opening. The request shall be executed by the bidder or a duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened. The bid will be irrevocable until such time as the City:
  - A. Specifically rejects the bid, and
  - B. Awards the contract to another bidder and said contract is properly executed.

All bids shall remain subject to acceptance by the City for sixty (60) days after the date of the bid opening.

- b. Prior to Bid Opening, changes may be made provided the change is initialed by the Bidder or the Bidder's agent. If the intent of the Bidder is not clearly identifiable, the interpretation most advantageous to Owner will prevail.
- c. No Bidder may withdraw a bid after bid opening unless sixty (60) days have elapsed and the City has not awarded a contract.

**12. MISTAKES IN BIDS**

- a. To protect the integrity of the competitive solicitation process and to assure fair treatment of Bidders, City will carefully consider whether to permit waiver, correction or withdrawal for certain mistakes.
- b. Treatment of Mistakes. City shall not allow a Bidder to correct or withdraw a Bid for an error in judgment. If the City discovers certain mistakes in a Bid after Opening, but before award of the Contract, the City may take the following action:
  - A. City may waive, or permit a Bidder to correct, a minor informality. A minor informality is a matter of form rather than substance that is evident on the face of the Bid, or an insignificant mistake that can be waived or corrected without prejudice to other Bidders. Examples of minor informalities include a Bidder's failure to:
    - 1) Return the correct number of Signed Bids or the correct number of other documents required by the Solicitation Document;
    - 2) Sign the Bid in the designated block, provided a Signature appears elsewhere in the Bid, evidencing an intent to be bound; and



- 3) Acknowledge receipt of an Addendum to the Solicitation Document, provided: it is clear on the face of the Bid that the Bidder received the Addendum and intended to be bound by its terms; and the Addendum involved did not affect price, quantity or delivery.
- B. City may correct a clerical error if the error is evident on the face of the Bid, or other documents submitted with the Bid, and the Bidder confirms the City's correction in Writing. A clerical error is a Bidder's error in transcribing its Bid. Examples include typographical mistakes, errors in extending unit prices, transposition errors, arithmetical errors, instances in which the intended correct unit or amount is evident by simple arithmetic calculations (for example a missing unit price may be established by dividing the total price for the units by the quantity of units for that item or a missing, or incorrect total price for an item may be established by multiplying the unit price by the quantity when those figures are available in the Bid). In the event of a discrepancy, unit prices shall prevail over extended prices.
  - C. City may permit a Bidder to withdraw a Bid based on one or more clerical errors in the Bid only if the Bidder shows with objective proof and by clear and convincing evidence:
    - 1) The nature of the error;
    - 2) That the error is not a minor informality under this subsection or an error in judgment;
    - 3) That the error cannot be corrected or waived under subparagraph B of this subsection;
    - 4) That the Bidder acted in good faith in submitting a Bid that contained the claimed error and in claiming that the alleged error in the Bid exists;
    - 5) That the Bidder acted without gross negligence in submitting a Bid that contained a claimed error;
    - 6) That the Bidder will suffer substantial detriment if the City does not grant it permission to withdraw the Bid;
    - 7) That the City's or the public's status has not changed so significantly that relief from the forfeiture will work a substantial hardship on the City or the public it represents; and
    - 8) That the Bidder promptly gave notice of the claimed error to the City.
  - D. The criteria in subsection C above shall determine whether a City will permit a Bidder to withdraw its Bid after the bid submission deadline. These criteria also shall apply to the question whether an City will permit a Bidder to withdraw its Bid without forfeiture of its bid bond (or other bid security), or without liability to the City based on the difference between the amount of the Bidder's Bid and the amount of the contract actually awarded by the City, whether by award to the next lowest Responsive and Responsible Bidder or the best Responsive and Responsible Proposer, or by resort to a new solicitation.
  - E. The City shall reject any Bid in which a mistake is evident on the face of the Bid and the intended correct Bid is not evident or cannot be substantiated from documents accompanying the Bid, i.e., documents submitted with the Bid.

### 13. REJECTION OF BIDS

- a. The City may reject any bid upon a finding that the Bid meets the criteria specified in OAR 137-049-0440(1)(a) or (b) or has not provided the certification required under OAR 137-049-0440(3). The City shall reject a Bid from a Bidder who meets the criteria specified in OAR 137-049-0440(1)(c). The City may, for good cause, reject any or all bids upon a finding it is in the public interest to do so. In any case where competitive bids are required and all bids are rejected, and the proposed contract is not abandoned, new bids may be called for as in the first instance. The City may, at its own discretion, waive minor informalities.
- b. This invitation to bid does not commit the City to pay any costs incurred by any Bidder in the submission of a Bid, or in making necessary studies, subsurface investigations or designs for the preparation of a Bid, or for procuring or contracting for the items to be furnished pursuant to the Contract Documents.

- c. The City reserves the right to reject any or all bids when such rejection is in the best interest of the City of St. Helens. Bids may be rejected if they show any alteration of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.
- d. When Bids are signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf, or a member of a partnership, a "Power of Attorney" must be submitted with the Bid or on file with the City Administrator prior to opening of bids; otherwise, the Bid will be rejected as irregular.
- e. More than one Bid from an individual, firm, partnership, corporation, or combination thereof with an interest in more than one bid, for the items bid, will be cause for the rejection of all Bids in which such individual, firm, partnership, corporation, or combination thereof, is interested.
- f. **If there is reason to believe that collusion exists among bidders, none of the bids of the participants in such collusion will be considered, and all involved bids shall be rejected. Bids in which prices are obviously unbalanced may be rejected.**

#### **14. BID PROTEST.**

Bidders may, in writing protest or request changes of any specifications or contract terms in accordance with adopted City contracting rules. The written protest or request for changes must be received by the City no later than ten (10) calendar days prior to the Bid Submission Deadline. The written protest or request shall include the reasons for the protest or request, and any proposed changes to the bid specifications or contract terms and a description of the prejudice to the bidder. Envelopes containing bid protests shall be marked "Contract Provision Protects or Request" with the Bid Number and Bid Submission Deadline. No protest against award, owing to the content of the bid specifications or contract terms shall be considered after the deadline established for submitting protests of bid specifications or contract terms.

#### **15. ORS 654.150 SANITARY FACILITIES AT CONSTRUCTION PROJECTS STANDARDS, EXEMPTIONS**

If the contract price is estimated (itemized bid) or bid (lump sum) by Contractor at \$1,000,000 or more, Contractor shall be responsible for all costs (which costs shall be included in the bid whether or not a specific bid item is provided therefore) that may be incurred in complying with or securing exemption or partial exemption from the requirements of ORS 654.150 (Sanitary facilities at construction projects; standards, exemptions) and the rules adopted pursuant thereto. Determination of applicability of ORS 654.150 to the project is the sole responsibility of the Contractor.



## EXHIBIT J

### OREGON PREVAILING WAGE RATES

#### S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525

- i. Workers must be paid not less than the applicable state prevailing rate of wage. ORS 279C.830(1)(c); OAR 839-025-0020(3)(a)
- ii. If the Contractor fails to pay for labor and services, the City can pay for them and withhold these amounts from payments to the contractor. ORS 279C.515; OAR 839-025-0020(2)(a)
- iii. The Contractor must pay daily, weekly, weekend and holiday overtime as required in ORS 279C.540. ORS 279C.520(1); OAR 839-025-0020(2)(b)
- iv. The employer must give written notice to the workers of the number of hours per day and days per week they may be required to work. ORS 279C.520(2); OAR 839-025-0020(2)(c)
- v. The Contractor must make prompt payment for all medical services for which the Contractor has agreed to pay, and for all amounts for which the contractor collects or deducts from the worker's wages. ORS 279C.530; OAR 839-025-0020(2)(d)
- vi. The Contractor is required to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2)(a); OAR 839-025-0020(2)(e)(A)
- vii. The Contractor is required to include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2)(b); OAR 839-025-0020(2)(e)(B)

Applicable Oregon prevailing wage rates are contained in the publication, Prevailing Wage Rates for Public Works Contracts in Oregon effective as of the date the Bidding Documents are first advertised.

See Oregon Bureau of Labor and Industries website links at:  
<http://www.oregon.gov/BOLI/WHD/PWR/pages/index.aspx>

# **PWR REQUIRED POSTINGS ALL CONTRACTORS AND SUBCONTRACTORS**

## **PREVAILING WAGE RATES**

Each and every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in a conspicuous place at the work site, so workers have ready access to the information. ORS 279C.840(4); OAR 839-025-0033(1).

## **DETAILS OF FRINGE BENEFIT PROGRAMS**

When a contractor or subcontractor provides for or contributes to a health and welfare plan or a pension plan, or both, for the contractor or subcontractor's employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the work site. The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in a conspicuous place at the work site in the same location as the prevailing wage rates (see above). ORS 279C.840(5); OAR 839-025-0033(2)

## **WORK SCHEDULE**

Contractors and subcontractors must give workers the regular work schedule (days of the week and number of hours per day) in writing, before beginning work on the project. Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information. If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements. ORS 279C.540(2); OAR 839-025-0034.

## PUBLIC WORKS BONDS

EVERY CONTRACTOR AND SUBCONTRACTOR who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a **\$30,000 “PUBLIC WORKS BOND”** with the Construction Contractor’s Board (CCB). (ORS 279C.836) This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

- This bond is to be USED EXCLUSIVELY FOR UNPAID WAGES determined to be due by the Bureau of Labor and Industries (BOLI).
- The bond MUST be filed BEFORE STARTING WORK on a prevailing wage rate project.
- The bond is in effect CONTINUOUSLY (do not have to have one per project).
- BEFORE PERMITTING A SUBCONTRACTOR TO START WORK on a public works project, CONTRACTORS MUST VERIFY their subcontractors have either filed the bond, or have elected not to file a public works bond due to a bona fide exemption.
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

### Exemptions:

- Allowed for a disadvantaged business enterprise, a minority-owned business, woman-owned business, a business that a service-disabled veteran owns or an emerging small business certified under ORS 200.055, for the first FOUR years of certification;
  - Exempt contractor must still file written verification of certification with the CCB, and give the CCB written notice that they elect not to file a bond.
  - The prime contractor must give written notice to the public agency that they elect not to file a public works bond.
  - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
  - For projects with a total project cost of \$100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
  - Emergency projects, as defined in ORS 279A.010(f).

### **ORS 279C.830(2) requires:**

That the specifications for every contract for public works shall contain a provision stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.

Every contract awarded by a contracting agency shall contain a provision requiring the contractor:

- To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt;
- To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt.

Every subcontract that a contractor or subcontractor awards in connection with a public works contract must require any subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the public works project, unless otherwise exempt.

Part 3

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# **2021 Oregon Standard Specifications for Construction**

**[https://www.oregon.gov/odot/Business/Pages/Standard Specifications.aspx](https://www.oregon.gov/odot/Business/Pages/Standard_Specifications.aspx)**

Part 4

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**City of St. Helens  
Engineering Standards  
Manual Municipal  
Code Title 18**

<https://www.codepublishing.com/OR/StHelens/>

Part 5

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# **Special Provisions & Technical Specifications**




OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>EXPIRES:</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00220, 00221, 00222, 00223, 00224, 00225, 00228, 00850, 00860, 00865, 00867, 00869, 00905, 00930, 00940, 00960, 00962, 00970, 02910, 02926</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST


OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>EXPIRES: 12/31/2023</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00210, 00280, 00290, 00294, 00305, 00320, 00620, 00640, 00730, 00744, 00749, 00755, 00765, 00759, 02510, 02560, 02690,</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST


OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>REGISTERED PROFESSIONAL ENGINEER 83,599PE OREGON JAN. 12, 2010 ROSE C. HORTON RENEWS: 06-30-2023</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00350, 00390, 00470, 00490, 02320</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST


OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p> 	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00293, 00310, 00405, 00415, 00440, 00442, 00445, 00470, 00490, 00495, 01140, 01150, 01160, 01170, 02001, 02030, 02050, 02415, 02440, 02450, 02470, .02475, 02480, 02485, 02490</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST


OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>400 Jeramie Shane OREGON 5/8/98</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00760, 00815, 01030, 01040, 01069, 01095, 01120, 02830</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST


OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>REGISTERED PROFESSIONAL ENGINEER 17,262PE OREGON JULY 19, 1994 SCOTT M. NETTLETON RENEWS: 12-31-2022</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 0596C</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

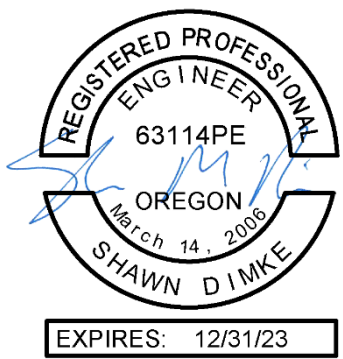
OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> and Strand Streets, Road and Utility Extensions

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>EXPIRES: 12/31/23</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1st and Strand Streets, Road and Utility Extensions. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00330</p>
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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

## S. 1<sup>st</sup> and Strand Streets Project

### Project # P-525 S. 1<sup>ST</sup> AND STRAND STREETS PROJECT

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#### APPLICABLE SPECIFICATIONS

The following St. Helens Technical Specifications are applicable to the Work on this Project, as modified herein, and included in the project-specific Contract Documents.

These Specifications take precedence over the CSI specifications for the pump station construction and the 2021 Oregon Standard Specifications for Construction (OSSC), as modified by Special Provision for this Project. Where a conflict arises, the St. Helens Technical Specification shall prevail.



## S. 1<sup>st</sup> and Strand Streets Project

### SECTION 0110

#### SUMMARY OF WORK

##### 1.1 GENERAL

These general requirements, special provisions, and technical specifications supplement and amplify certain sections of the Standard Terms and Conditions for Public Improvement Contracts, and Supplementary General Conditions. Work shall be in accordance with the 2021 or most current version of the Oregon Standard Specifications for Construction (OSSC), including all revisions at date of bid opening except as may be modified herein. These specifications shall apply in all particulars insofar as they are applicable to this project. In the case of discrepancy, unless noted herein, the more restrictive provisions shall apply.

##### 1.2 SCOPE OF WORK

S. 1ST STREET is proposed to extend from Cowlitz Street south to Plymouth Street. This street extension will include multiple mid-block crossings to allow for pedestrian and bicycle crossings that provide access to the river and future property development. The street section proposes two narrow shared travel lanes that allow for bike traffic and minimize the pedestrian street crossing length at designated crossings. The coordinated location of the street crossings with adjacent future development parcels provide the opportunity to maintain view corridors to the river, as well as enhanced multimodal connections between the proposed Riverwalk trail, S. 1st Street, and connections to the west (Tualatin St stairway, Nob Hill Nature Park, Plymouth Street).

STRAND STREET is proposed to extend south and west from Columbia View Park to intersect S. 1st Street opposite the Tualatin pedestrian stairway. The extension will begin about 180 feet south of the Cowlitz Street Intersection. In accordance with previous community input, the design of the Strand Street extension should include ample parking and maintain view access to the river, so there is a great opportunity to integrate the streetscape design into the Riverwalk design (wider sidewalks, head-in-parking, connections to Riverwalk trail, overlook/nodes, etc.). Strand Street is targeted to be a festival street with a gateway or special streetscape treatment at the intersection of 1st and Strand to highlight an arrival to the riverfront. This work effort also is to include a subset of plans that incorporates the design of the Strand Street reconstruction between Cowlitz and the Courthouse as well as the extension of Cowlitz east of Strand to a turnaround/dropoff terminus.

INTERSECTION IMPROVEMENTS at the existing Cowlitz/S. 1st and Cowlitz/Strand intersections will be completed in accordance with previous design approach/parameters of the S. 1st/St. Helens intersection (design completed by others). The streetscape design elements incorporated into the S. 1st and Strand project will be added to the existing S. 1st/St Helens intersection design (by others) to maintain consistency within the River District. The S. 1st and Strand Street intersection will be designed as a new intersection with consistent design and streetscape elements to the existing intersections. S. 1st/Street A, Strand/Street A intersections and will be completed in accordance with previous design approach/parameters of S. 1st/St. Helens. S. 1st Street/Cowlitz Street is being modified to be a concrete intersection.

NEW UTILITY EXTENSIONS and the relocation of the existing sanitary sewer lift station on the Veneer Property will support new development and improve the existing City systems (looping of water, alleviating sewer capacity issues). Utility infrastructure and stormwater management should be designed in

## **S. 1<sup>st</sup> and Strand Streets Project**

accordance with City Master Plan documents and provide coordinated stubs and services (including franchise utilities) to future development parcels, providing flexibility for different configurations and development patterns for the area. Stormwater management will include the exploration of low impact development options. A challenge for drainage will be maintaining adequate depth and conveyance to utilize the existing stormwater outfalls to the Columbia River. As amended with WO2, pump station site is being revised to include a custom building that will house the generator and allow for removal of the security fence.

Base Contract includes street construction of S. 1<sup>st</sup> Street from Tualatin Street to Cowlitz Street, all of the Cowlitz Street improvements, and Strand Street from its existing southern terminus to the Courthouse. Base contract also includes construction of the new pump station, the pathway along the bluff (including lighting and landscaping), and the two water quality swale facilities. Storm drain improvements within Base contract include all storm line construction within the street improvements described above, storm main construction within S. 1<sup>st</sup> Street (from Plymouth to Tualatin Street), Tualatin Street, and Strand Street (from Tualatin Street to existing southern terminus of Strand Street). Sewer construction includes the force main connection between the pump station and waste water treatment plant along with all of the gravity sewer construction shown on the plans. Water construction includes all of the water line improvements proposed within the street improvements mentioned above along with the water construction proposed between Tualatin Street and Plymouth.

Add 1 includes the street construction of Tualatin Street, Street A, and Strand Street (from Tualatin Street to the existing southern terminus of Strand Street). The street construction is inclusive of furnishings, lighting, and landscaping within the limits of Add 1. Water construction for Add 1 includes construction of the waterline extension between the end of existing Strand Street and the intersection of S. 1<sup>st</sup> Street and Tualatin Street. Stormwater construction for Add 1 includes catch basins for new street construction of Strand Street and Tualatin Street as well as Street A. Add 1 is included as a separate bid tab.

Add 2 includes the street construction of S. 1<sup>st</sup> Street from Tualatin Street south to the northern terminus of Plymouth Street. The street construction is inclusive of furnishings, lighting, and landscaping within the limits of Add 1. Water construction within Add 2 includes hydrant construction for the new construction of S. 1<sup>st</sup> Street. Stormwater construction within Add 2 includes catch basins for the street construction. Add 2 is excluded from this contract and is not included as a separate bid tab.

The general outline of the principal features of the work does not in any way limit the responsibility of the Contractor to perform all work and furnish all equipment, labor, and materials necessary to successfully complete the work required by the Contract Documents. The Contractor shall not change any material, design values, or procedural matters stated or approved herein, without informing the Engineer and receiving written approval of the change. Unapproved changes shall be considered unauthorized work and shall result in rejection and removal of work done with the unapproved materials or with an unapproved process at no cost to the City.

### **1.3 LOCATION OF WORK**

Work on this project is located within the city limits of St. Helens, Oregon as shown on the vicinity map on Sheet 1 of the project plans.

### **1.4 INTENT OF WORK**

The intent of the Work is to produce a complete and finished work, which the Contractor undertakes to do in full compliance with the Contract Documents, properly installed public utilities and other public improvements which meet all specifications as described in these Contract Documents. It is not intended to

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mention every item of work in the specifications that can be adequately shown on the drawings nor to show on the drawings all items of work described or required by the specifications. All materials or labor for work shown on the drawings or reasonably inferable therefrom as being necessary to produce a finished job shall be provided by the Contractor whether not it is expressly covered in the specifications. The Contractor shall do all work as provided in the plans, specifications, special provisions, bid and contract, and shall do such additional extra work as may be considered necessary to complete the work in a satisfactory manner acceptable to the City.

SECTION 0112

DEFINITIONS AND REGULATORY REQUIREMENTS

1.1 DEFINITIONS

In addition to the words and terms defined herein, the following shall be understood to have the meanings given:

- Owner/City City of St. Helens
- Engineer Otak
- Project Manager City of St. Helens
- Construction Inspector City of St. Helens
- County Columbia County
- Sewer District City of St. Helens
- Water District City of St. Helens
- Gas Company Northwest Natural Gas
- Power Company Columbia River PUD
- Telephone Company Century Link/Lumen
- Cable Company Comcast Cable
- Fire Department Columbia River Fire & Rescue

1.2 ABBREVIATIONS

- AASHTO American Association of State Highway and Transportation Officials
- ACI American Concrete Institute
- ADA Americans with Disabilities Act
- ANSI American National Standards Institute
- ASTM American Society for Testing and Materials
- AWWA American Water Works Association
- BOLI Oregon Bureau of Labor & Industries
- DEQ Department of Environmental Quality, State of Oregon
- EPA U.S. Environmental Protection Agency
- IBC International Building Code
- MUTCD Manual on Uniform Traffic Control Devices
- NACWA National Association of Clean Water Agencies
- NASSCO National Association of Sewer service Companies
- NEC National Electrical Code
- NESC National Electrical Safety Code
- OAR Oregon Administrative Rules
- ODOT Oregon Department of Transportation
- OR-OSHA Oregon Occupational Safety & Health Administration
- ORS Oregon Revised Statutes
- OSSC Oregon Standard Specifications for Construction
- UBC Uniform Building Code (as adopted by the State of Oregon)
- UMC Uniform Mechanical Code
- UPC Uniform Plumbing Code (as adopted by the State of Oregon)

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### **1.3 CODE REQUIREMENTS**

All work shall be done in strict compliance with the requirements and current revisions, as applicable, of:

- Oregon Standard Specifications for Construction (OSSC)
- Oregon Department of Transportation (ODOT)
- Uniform Plumbing Code
- Uniform Mechanical Code
- National Electric Code
- National Electric Safety Code
- City of St. Helens Engineering Standards Manual (Municipal Code Title 18)
- City of St. Helens Development Code
- State of Oregon Bureau of Labor and Industries (BOLI)
- Oregon Department of Environmental Quality (DEQ)
- Manual of Uniform Traffic Control Devices (MUTCD)
- American National Standards Institute (ANSI)
- American Water Works Association (AWWA)

In case of disagreement between these codes or specifications, the more restrictive shall prevail.

### **1.4 PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS**

Prevailing wage rates apply for public works construction projects costing over \$50,000. If a project begins with a total project cost under \$50,000, but change orders increase the project cost to more than \$50,000, the entire project will be subject to the prevailing wage rate law, including all work already performed on the project. OAR 839-025-0100(1)(a).

For each labor classification, the Contractor shall abide by the requirements of the prevailing wage rates for the State of Oregon Bureau of Labor and Industries (BOLI), as required. Applicable Oregon prevailing wage rates are contained in the publication, Prevailing Wage Rates for Public Works Contracts in Oregon. Effective January 1, 2022. ORS 279C.830(1)(a). The Contractor and every subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2); OAR 839-025-0020(4).

### **1.5 PERMITS, FEES, AND LICENSES**

Unless provided for otherwise in these Contract Documents, all permits, licenses, and fees shall be obtained by the Contractor and all costs shall be borne by the Contractor. Contractor shall be responsible for compliance with all permit provisions and shall accommodate all special inspections required thereof, all at no additional expense to the City beyond prices as bid. Contractor and Subcontractors shall obtain required business licenses from the City of St. Helens. Contractor shall stay fully informed of all permits required by various jurisdictions having authority over the Work and shall also bear all costs of fines or claims arising from, or based on, the violation of permit requirements.

There will be no measurement of work performed under this section and all permit requirements will be considered incidental to the work and no separate payment will be made.

### **1.6 US MAIL SERVICE**

Contractor shall comply and cooperate fully with the requirements of the local authority of the U.S. Postal Service to maintain mailboxes and uninterrupted mail service during construction.

## **S. 1<sup>st</sup> and Strand Streets Project**

### **SECTION 0120**

#### **PROJECT MEETINGS**

##### **1.1 PRE-BID CONFERENCE**

A Mandatory Pre-Bid Conference and walk-through of the site is scheduled for this project and for the S 1st Street and St. Helens Street Intersection Project. The meeting for both projects will be held concurrently. Bidders are strongly encouraged to visit the project site at any time during the bidding phase of the project at their convenience.

##### **1.2 PRE-CONSTRUCTION CONFERENCE**

Prior to Contractor mobilization, a mandatory Pre-Construction Conference will be scheduled by the City's Project Manager. Representatives of the City, Contractor, subcontractors, and appropriate utility representatives shall attend. The purpose of this meeting will be to review and discuss the proposed methods and practices for accomplishing the required work, job site procedures, roles and responsibilities, schedule, and other requirements of the Contract. Contractor shall submit a detailed construction schedule, list of emergency contacts, and list of subcontractors, and other required documentation listed on the Project Documentation Checklist of the Supplementary section of these Contract Documents before or at the meeting for discussion.

##### **1.3 CONSTRUCTION PROGRESS MEETINGS**

Regular project progress meetings may be scheduled by the City's Project Manager. Project progress meetings shall be attended by representatives of the City, the Contractor's project manager and jobsite superintendent. Progress meetings may, at a minimum, be held every 30 days after the start of construction and at a maximum be held every two weeks. The Project Manager may adjust frequency and location of meetings, as necessary. In general, progress meetings shall review work progress, discuss field observations, problems and conflicts, construction schedule, and other project business.

##### **1.4 PROJECT WALKTHROUGH**

When the project is nearing completion, the City's Project Manager will schedule a walkthrough to be attended by representatives of the City and Contractor. A final project punch list will be developed from the walkthrough in the form of a list of tasks or items that need to be fixed or completed before Final Acceptance.

##### **1.5 PROJECT CLOSEOUT MEETING**

The project closeout meeting will generally be held virtually and shall be attended by representatives of the City and Contractor. The purpose of the project closeout meeting is for the City and Contractor to review the project i.e., what went well, what were the challenges, and to identify the lessons learned and establish recommended future actions for future projects.

**SECTION 0121**

**ROLES & RESPONSIBILITIES**

**1.1 OWNER'S AUTHORITY AND RESPONSIBILITIES**

The City has full authority over the Work and shall identify a representative or representatives to act on its behalf with respect to the project.

**A. The Engineer**

The Engineer has full authority over the Work and its suspension. The Contractor shall perform all Work to the complete satisfaction of the Engineer. The Engineer's determination shall be final on all matters, including, but not limited to, the following:

- Quality and acceptability of materials and workmanship
- Measurement of unit price Work
- Timely and proper prosecution of the Work
- Interpretation of Contract Documents
- Payments due under the Contract

Work performed under the Contract will not be considered complete until it has passed Final Inspection by the Engineer and has been accepted in writing by the City. Interim approvals issued by the Engineer will not discharge the Contractor from responsibility for errors in prosecution of the Work, for improper fabrication, for failure to comply with Contract requirements, or for other deficiencies, the nature of which are within the Contractor's control.

The Engineer's decisions will be final and binding. The Engineer may pursue actions against the Contractor, including but not limited to the withholding of estimates and suspending the work for noncompliance of the Contract. The Engineer may suspend the work without suspending working day charges for noncompliance of the Contract.

Engineer's decisions and estimates shall be final.

**B. Project Manager**

The Project Manager, as the Engineer's representative, has the authority to enforce the provisions of the Contract. The Contractor shall direct all requests for clarification or interpretation of the Contract, in writing, to the Project Manager. Contract clarification or interpretation obtained from persons other than the Project Manager will not be binding on the City. The Project Manager shall have the authority to appoint inspectors and other personnel as required to assist in the administration of the Contract, to observe, test, inspect, approve, accept or reject work, and answer all questions arising under the terms of the Contract.

The Project Manager manages all aspects of the project, including reviewing and approving construction plans, changes in construction, submittals, shop drawings and supporting calculations, and ensuring project compliance with all codes and ordinances and established engineering standards. The Project Manager manages the project's bid process, holds bid conferences, pre-construction conferences, project meetings, evaluates bids, makes bid award recommendations, and reviews contractor pay requests, coordinates work with Contractor and other agencies, resolves construction

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difficulties and problems and makes adjustments in original designs as needed; performs inspections, and oversees all aspects of project closeout.

### **C. Project Construction Inspector**

The City Project Construction Inspector is authorized to represent the Engineer and Project Manager to perform the following:

- Inspect Work performed and materials furnished, including, without limitation, the preparation, fabrication, or manufacture of materials to be used
- Verbally reject defective materials and to confirm such rejection in writing
- By verbal order, temporarily suspend the Work for improper prosecution pending the Engineer's or Project manager's decision
- Monitoring both work progress and performance testing results
- Inform the city engineer of all proposed plan changes, material changes, stop work orders, or errors or omissions in the approved plans or specifications as soon as practical. Any revision to approved plans must be under the direction of the engineer. It shall be at the discretion of the city's project inspector as to whether the revision is significant enough to warrant review by the city engineering plan review/permits unit.

Project Construction Inspector is not authorized to:

- Accept Work or materials that do not conform to the Contract Documents
- Alter or waive provisions of the Contract
- Give instructions or advice inconsistent with the Contract Documents

## **1.2 CONTRACTOR'S AUTHORITY AND RESPONSIBILITIES**

The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall ensure the completed work complies with the Contract Documents and shall supervise, direct, and control the work competently and efficiently. Contractor shall devote such attention thereto and applying such skill and expertise as necessary to perform the work in accordance with the Contract Documents and shall provide competent, qualified personnel to survey and lay out the work and to perform construction as required by the Contract Documents.

The Contractor shall do all work and furnish all labor, materials, equipment, tools, and machines necessary for the performance and completion of the project in accordance with Contract Documents within the specified time. Materials and construction details of forms, shoring, false work, and other structures built by the Contractor but not a part of the permanent project, shall meet approval of the Engineer, but such approval shall not relieve the Contractor from responsibility for their safety and efficiency.

The City shall not be liable or responsible for any accident, loss, or damage happening to work referred to in the Contract Documents prior to completion and acceptance thereof.

Contractor shall at all times maintain good discipline and order at the site. At the written request of the Engineer, the Contractor shall immediately remove from the project any employee or representative of the Contractor or a subcontractor who, in the opinion of the Engineer, does not perform work in a proper and skillful manner or who is disrespectful, intemperate, disorderly, uncooperative, or otherwise objectionable. Such person shall not be employed again on the work. The Contractor, acting through an approved designated superintendent, shall give personal attention to and shall manage the work to the end that it



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shall be prosecuted faithfully. When the superintendent is not personally present at the job site, an alternate previously designated representative shall be available and shall have the authority to act on the Contract. The Contractor alone shall at all times be responsible for the safety of his and his subcontractor's employees.

### **1.3 COMPETENT PERSON DESIGNATION**

The Contractor shall designate, in writing, a qualified and experienced competent superintendent at the site whose duties and responsibilities shall include the enforcement of Oregon - OSHA regulations regarding excavations, the prevention of accidents, and the maintenance and supervision of construction site safety precautions and programs. The Superintendent must be experienced with the work being performed and capable of reading and understanding the Contract. The Contractor shall ensure the Superintendent is available at all times and able to receive instructions from the Engineer or authorized representatives and to act for the Contractor. The Engineer may suspend work without suspending working day charges if a Superintendent is not available or does not meet the above criteria. The designated superintendent shall not be replaced without written notice to Engineer except under extraordinary circumstances. An alternate representative may be designated. The alternate representative shall be present at the site whenever Work is in progress. Any order or communication given to this representative shall be deemed delivered to the Contractor.

In the absence of the Superintendent or his designated representative, necessary or desirable directions or instructions may be given by the Engineer to the superintendent or foreman having charge of the specific Work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or his representative. The designated Superintendent will act as the Contractor's representative and shall have the authority to act in all matters relating to this Contract. The superintendent shall have full authority to carry out all the provisions of the Contract and to supply materials, equipment, tools and labor without delay.

### **1.4 EMERGENCY MAINTENANCE SUPERVISOR**

The Contractor shall submit to the Engineer the names, addresses and telephone numbers of at least three employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated, in writing by the Contractor, to act as its representatives and shall have full authority to act on its behalf. At least one of the designated employees shall be available for a telephone call any time an emergency arises with a maximum of one hour allowed to return phone call.

The Contractor will be responsible for reimbursing the City for all costs incurred by the City for performing emergency maintenance and repairs when the Contractor does not respond to the emergency calls or does not complete the emergency maintenance or repair.

**SECTION 0122**

**COORDINATION OF WORK**

**1.1 COORDINATION OF CONTRACT DOCUMENTS**

Drawings and specifications are intended to describe and provide for a complete work. Any requirement in one is as binding as if stated in all. The Contractor shall provide any work or materials clearly implied in the Contract Documents even if the Contract Documents do not mention it specifically. If there is a conflict within the Contract Documents, it will be resolved by the following order of precedence:

- Contract change orders
- Addenda to Contract Documents
- St. Helens Technical Specifications, as included in project-specific Contract Documents
- OSSC Special Provisions
- CSI Specifications for pump station construction
- Bidding Rules and Contract Documents
- Plan drawings specifically applicable to the Project and bearing the Project title
- Contractor's Approved Proposal
- Outside agencies permits/requirements as may be required by law or loan agreements
- General and Supplementary Conditions of the Contract
- Standard Drawings
- Oregon Standard Specifications for Construction (most current version at bid opening)
- Reference Specifications

Change Orders, supplemental agreements, and approved revisions to Contract Drawings and specifications will take precedence over documents listed above. Detailed plans shall have precedence over general plans. Dimensions shown on Contract Drawings of that which can be computed shall take precedence over scaled dimensions. Notes on drawings are part of the drawings and govern in the order described above. Notes on drawings shall take precedence over drawing details. The intent of the drawings and specifications is to prescribe the details for the construction and completion of the work which the Contractor undertakes to perform according to the terms of the Contract.

Where the drawings or specifications describe portions of the work in general terms, but details are incomplete or silent, it is understood that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all the work involved in executing the Contract in a manner satisfactory to the City.

Contract Drawings for the project are designated by general title, sheet number and sheet title. The specific titles of each sheet are contained on Sheet 1A in of the Contract Drawings. When reference is made to the drawings, the "Sheet Number" of the drawing will be used. Each drawing bears the general title, S. 1<sup>ST</sup> AND STRAND STREETS, Project No. P-525.

**1.2 CONFORMITY WITH PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS**

Contractor shall furnish materials and perform work in reasonably close conformity with the lines, grades, cross-sections, dimensions, details, gradations, physical and chemical characteristics of materials, and other requirements shown in the Contract. Reasonably close conformity limits will be as defined in the

## **S. 1<sup>st</sup> and Strand Streets Project**

respective items of the Contract or, if not defined, as determined by the Engineer. Contractor shall obtain approval before deviating from the plans and approved working drawings. The Contractor shall not perform work beyond the lines and grades shown on the plans or any extra work without prior approval from the Engineer. Work performed beyond the lines and grades shown on the plans or any extra work performed without prior approval from the Engineer is considered unauthorized and shall be excluded from pay consideration. The City will not pay for materials rejected due to improper fabrication, excess quantity, or any other reason within the Contractor's control.

### **1.3 NOTIFICATION OF UTILITIES AND AGENCIES**

Utility locations shown on Contract Drawings are approximated. Contractor shall secure utility locates and pothole all known utility locations to determine utility depths prior to the commencement of any construction as needed. Before starting any site work, Contractor shall call One Call at 1-800-332-2444 for utility locates and to notify utility agencies. The Contractor is responsible for verifying the locations of all existing utilities prior to work. All excavators performing work on this project must comply with all the provisions of ORS 757.541 to 757.571, including notification of all owners of underground utilities at least forty-eight (48) business day-hours, but not more than ten (10) business days before commencing an excavation. Existing utilities, even if not specifically shown on the Contract Drawings or addressed in this document, that are damaged or disturbed by construction shall be restored and/or replaced to the original condition and up to the satisfaction of the utility owner at the Contractor's expense. In the event of damage to power, gas, telephone or any other underground utility system, the Contractor shall make available to the utility owner any manpower or equipment that will facilitate the repair and the continuation of scheduled work. All cost of repairs shall be the responsibility of the Contractor.

Before exposing any utility, the utility having jurisdiction shall grant permission and be provided the opportunity to oversee the operation, with advance notice provided as the individual utility requires. Should service of any utility be interrupted due to the Contractor's operation, the proper authority shall be notified immediately. It is of the utmost importance that the Contractor cooperates with the said authority in restoring the service as promptly as possible. Any costs shall be borne by the Contractor.

Utilities which may be impacted include the following:

- Streets                      City of St. Helens
- Watermain                 City of St. Helens
- Storm Sewer               City of St. Helens
- Sanitary Sewer            City of St. Helens
- Natural Gas                Northwest Natural Gas
- Power/Electricity         Columbia River PUD
- Telephone                 Century Link/Lumen
- Cable Company            Comcast

Contractor shall be responsible for the scheduling and coordination of the construction activities necessary to support the resolution of any utility conflicts with the appropriate utility agency. The City will not incur any financial responsibility for any construction delays related to the relocation of any utilities. If the Contractor fails to locate any known utility that interferes with construction, the cost of correcting the conflict shall be borne by the Contractor. Contractor shall be responsible for prompt notification to the City and the appropriate utility agencies of any known utility conflicts. Contractor shall give at least five (5) business days' notice to the City or utility agency if a conflict arises and relocation of an existing utility is necessary. In areas where the Contractor's operations are adjacent to or near a utility and such operations may cause

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damage which might result in significant expense, loss and inconvenience, the operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor.

There will be no separate payment made for the verification of utility depths or maintenance of utility markings and the costs thereof shall be considered incidental to construction.

**1.4 COORDINATION WITH UTILITIES AND OTHER CONTRACTORS**

It is the Contractor’s responsibility to coordinate work with utility owners. The Contractor shall use established safety practices when working near utilities and shall consult with the appropriate utilities before beginning work. Contractor shall notify the Engineer immediately of utility conflicts. The Engineer will decide whether to adjust utilities or adjust the work to eliminate or lessen the conflict. Unless otherwise shown on the plans, the Contractor will make necessary arrangements with the utility owner when utility adjustments are required. Contractor shall use work procedures that protect utilities or appurtenances that remain in place during construction, cooperate with utilities to remove and rearrange utilities to avoid service interruption or duplicate work by the utilities, and allow utilities access to the right of way. Contractor shall immediately notify the appropriate utility of service interruptions resulting from damage due to construction activities.

The following table lists the utility contacts during the period of the Contract. This information is subject to change at any time without prior notification:

Utility	Owner	Utility Contact Person
Water, Sewer, & Storm	City of St. Helens	Dave Elder 984 Oregon St St. Helens, OR 97051 <a href="mailto:delder@sthelensoregon.gov">delder@sthelensoregon.gov</a> 503-936-8523
Natural Gas	Northwest Natural Gas	Rich Girard 220 NW Second Ave Portland, OR 97209 <a href="mailto:r2g@nwnatural.com">r2g@nwnatural.com</a> 503-226-4211 ext 2967
Power	Columbia River PUD	Karl Webster / Brooke Sisco PO Box 1193, St. Helens, OR 97051 <a href="mailto:kwebster@crpud.org">kwebster@crpud.org</a> 503-397-8154
Telephone	Century Link	Scott Miller / Marco Galas 8021 SW Capitol Hill Rd Portland, OR 97219 <a href="mailto:scott.miller4@centurylink.com">scott.miller4@centurylink.com</a> 503-242-4144
Telephone	Lumen	Masood Zeerak 1025 Eldorado Blvd. Broomfield, CO 80021 masood.zeerak@lumen.com 720-888-8568
Cable	Comcast	Ken Parris Construction Dept

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Utility	Owner	Utility Contact Person
		445 Port Ave Suite 1 St Helens, OR 97051 <a href="mailto:Kenneth.Parris@cable.comcast.com">Kenneth.Parris@cable.comcast.com</a> 503-366-9717

### 1.5 SITE INVESTIGATION AND PHYSICAL DATA

The Contractor acknowledges that it is satisfied as to the nature and location of the work and the general and local conditions, including but not limited to those bearing upon transportation, disposal, handling, and storage of materials. The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify the Engineer of all errors, omissions, conflicts, and discrepancies found therein. The Contractor shall assume all responsibility for making estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract. Any failure by the Contractor to become acquainted with the available information and existing conditions will not be a basis for relief from successfully performing the work and will not constitute justification for additional compensation. The Contractor shall verify the locations existing of structures, pipelines, grades, and utilities as needed, prior to construction. The City assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available. Information and data furnished or referred to herein is furnished for information only.

### 1.6 MEANS AND METHODS OF CONSTRUCTION

Unless otherwise expressly provided in the Contract Documents, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Engineer's right to prohibit means and methods proposed by the Contractor which in the Engineer's judgment:

- shall constitute a hazard to the work, or to persons or property, or shall violate express requirements of applicable laws or ordinances; or
- shall cause unnecessary or unreasonable inconvenience to the public; or
- shall not produce finished work in accordance with the requirements of the Contract documents; or
- shall not assure the work to be completed within the time allowed by the Contract.

The Engineer's approval of the Contractor's means or methods of construction, or the Engineer's failure to exercise Engineer's right to prohibit such means or methods, shall not relieve the Contractor of its responsibility for the work or of its obligation to accomplish the result intended by the Contract Documents; nor shall the exercise or non-exercise of such rights to prohibit create a cause of action for damages or provide a basis for any claim by the Contractor against the City. Where the Contract Documents do not require the use of specific means or methods for the Work, the Contractor shall submit its proposed means and methods of construction to the Engineer sufficiently in advance of the work affected to permit a reasonable time for review and comments. The means and methods of construction must be approved in advance by the Engineer before construction begins. Failure to submit the proposed plan within a reasonable time shall not create a claim for damages for resulting delay in the work or for damages, nor shall it be a cause for extension of working time to complete the work. Contractor further agrees to defend and indemnify City for any claim or cause of action brought by any third party against the City.

**SECTION 0123**

**ACCESS TO WORK**

**1.1 ACCESS TO WORK**

The City, Engineer, their consultants and other representatives and personnel of the City, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

**1.2 ACCESSIBILITY OF PRIVATE ROADS AND DRIVEWAYS**

Entrances to properties shall be provided and maintained. No private road or driveway may be closed without prior written permission by the affected property owner. Driveways shall be left open and ready for use at the end of the work shift. All expenses involved in providing for construction, maintenance, and use of private roads or driveways, shall be borne by the Contractor and the amount thereof absorbed in the unit prices of the Contractor's bid.

**1.3 CONSTRUCTION WITHIN PUBLIC RIGHTS-OF-WAY**

When the work contemplated is wholly or partly within the right-of-way of a public agency such as a city, county or state, the Contractor will obtain from these agencies any right-of-way and street opening permits and all other necessary permit(s) required for the work. The Contractor shall abide by all regulations and conditions stipulated in the permit(s). Such conditions and requirements are hereby made a part of these specifications, as fully and completely as though the same were fully set forth herein. The Contractor shall examine the permit(s) granted to the Owner by any city, county, state and federal agencies. Failure to do so will not relieve the Contractor from compliance with the requirements stated therein. The Contractor shall obtain all construction permits and pay all fees or charges and furnish any bonds and insurance coverages as necessary to ensure that all requirements of the city, county, state or federal agencies will be observed and roadways and ditches are restored to their original condition or one equally satisfactory. A copy of all permits shall be kept on the work site for use of the Engineer.

**1.4 CONSTRUCTION WITHIN EASEMENTS ON PRIVATE PROPERTY**

No work is planned for outside of public right-of-way (ROW).

Utility service connections shall be completed under separate contract.

**SECTION 0130**

**CONSTRUCTION DOCUMENTATION**

**1.1 DOCUMENTATION**

The following is a general list of documentation the Contractor shall provide to the Project Manager at various phases of the project. The Contractor is responsible for providing all materials, labor, and transportation for required construction documentation on this project.

**A. Door Hangers**

The Contractor is required to notify all residences and businesses in the project area of the Work at least 48-hours prior. The Contractor shall prepare and submit to the Project Manager a sample of their 48-Hour Notice of Construction door hanger template for approval prior to distribution. 48-Hour Notices shall have listed, at a minimum,

- The Contractor's 24-hour contact person's name and number
- The name of the project
- And the expected date of the work

The contact number on the notice shall remain unchanged throughout the duration of project. Notifications shall be distributed to all properties in the construction zone. A list of property owners and addresses for the properties in the construction zone will be provided to the successful Contractor, upon request.

**B. Pre-Construction and Post-Construction Site Documentation**

The Contractor shall perform pre-construction inspection video recordings and photographs of the existing surface and property conditions prior to the commencement of any work on site, including project staging, mobilization, and demolition. The pre-construction site video and photos shall be submitted to the Project Manager not less than ten days following the notice to proceed.

Upon completion of the project construction, the Contractor shall perform post-construction video recordings and photographs consistent with the pre-construction inspection video recordings and photographs, showing same catalog of surface items, locations, and surface and property conditions within project limits and submit to the Project Manager prior to submitting Exhibit F, Certificate of Compliance.

The areas to document will generally include,

- Road surface conditions
- Private Driveways
- Paved walkways
- Trees, shrubs, flower beds
- Fences and gates
- Retaining walls
- House foundations
- Parked vehicles

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- Outdoor fixtures (sheds, lights, furniture, etc.)
- Any visible pre-existing conditions such as broken sidewalks, fences, etc.
- Unpaved ground conditions (lawn conditions, etc.)

Recorded video media for site documentation shall be submitted on a flash drive and viewable as standard MP4 file format. Photos shall be submitted in JPEG format. There will be no separate payment made for construction documentation and the costs thereof shall be considered incidental to “Mobilization”.



**SECTION 0131**

**PROJECT SCHEDULE AND TIMELINE**

**1.1 NOTICE TO PROCEED**

The Notice to Proceed with construction will be issued to the Contractor after the Contractor submits the signed Contract, Bonds, and Insurance Certificates to the City and those documents have been approved as to form and executed by the City. Generally, work shall begin within five days following issuance of the Notice to Proceed.

The Contractor shall be liable for any actions taken that delay, suspend, or retard the progress of work without the express written permission on the City and no additional Contract Time or Price shall be granted if the Engineer decides the cause of delay was solely caused by Contractor's actions. Contractor shall prosecute the work continuously to completion within the working days specified. Unless otherwise shown on the plans, work may be prosecuted in concurrent phases. The Contractor shall notify the Project Manager at least 24 hours before beginning work or before beginning any new operation.

**1.2 TIME OF COMPLETION**

The Contractor shall complete all work shown and specified within the time limits stated in the Agreement. All work on the Base Contract and Add 1, if included, within this project shall be completed by September 15, 2024. Once started, the Work on each phase shall continue uninterrupted except by weekends, authorized holidays and events, severe weather, or by written agreement with the City for an agreed upon time.

**1.3 WORKING HOURS, OVERTIME, AND HOLIDAY WORK**

Work shall be performed during normal working hours in St. Helens:

Mon – Fri: 8:00 A.M. – 4:30 P.M. Sun – Sat – Holidays: None

The Contractor is limited to these working hours unless permission is requested in writing and pre-approved by the Engineer. The Contractor will not be allowed to work during the hours of 10:00 P.M. to 7:00 A.M. as set by City of St. Helens Municipal Code Noise Regulations 8.16. The number of working days provided in the Contract is considered to be sufficient time to complete the project. There will be no separate payment made for working outside of normal work hours and the costs thereof shall be considered incidental to construction.

**1.4 PROJECT SCHEDULE**

Project Schedule -- Contractor shall prepare and submit a practicable Gantt chart schedule to the Engineer within ten (10) days after the Notice to Proceed. The schedule shall show at a minimum:

- Critical path
- Dates on which important features of the work will start
- Order in which Contractor proposes to carry out the work
- Estimated dates for completion of tasks

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Schedule is to be updated whenever the Contractor's progress deviates from the previously approved schedule by more than 10 percent.

### **1.5 CONSTRUCTION DELAYS AND EXTENSION OF TIME**

The Contractor shall notify the Project Manager immediately upon encountering any condition that the Contractor believes may cause a claim for a time extension. The Contractor shall be entitled to an extension of working time under this Contract only when claim for such extension is submitted to the City in writing by the Contractor within fourteen (14) days from and after the time when any alleged cause of delay shall occur, and then only when such time is approved by the City in writing.

In adjusting the Contract Time for the completion of the project, unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to inability to obtain supplies and materials when orders for such supplies and materials were timely made and materials are not available from other sources, naturally occurring inevitable unavoidable accidents, or public enemy acts, acts of the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather conditions, ozone alerts as determined by the National Weather Bureau or other authorized agency, or delays of subcontractors due to such causes beyond their control shall be taken into consideration. If the satisfactory execution and completion of the Contract should require work and materials in greater amounts or quantities than those set forth in the Contract, requiring more time for completion than the anticipated time, then the Contract time shall be increased, but not more than in the same proportion as the cost of the additional work bears to the cost of the original work contracted for.

No allowances shall be made for delays or suspension of the performance of the work due to the fault of the Contractor. No adjustment of the Contract time shall be made if, concurrently with the cause for delay, hindrance, disruption, force majeure, impact or interference, there existed a cause for delay due to the fault or negligence of the Contractor or Contractor's agents, employees, or subcontractors. Notwithstanding any other provisions of the Contract Documents, including the General and Special Provisions, no adjustment shall be made to the Contract price and the Contractor shall not be entitled to claim or receive any additional compensation as a result of or arising out of any delay, hindrance, disruption, force majeure, impact or interference, foreseen or unforeseen, resulting in adjustment of the Contract time to complete the project, including but not limited to those caused in whole or in part by the acts, omissions, failures, negligence or fault of the City, its officers, officials, agents, Engineer, Consulting Engineer or employees. This provision is intended to cover all delays except as prohibited by law.

### **1.6 LIQUIDATED DAMAGES**

The City will sustain damage if the work is not completed within the specified Contract Time. Not as a penalty but as liquidated damages, the Contractor agrees to pay to the City the amount specified in the Standard Terms and Conditions for Public Improvement Contracts section in this Contract for each Calendar Day the Contractor expends performing the Contract in excess of the Contract Time or adjusted Contract Time.

Payment by the Contractor of liquidated damages does not release the Contractor from its obligation to fully and timely perform the Contract according to its terms. Nor does acceptance of liquidated damages by the City constitute a waiver of the City's right to collect any additional damages it may sustain by reason of the Contractor's failure to fully perform the Contract according to its terms. The liquidated damages shall constitute payment in full only of damages incurred by the City due to the Contractor's failure to complete the Work on time. Liquidated damage payment to the City in the event the Contractor does not complete the work in the specified Contract Time shall be in the amount of Two Thousand Two Hundred Dollars

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(\$2,200.00) assessed for each calendar day of delay, including holidays and weekends, and shall run continuously until the work is substantially complete.

**SECTION 0132  
QUALITY CONTROL**

**1.1 WORKMANSHIP**

The work shall be performed in accordance with the best modern practice with materials and workmanship of the highest quality and suitable for their purpose. The Engineer shall judge and determine the Contractor's compliance with these requirements. The Contractor shall ensure all work is of good quality, free from faults, defects, inferior materials, or equipment, will be performed by experienced knowledgeable personnel, and be in conformance with the Contract Documents. All work not conforming to these requirements, including substitutions not properly approved or authorized, shall be considered defective unless specifically accepted by the City.

**1.2 INSPECTION OF WORK**

It is the intent of the City to inspect all work on this project. The Contractor must pay for all testing needed to determine acceptability for any work done without inspection, as directed by the Engineer. The Contractor shall furnish the City with every reasonable facility for ascertaining whether the work performed was in accordance with the requirements and intent of the plans and specifications. Contractor shall provide safe access to all parts of the work and provide information and assistance to the Engineer to allow a complete and detailed inspection. Contractor shall give the Inspector or the Engineer sufficient notice to inspect the work. Work performed without suitable inspection, as determined by the Engineer, may be ordered removed and replaced at Contractor's expense. The Contractor shall remove or uncover portions of finished work as directed, and once inspected, restore work to Contract requirements. The City will provide general construction inspection services of the project. The City will not provide any special inspections services for the project.

**1.3 QUALITY OF MATERIALS**

The Contractor shall incorporate into the Work only materials conforming to the specifications and approved by the Engineer. The Contractor shall incorporate into the Work only manufactured products made of new materials unless otherwise specified in the Contract. The City may require additional testing or retesting to determine whether the materials or manufactured products meet specifications. Materials or manufactured products not meeting the specifications at the time they are to be used are unacceptable and must be removed immediately from the Project Site, unless otherwise directed by the Engineer.

**1.4 "OR EQUAL" CLAUSE**

To establish a basis of quality, certain processes, types of machinery and equipment or kinds of material may be specified on the drawings or herein by designating a manufacturer's name and referring to its brand or product designation. It is not the intent of these specifications to exclude other processes, equipment or materials of a type and quality equal to those designated. When a manufacturer's name, brand or item designation is given, it shall be understood that the words "or equal" follow such name or designation, whether in fact they do so or not.

If the Contractor desires to furnish items by manufacturers other than those specified, he shall secure the approval of the Engineer prior to placing a purchase order. No extras will be allowed the Contractor for any changes required to adopt the substitute equipment, materials, or processes. Therefore, the Contractor's proposal for an alternate shall include all costs for any modifications to the drawings, such as additional

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pipings or changes in pipings, or other modifications which may be necessary or required for approval and adoption of the proposed alternate equipment.

### **1.5 MATERIALS AND EQUIPMENT**

The Contractor warrants to the City that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract and that same shall be of good quality and workmanship, free from faults and defects and in conformance with the Contract documents. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the City. No material shall be delivered to the work without prior approval of the City. All materials and equipment not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective and shall be promptly repaired or replaced by the Contractor at the Contractor's sole cost upon demand of the City. If required by the City, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### **1.6 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK**

All work which has been rejected or condemned shall be repaired. If it cannot be repaired satisfactorily, it shall be removed and replaced at the Contractor's expense. Defective materials shall be immediately removed from the site of the work. Work done without line and grade having been given, work done beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided, work done without written authority and prior agreement in writing as to process, shall be done at the Contractor's risk and considered unauthorized and at the option of the Engineer may not be measured and paid for and may be ordered removed at the Contractor's expense.

Upon failure of the Contractor to repair satisfactorily or to remove and replace, if so directed, rejected, unauthorized or condemned work or materials immediately after receiving notice from the City, the Engineer shall, after giving written notice to the Contractor, have the authority to cause defective work to be remedied or removed and replaced, or to cause unauthorized work to be removed and to deduct the cost thereof from any monies due or to become due the Contractor. Alternatively, the City may, at its option, declare the Contractor in default, in which event the performance bond surety shall complete the Contract.

**SECTION 0133**

**TESTING**

**1.1 MATERIALS AND COMPACTION TESTING**

The Contractor shall provide the services of a licensed, independent agency to perform materials and compaction testing for this project, as required. The name of the agency must be submitted and approved by the Engineer.

All required testing of work and/or materials shall be conducted in the presence of the Engineer. The Contractor shall provide forty-eight (48) hour notification to the City and Engineer prior to conducting any and all quality assurance testing.

Materials and compaction tests will be required to show that specified densities of compacted backfill, crushed rock, asphaltic concrete surfacing are being achieved by the Contractor's compaction methods. Concrete compressive strength testing will be required to show that the requirements of the Contract Documents are being met.

The Contractor shall provide the Engineer with copies of Proctor tests performed for the project backfill and paving material in addition to copies of compaction tests performed in the field. After the Engineer is satisfied that the Contractor's method of compaction consistently meets specified compaction requirements, the testing frequency may be reduced. The Engineer may direct testing at a higher frequency upon failure to obtain specified densities or if the Contractor changes compaction equipment or methods of compaction.

Concrete compressive strength testing shall follow Section 00440 of the Oregon Standard Specifications for Commercial Grade Concrete. Concrete compressive strength shall be a minimum of 3,000 psi at 28 Days. Contractor will supply the Engineer with test results.

All test locations shall be determined by the Engineer. Materials and compaction testing is considered incidental to the Contract and no separate payment shall be made.

The Contractor shall be responsible for the cost of all testing as specified in the Contract Documents. Additional testing requirements may be required elsewhere in these Contract Documents. The City or Engineer reserves the right to complete additional testing. In such cases, the Contractor shall provide safe access for the City or Engineer and their inspectors to adequately inspect the quality of work and the conformance with project specifications.

**1.2 TESTING AND OPERATION OF FACILITIES**

It is the intent of the City to have a complete and operable facility. All the work under this Contract will be fully tested and inspected in accordance with the specifications. Upon completion of the work, the Contractor shall operate the completed facilities as required to test the equipment under the direction of the Engineer. During this period of operation by the Contractor, the new facilities will be tested thoroughly to determine their acceptance.

**1.3 TESTING AND LABORATORY SERVICES**

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Contractor shall perform all testing services of materials, equipment, and workmanship required by the Contract Documents. All materials and equipment used in the performance of work under are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. Unless otherwise stipulated in the Contract Documents, initial testing of all materials, construction items or products incorporated in the work shall be performed at the direction and expense of the Contractor and deemed necessary by the Engineer. In the event materials, construction items or products incorporated in the work fail to satisfy the minimum requirements of the initial test, appropriate prove out test shall be made as directed by the Engineer to determine the extent of the failure and to verify that the corrective measures have brought the item up to specification requirements.

The cost of all testing necessary to determine the extent of the failure and the adequacy of the corrective measures shall be the responsibility of the Contractor. The failure of the City to make any tests of materials shall in no way relieve the Contractor of its responsibility of furnishing materials conforming to the Contract Documents. Tests, unless otherwise specified, shall be made in accordance with the latest methods of the applicable ASTM regulation.

The Contractor shall provide such facilities as the City may require for collecting and forwarding samples and shall not use the materials represented by the samples until tests have been made. The Contractor shall furnish adequate samples without charge. Test materials and samples shall be stored so as to ensure the preservation of their quality and fitness for the Work. The Contractor shall furnish without additional cost to the City such materials for testing as may be reasonably necessary. Retesting after failure to pass tests shall be at the expense of the Contractor. Should the percentage of rejected material or equipment be unreasonably large, the additional cost of such inspection and tests resulting therefrom shall be borne by the Contractor. The Engineer shall determine what extra inspection is and shall determine the additional cost incurred thereby and payable by the Contractor and such determination shall be final. The City may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the City shall be allowed on account of such testing and certification.

**SECTION 0140**

**CLARIFICATION AND MODIFICATION OF WORK**

**1.1 CLARIFICATION OF WORK AND CONTRACT MODIFICATIONS**

The Contractor expressly agrees that it shall not consider any order, instruction, clarification, response to a Request for Information or any other communication either written or oral given intentionally or unintentionally by any other person to do work that would cause a change in Contract Time or Price unless it is in the form of a Change Order from the City.

**1.2 INTERPRETATION AND MINOR CHANGES**

The City has the authority to order minor changes in the Work including interpretations which are consistent with the intent of the Contract Documents, excluding:

- a change in Contract Price, or
- a change in the Contract Time, or
- a change in the means, methods, techniques, or sequence of work

If the Contractor considers that a minor change so ordered causes a Change in Contract Price or Contract Time, the Contractor shall notify the City in writing within 15 days of receipt of the order and shall not proceed with the work except in the case of an emergency endangering persons or property. If, after reviewing the Contractor's objection to a minor change, the City determines the work is required by the Contract Documents and does not involve a change in Price or Time, the City may direct the Contractor, in writing, to proceed with the work. If so directed, the Contractor may (1) accept the City's determination and proceed with the work or (2) give the City written notice 5 days in advance of beginning work stating that it intends to make a claim.

**1.3 REQUESTS FOR INFORMATION**

If the Contractor does not clearly understand the plans and specifications or is not sure of their meaning, the Contractor shall make a written request to the Engineer in the form of a RFI (Request for Information). The Engineer's written explanation and interpretation of the Contract Documents shall be final.

**1.4 REQUESTS FOR QUOTATION**

If a change involving Contract Price and/or Time or a new bid item is being considered, the Engineer will issue a Request for Quotation describing the proposed change. The Contractor shall submit a quotation promptly so not to delay or interfere with the progress of the Work, in accordance with the requirements for determining the cost of changes described in the Oregon Standard Specifications Construction.

**1.5 CHANGES REQUESTS**

The Engineer may, at the Contractor's request, authorize in writing changes in the Project Plans or specifications to facilitate or expedite the work of the Contractor, provided such changes are not detrimental to the work or to the best interests of the City. Requests for such changes shall be submitted in writing to the Engineer. Such changes, as are authorized under this provision, shall be made without



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additional cost to the City, and the City reserves the right to receive an equitable adjustment in the Contract Price or Contract Time as a consideration for authorizing any such change. The Contractor shall maintain sole responsibility for assuring these changes meet all the requirements of the Contract.

### **1.6 CHANGE DIRECTIVES**

When a change of work involves an addition, deletion, or adjustment of work or Contract Time which can be covered by Contract bid items and the estimated increase or decrease in Contract cost does not exceed \$5,000, a Change Directive will be issued. A change directive may be issued in the field by the Project Manager and the Contractor shall then proceed with the work without delay. Verbal change directives will be confirmed by written change directives and signed by the Contractor and the Engineer thereby adding, deleting, modifying work, increasing, or decreasing Contract bid items.

### **1.7 CHANGE ORDERS**

If the City and the Contractor agree on a change in Contract Price and/or Time for a proposed change, a Change Order will be issued and signed by the Engineer and Contractor. An executed Change Order shall be conclusive and final settlement of the change in Contract Time and Price for the work covered by the Change Order including the effect of the change on all other portions of the work completed or not and shall include compensation for all related claims for disruption, impact, delay or extended overhead, if any, that may result from the change. Implied in every Change Order, unless expressly reserved by the City or Contractor, is a waiver of all known and unknown claims arising out of the Change Order. The City reserves the right to have changed work performed by a separate contractor or its own workers.

### **1.8 CHANGED OR UNFORESEEN CONDITIONS**

During the progress of the work, if the Contractor should encounter conditions materially different from those shown on the Project Plans or indicated in the Project Specifications, or unknown conditions of a nature differing materially from those ordinarily encountered and generally recognized as being inherent in work of the character being performed, the Contractor shall, before proceeding further with work affecting or affected by such conditions, immediately notify the City which will promptly make an investigation. If the City determines conditions do materially differ and the Contractor could not reasonably have been expected to ascertain in advance the true nature of the existing conditions, a Change Order will be issued to provide for any increase or decrease in cost and difference in Contract Time resulting from any such condition.

### **1.9 EXTRA WORK**

The Engineer shall have the right to require, and the Contractor agrees to do, extra work over and above that which is indicated by the Contract Documents and covered by the unit prices of the Contract or negotiated price or prices, which logically forms a part of the Contract, arising from reasonably unforeseeable conditions, changed requirements or new information. Such additional work shall be undertaken only upon written instructions from the Engineer. Payment for extra work will be made pursuant to Section 00197 of the Oregon Standard Specifications for Construction.

Extra Work performed on a Force Account Basis shall be used to equitably and uniformly compensate the Contractor for Extra Work when a negotiated price cannot be reached. Extra Work is defined as work that is significantly different from the Work included in the original or modified Contract, yet necessary for completing the Project. The Contractor shall maintain records in such a manner as to provide a clear distinction between direct cost of extra work paid for on force account basis and cost of other operations performed in connection with the Contract Documents.

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Force Account procedures shall only be used as a last resort when an agreement cannot be reached on the price of a new Work item or when the extent of the Work is unknown or of such character that a price cannot be determined to a reasonable degree of accuracy. When the City orders Extra Work to be performed via Force Account, the Engineer will discuss the proposed work with the Contractor and will seek the Contractor's comments and advice concerning the formulation of Force Account Work specifications. The Engineer is not bound by the Contractor's comments and advice and has final authority to: determine and direct the materials, equipment and labor to be used on the approved Force Account Work; and determine the time of the Contractor's performance of the ordered Force Account Work.

Before Extra Work to be performed on a Force Account Basis is authorized, the Project Manager will make the determination that Extra Work is necessary. Only work not included in the Contract as awarded or in executed Change Orders but deemed by the Project Manager to be necessary to complete the Project will be paid as Extra Work per Section 00197 of the Oregon Standard Specifications for Construction.

The following steps shall be followed to perform Extra Work:

- A. The Project Manager will discuss the Extra Work with the Contractor, define the scope of work, and discuss the options, means and methods for completing the Extra Work.
- B. The Project Manager shall attempt to negotiate a Contract Change Order with the Contractor to perform the Extra Work if the unable to successfully negotiate a Change Order, the Extra Work will be completed on a Force Account Basis.
- C. Extra Work shall not proceed on a Force Account Basis without a written and approved Extra Work Order prepared by the Project Manager, which shall be signed by the Contractor and the Project Manager. The Extra Work order will determine when, how, and with what Equipment and labor the Extra Work will be completed.

For each day Extra Work is performed, the City's Project Inspector shall complete a Daily Force Account Record which shall be signed by both the Inspector and the Contractor's authorized representative at the end of the day. These signatures indicate agreement on the accuracy and completeness of the information recorded on the Daily Force Account Record.

The Daily Force Account Record will be the basis for payment. Contractor shall not proceed with Extra Work without daily agreement on the Daily Force Account Record.

## **SECTION 0150**

### **SUBMITTALS**

#### **1.1 GENERAL REQUIREMENTS**

The Contractor shall provide the following submittals found listed in this section. There may be other submittals required elsewhere in these Specifications that are not included or mentioned in this section. Direct submittals from suppliers will not be allowed. Digital submittals are preferred to paper copies.

Technical submittals covered by these specifications include manufacturer's information, shop drawings, test procedures, test results, samples, request for substitutions and miscellaneous work-related submittals. The Contractor shall furnish all drawings, specifications, descriptive data, certifications, samples, tests, methods, schedules and manufacturers installation and other instructions as required by the Contract Documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents.

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements.

Submittals shall coordinate with the work so that work will not be delayed. Coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals.

The Contractor shall not proceed with work related to a submittal until the submittal process is complete.

#### **1.2 REQUIRED SUBMITTALS**

The following listing shall be considered minimum and may be expanded during the course of the work at the direction of the Engineer,

- A. Project Schedule. Refer to Section 0131 PROJECT SCHEDULE & TIMELINE for details.
- B. Shop Drawings, Schedules and Drawings: The Contractor shall provide shop drawings, schedules and such other drawings and information as may be necessary for the prosecution of the work in the shop and in the field as required by the Contract Documents and/or Engineer's instruction. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
  - Dimensions
  - Identification of products and materials included
  - Compliance with specified standards
  - Notation of coordination requirements
  - Notation of dimensions established by field measurement.

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- C. Product Data: Submit manufacturer's product literature and application, installation requirements, recommended repair requirements, technical data sheet on each product to be used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.
- D. Material Safety Data Sheets
- E. Erosion and Sedimentation Control Plan, as required
- F. Materials and equipment list
- G. Contractor and Subcontractor 24 Hour – 7-day Emergency Contact List
- H. Traffic Control and Protection Plan, as required
- I. Pre-construction documentation of sites, submit 14 days after NTP issued
- J. Post-construction documentation of site(s), submit with Exhibit F, Certificate of Compliance, and Exhibit G, Contractor's Release of Liens and Claims
- K. Documentation to be sent to property owners regarding the project
- L. Site Specific Health and Safety Plan, as required
- M. Utility Rupture Response Plan, As required
- N. Location of dump site for excavated and removed material
- O. Copies of all licenses and permits
- P. Certified Payroll
- Q. Miscellaneous materials and other submittals required elsewhere in the Contract Documents

### **1.3 REQUEST FOR SUBSTITUTION**

Requests for substitution for product specified by manufacturer or manufacturer's model number as specified throughout the Contract Documents shall be in writing and be accompanied with sufficient information to allow the Engineer to identify the nature and scope of the request. Please refer to Section 0132.1.4 "OR EQUAL" CLAUSE.

Information to be provided shall include,

- A. All submittal information required for the specified product, including all deviations from the specified requirements necessitated by the proposed substitution.
- B. Materials of construction, including material specifications and references.
- C. Performance data.

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- D. Dimensional drawings, showing required access and clearances, including any changes to the work required to accommodate the proposed substitution.
- E. Information and performance characteristics for all system components and ancillary devices to be furnished as a part of the proposed substitution.
- F. Reproducible drawings, marked up to illustrate the alterations to all systems required to accommodate the proposed substitutions

If the substitution requires any mechanical, electrical, or structural changes, the Contractor will be responsible for costs for evaluating a requested substitution. The cost for such an evaluation will be determined on a case-by-case basis, after receipt of written request. The Engineer will notify the Contractor in writing of said cost. If the Contractor wishes to proceed, he shall advise the Engineer in writing and submit additional information as may be requested. The City shall final approval of a substitution.

### 1.4 SUBMITTAL APPROVAL PROCESS

The Engineer will review the submitted data and will issue a Submittal Response to the Contractor. The Engineer will review each submittal, mark to indicate action taken, and return promptly.

Submittal response notations are as follows,

- “Approved For Construction, No Exceptions Taken”  
The part of the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
- “Approved For Construction, As Noted”  
The part of the Work covered by the submittal may proceed, provided it complies with the requirements of the Contract Documents and it complies with the notations or corrections of the submittal response.
- “For Record Only”  
The information contained in the submittal has been accepted into the project records.
- “Revise and Resubmit”  
Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Contractor shall revise the submittal in compliance with the Contract Documents and the corrections noted in the submittal response.
- “Submit Specified Item”  
Contractor shall the submit the additional information requested in the submittal response. Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity until specified item has been approved by the Engineer.
- “Rejected”  
Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The Contractor shall revise or prepare a new submittal in accordance with the corrections noted in the submittal response.

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The Engineer's review of submittals shall not extend to means, methods techniques, sequences or procedures of construction, or to verify quantities, dimensions, weights or gages, or to fabrication processes, except when specifically indicated or required by the contract documents, and will not relieve the Contractor from responsibility for errors of any sort in the submittals.

When submittals are required to be revised or corrected and resubmitted, the Contractor shall make such revisions and/or corrections and resubmit those items or other materials in the same manner as specified above. Submitted data shall be sufficient in detail for determination of compliance with the Contract Documents. No equipment or material for which listings, drawings, or descriptive material is required shall be installed until the Contractor has received approval from the Engineer. Regardless of corrections made in or review given to the drawings by the Engineer, the Contractor shall be responsible for the accuracy of such drawings and for their conformity to the drawings and specifications.

**SECTION 0160  
PROGRESS PAYMENTS**

**1.1 PROGRESS PAYMENT AND RETAINED AMOUNTS**

The City shall pay Contractor for all work completed in accordance with terms and conditions of the Contract Documents in accordance with the procedures described below and elsewhere in the Contract Documents.

**A. Progress Payments**

- On a monthly basis, during performance of the work, the Contractor shall prepare an estimate of the value of Contract work completed on a form approved by the City and submit to the Project Manager. Applications for payment will be reviewed and processed by the City in accordance with the applicable provisions of the Contract Documents. The pay application shall also provide such supporting documentation as the City or the other applicable provisions of the Contract Documents may require. Certified payroll must be submitted for review with or prior to pay application submittal. The St. Helens City Council generally meets the first and third Wednesdays of each month and must approve all pay applications.
- It is understood that the monthly estimates shall be approximate only, and all monthly estimates and partial payments shall be subject to correction in the estimate rendered following the discovery of an error in any previous estimate, and such estimate shall not in any respect be taken as an admission of the City of the amount of work done or of its quality or sufficiency nor as an acceptance of the work or the release of the Contractor of any of its responsibility under the Contract.
- Payment shall be made by the City about three (3) days after Council approval of the pay request. The City shall not be liable for interest on any late or delayed payment caused by any claim or dispute, any discrepancy in quantities, any failure to provide supporting documentation or other information required with the estimate or as a precondition to payment under the Contract, or due to any payment the City has a right to withhold under the Contract.

**B. Retained Amounts**

The City shall retain five percent (5%) of the amount earned on all progress payments. Monies retained will be released to Contractor following final acceptance of the project by the City. Contractor's monthly payment applications and invoices shall include retainage as a line item.

**1.2 FIELD DOCUMENTATION OF BID ITEM QUANTITIES**

Daily Bid Item Logs shall be the basis of recording and documenting all pay quantities. The City's Construction Inspector is responsible for ensuring that all quantity measurements are made and documented in accordance with the Contract Documents. Bid quantity entries, including supporting documentation, serve as both partial and final verification that correct payments are made on all pay applications and invoices.

The Contractor's foreman or superintendent shall sign the daily bid item log receipts in the possession of the City Construction Inspector for Contract Bid Items completed as specified. The bid item log shall be

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signed by both the City Construction Inspector and the Contractor's authorized representative within 24 hours of completion of bid items that meet specifications. It is the responsibility of the Contractor to ensure the log is signed daily for the work completed. At a minimum, the bid item log shall contain the following: Bid item reference number, location of work, stationing of construction, description of work, quantity of work completed, and plan sheet reference number.

The Contractor will be provided a copy of all bid item logs. The Contractor's pay applications and invoices shall be equal to the bid items signed for and no more and shall reference bid item log receipt number on the appropriate pay request. Final quantities to be adjusted per project as-builts.

### **1.3 PAYMENT FOR EXTRA WORK**

Extra Work done by the Contractor, as authorized and approved by the City, shall be compensated for in the manner described in Section 0140 – CLARIFICATION AND MODIFICATION OF WORK, and by Section 00196 of the OSSC, the more restrictive will apply. The compensation provided for Extra Work done by the Contractor constitutes full and final payment for the cost of the Extra Work, which cost is limited to:

- All reasonable costs of labor, materials, supplies, tools, equipment or machinery rental, power, fuel, lubricants, water and other similar operation expenses for the time that such of the above things are employed or used on such Extra Work and approved in writing by the Project Manager; and
- A markup amount not-to-exceed percentage allowances listed under Section 00196 of the OSSC. Costs shall be considered to cover and compensate the Contractor for profit, overhead, profit-and-overhead markups charged to Contractor by subcontractors and suppliers, general supervision, field office expense and all other elements of cost and expense not embraced within the cost of the Extra Work as described in this Section. No cost of off-site storage shall be included in the above description of cost unless off-site storage has been approved and directed by the City in writing. No other claims or reservations of right as to additional costs, prices, markups, costs not permitted by the OSSC included under this paragraph, disallowed costs or other future additional money or time shall be accepted; each change order shall be specific and final.

The method of determination and payment of cost, or credit to the City for any Extra Work shall be one of the following:

- A. Unit prices agreed on in writing and executed by the City before the Extra Work is commenced or unit prices already included in the Contract Documents, subject to all other conditions of the Contract. Mutual acceptance of a not-to-exceed lump sum properly itemized and supported by sufficient substantiating data to permit evaluation before the Extra Work is commenced, subject to all other conditions of the Contract.
- B. A not-to-exceed cost to be determined in a manner agreed upon by the parties plus a mutually acceptable fixed or percentage fee, agreed upon before the Extra Work is commenced and subject to all other conditions of the Contract.
- C. The force account method provided in these Contract Documents and governed by Section 00197 of the OSSC.
- D. Signed, daily reports in duplicate of the extra work to be paid for on a force account basis, shall be furnished to the Engineer by the Contractor. Materials used will be itemized and direct cost of labor and charges for equipment rental will be furnished by the Contractor or Subcontractor. The Contractor will



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provide names, identifications, and classifications of workmen, the hourly rate of pay and hours of work, and the size, type, and identification number of equipment and hours of equipment operation.

- E. Material charges shall be substantiated by vendors' invoices with copies of such invoices submitted with the reports, or, if not available, submitted with subsequent reports. In the event said vendors' invoices are not submitted within 15 days after completion of the work, the City reserves right to establish the cost of such materials at the lowest current price at which said materials are available in the quantities concerned, delivered to the location of the work. The Engineer will compare his records with the reports furnished by the Contractor, make any necessary adjustments, and compile the cost of extra work paid for on a force account basis on forms furnished by the Owner. When these extra work reports are agreed upon and signed by both parties, they shall become the basis of payment for the work performed.

### **1.4 PAYMENT WITHHELD**

In addition to express provisions elsewhere contained in the Contract, the City may withhold from any payment otherwise due the Contractor such amount as determined necessary to protect the City's interest, or, if it so elects, may withhold or retain all or a portion of any payment or refund payment on account of:

- Unsatisfactory progress of the work not caused by conditions beyond the Contractor's control
- Defective work not corrected
- Contractor's failure to carry out instructions or orders of the Owner or its representative,
- Work or execution thereof is not in accordance with the Contract documents
- Claim filed by or against the Contractor or reasonable evidence indicating probable filing of claims
- Failure of the Contractor to make payments to any subcontractor or suppliers for material or labor used in the performance of the Work
- Unsafe working conditions allowed to persist by the Contractor

When the grounds for withholding payment are removed, payment shall be made for amounts withheld because of them, and City shall not be liable for interest on any delayed or late payment.

### **1.5 FINAL PAYMENT**

The amount of final payment will be the difference between the total amount due to the Contractor and the sum of all payments previously made. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. After computation of the final amount due, and after Final Acceptance of the Project, final payment will be mailed to the Contractor's last known address as shown in the records of the City.

**SECTION 0162**

**MEASUREMENT & PAYMENT**

**1.0 MEASUREMENT AND PAYMENT OF CONTRACT BID ITEMS**

Measurement and Payment of Contract Bid Items shall be on a unit price basis in accordance with the prices set forth in the Contract for individual work items. Where work is required but does not appear as a separate item in the Contract, the cost for that work shall be included and absorbed in the unit prices named in the Contract. No payment or compensation shall be made for bid items that are not completed. Only payment for actual work completed will be made regardless of how the Contractor balances bid. Contractor shall make a careful assessment when preparing bid.

The City may add and/or delete bid item quantities during construction. The term "Lump Sum" when used as an item of payment will mean full compensation for the Work described in the Contract Documents. The unit will be construed to include all necessary fittings and accessories. Payments for Lump Sum items will be made in proportion to the amount of Work accomplished as determined by the Engineer as of the "period ending date" of each Partial Payment Estimate. Contractor shall provide a schedule of values for each lump sum item. The Unit Price and Lump Sum price for furnishing each item of Work listed in the Contract Price shall include all labor, materials, tools, equipment, superintendence, and incidentals necessary to perform and complete the Work, including profit, overhead costs, permit and license fees, royalties, and applicable taxes and fees.

**1.1 MOBILIZATION, BONDS, INSURANCE, AND DEMOBILIZATION**

Payment for Mobilization, Bonds, Insurance and Demobilization shall be paid for at the Contract lump sum price as stated in the Schedule of Bid Prices of the Contract Documents for this project under "Mobilization" and shall include full compensation for the work involved as described herein and no additional allowance will be made.

Mobilization, Bonds, Insurance, and Demobilization typically includes, but is not limited to, the preparation of contract; completion of all tasks and submittal of all documents (bonds, insurance, schedule, etc.) required as a condition of issuing the Notice to Proceed; moving onto the site(s) all Contractor's equipment and materials required; installing and maintaining temporary buildings or trailers; providing power, utilities, lighting, fencing, etc. as may be required; providing all on-site communications equipment or facilities; obtaining all permits; permit fees; having all OR-OSHA required notices posted, establishment of a safety program; preparing and delivering all pre-construction notices and/or job signs; arrangement of markings and plan for verification (potholing) of existing facilities; and beginning work on the project; removing all equipment, unused materials, all temporary facilities, job trailers, final clean up, and any other items, facilities, tools or materials left behind by the Contractor at the completion of the work.

The amounts paid for Mobilization, Bonds, Insurance, and Demobilization shall be paid for according to the Section 00210 of the OSSC.

**SECTION 0170**

**PROJECT RECORD DRAWINGS**

**1.1 GENERAL REQUIREMENTS**

Contractor shall maintain and keep up to date all times on site one set of drawings, specifications, shop drawings, equipment drawings and supplemental drawings which shall be corrected as the work progresses to show all changes made or different site conditions, including all addendum, Change Orders, job decisions, etc. Contractor shall make provisions to allow the Engineer to copy redline drawings during construction, as requested. Redline drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Engineer at any time. Upon completion of the Contract and prior to final payment, redline drawings shall be submitted to the City's Project Manager. All changes shall be neatly and legibly drawn to scale on one set of current conformed plan drawings using standard engineering drafting practices. In general,

- Contractor shall not use Record Drawings for construction purposes.
- Contractor shall protect Record Drawings from deterioration and loss in a secure location and shall provide access to documents for the Engineer's reference during normal working hours.
- Contractor shall keep Record Drawings current, as they will be reviewed for completeness by the Engineer as condition for Final Acceptance.
- Contractor shall,
  - (1) Maintain a clean, undamaged set of Contract Drawings and Shop Drawings and mark the set to show the actual installation and where the installation varies substantially from the Work as originally shown.
  - (2) Legibly and to scale, mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
  - (3) Mark new information that is important to the City but was not shown on Contract Drawings.

**1.2 QUALIFIED REGISTERED SURVEYOR**

All surveying required during the project will be performed by a qualified surveyor registered in the State of Oregon employed by the Contractor. The name of the person or agency so employed shall be submitted to the Engineer with proof of registration for approval not later than 10 (ten) days after the Notice to Proceed.

**1.3 REDLINE DRAWINGS AND PROJECT AS-BUILTS**

Redline drawings and the as-built survey shall include, but not be limited to:

- any differences in alignment, structures, valves, and hydrant locations, pipe sizes, and other pipes or structures discovered during the progress of the work
- Pipe sizes, lengths and materials
- Fittings and appurtenances, including valves, bends, tees, reducers, blow offs, water meters, and hydrants
- Horizontal and vertical separation from existing and new utilities and drainage culverts/storm drain
- All changes in alignment
- All horizontal control points (e.g. centerline intersects, PC, PT)
- Centerline station and offset to each service tap; size of tap and meter
- If the water main continues in a straight horizontal and vertical alignment for more than 100 feet, the water main will be surveyed every 100 feet. Sufficient survey measurements shall be taken on horizontal and vertical curves to establish an accurate alignment

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- A complete list of all materials installed and abandoned must be shown. The specific size and material type of each pipeline installed must be shown at every construction reference to that pipe. Any changes to the record drawing must be reflected on the materials list.

Contractor shall submit as-built deliverables prior to final acceptance of the project. The as-built survey shall contain all horizontal and vertical as-built data in ASCII format, including a northing, easting, elevation and description of all work completed under this contract. The Contractor shall provide all labor and materials necessary for submission of the Record As-built survey and shall submit As-Built CAD files on a flash drive at the end of the project.

- Neatly redlined plan mark-ups from beginning to end of construction
- As-Built Survey CAD file in latest version of AutoCAD, .dwg file format
- As-Built Survey CAD file in PDF format
- Text file of as-built survey points in the point file format (P,N,E,Z,D). As-built survey points in the text file clearly shall designate each corresponding structure, plan sheet, stationing, and rim and invert elevations of all pipes entering or exiting the structure.

**SECTION 0171**

**CONTRACT CLOSEOUT PROCEDURES**

**1.1 GENERAL REQUIREMENTS**

This Section specifies administrative and procedural requirements for project closeout and final acceptance, including but not limited to final inspection procedures, submittal of warranties, redline drawings, as-built drawings, other regulatory inspections, removal of temporary facilities, final cleaning and demobilization.

**1.2 FINAL CLEANUP**

Contractor shall cleanup the project site(s), including landscaped areas, of rubbish, litter, and foreign substances. Temporary protection and facilities installed for protection of the work during construction shall be removed and the site repaired to equal or better condition. Waste materials shall be removed from the site and disposed of in a lawful manner.

**1.3 PUNCH LIST INSPECTION**

When the work is, in the opinion of the Engineer, complete in all respects, the Contractor shall call for a punch-list inspection. The Project Manager will schedule a walk-through inspection with the Contractor and other City representatives. The results of the inspection will form the basis of the final project punch list and shall be issued with Exhibit E, Certificate of Substantial Completion.

**1.4 SUBSTANTIAL COMPLETION**

Upon completion of the project walk-through inspection with the Contractor, the Project Manager shall issue Exhibit E, Certificate of Substantial Completion, with a copy of the punch list of items to be completed or corrected to the Contractor. Unless stated otherwise, all punch list corrections shall be completed by Contractor within 30 days of issuance of Substantial Completion. The City reserves the right to complete any outstanding punch list work remaining after the thirty-day period at Contractor's expense.

**1.5 RESPONSIBILITY FOR DEFECTIVE WORK**

**A. Correction or Removal of Defective, Unacceptable or Unauthorized Work**

- 1) When work fails to meet Contract requirements and is inadequate to serve the design purpose it will be considered defective. The Contractor shall correct or remove and replace the work at the Contractor's expense, as directed. All work which has been rejected or condemned shall be repaired, or if it cannot be repaired satisfactorily, it shall be removed and replaced at the Contractor's expense.
- 2) Defective materials shall be immediately removed from the site of the work. Work done without line and grade having been given, work done beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided, work done without written authority and prior agreement in writing as to process, shall be done at the Contractor's risk and shall be considered unauthorized and at the option of the Engineer may not be measured and paid for and may be ordered removed at the Contractor's expense.

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- 3) Upon failure of the Contractor to repair satisfactorily or to remove and replace, if so directed, rejected, unauthorized or condemned work or materials immediately after receiving notice from the City, the Engineer shall, after giving written notice to the Contractor, have the authority to cause defective work to be remedied or removed and replaced, or to cause unauthorized work to be removed and to deduct the cost thereof from any monies due or to become due the Contractor. Alternatively, the City may, at its option, declare the Contractor in default, in which event the performance bond surety shall complete the Contract.

### **B. Acceptance of Defective or Unauthorized Work.**

When work fails to meet Contract requirements, but is adequate to serve the design purpose, the Engineer will decide the extent to which the work will be accepted and remain in place. The Engineer will document the basis of acceptance by a letter and may adjust the Contract Price.

#### **1.6 FINAL INSPECTION**

A final inspection of the project will be scheduled with the Contractor to verify all outstanding deficiencies have been corrected and all punch list items have been corrected prior to Final Acceptance.

#### **1.7 CERTIFICATE OF COMPLIANCE**

Once all corrective items have been addressed; the Contractor shall submit Exhibit F, Certificate of Completion of the Contract Documents.

#### **1.8 RELEASE OF LIENS AND CLAIMS**

Following the submission of the Certificate of Completion, the Contractor shall submit a signed, notarized copy of Exhibit G, Contractor's Release of Liens and Claims of the Contract Documents.

#### **1.9 FINAL ACCEPTANCE**

When the Work is complete, the Engineer will conduct a final review of the project for final acceptance and will verify that,

- the Work has been inspected for compliance with the Contract Documents.
- the Work has been completed in accordance with the Contract Documents and all known deficiencies have been addressed.
- all required shop drawings, catalog cuts, maintenance manuals, instruction manuals, test reports, samples, operational manuals, and all other submittals have been submitted and reviewed.
- all deliverables have been submitted and have been as accepted, including but not limited to redline construction drawings, as-built survey, inspection videos (if applicable), pre-construction and post-construction site documentation, etc.
- all tools, surplus materials, construction equipment, storage sheds, debris, waste, and temporary services have been removed from the job site.
- Job site has been cleaned of rubbish, litter, and other foreign substances, and all surface restoration has been completed.

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If the Engineer's review reveals that the Work is complete and is in 100% compliance with all Contract Documents, the Contractor will be issued Exhibit H, Certificate of Final Completion.

### **1.10 FINAL PAYMENT AND RELEASE OF RETAINAGE**

After receiving the Certificate of Final Completion, the Contractor shall submit a final application for payment in accordance with the provisions of the Contract. Final pay application shall identify total adjusted Contract Sum, previous payments and sum remaining due.

### **1.11 WARRANTY**

The Work is guaranteed by the Contractor from the date of Final Acceptance by the City. The Contractor shall warranty all materials and equipment that it furnishes for a period of two (2) years from date of final acceptance (Exhibit H) of the work by the City. This warranty shall mean prompt attention to the correction and/or complete replacement of the faulty material or equipment. Per OSCC Section 00170.85, within ten calendar days of written notification of defect(s), the Contractor or the Contractor's surety shall vigorously and continuously correct and repair the defects and all related damage. If the Contractor fails within ten days to proceed to comply with the terms of this warranty, the owner may have the defects corrected. The Contractor and Contractor's surety shall be liable for all expense incurred. In case of an emergency where delay would cause serious loss or damage, repairs may be made without notice to the Contractor and the Contractor or Contractor's surety shall pay the cost.

The Contractor's performance bond shall remain in effect during the warranty period. If, within the warranty period, repairs or changes are required in connection with the work, the Contractor shall promptly, without expense to the City:

- Place in satisfactory condition all guaranteed work,
- Correct all damage to the site, equipment or contents which is the result of the use of materials, equipment or workmanship that are inferior, defective, or not in accordance with the terms of the contract; and,
- Correct any work, material, equipment, or contents of building, structure or site disturbed in fulfilling the guarantee.

Repairs, replacements, or changes made under the warranty requirements shall be warranted for the specified warranty period beginning on the date of the acceptance of the repairs, replacements, or changes. The expiration of the two-year warranty period shall not affect any other claims or remedy available to the City.

## SECTION 0320

### TRENCH EXCAVATION, BEDDING, & BACKFILL

#### 1.1 GENERAL REQUIREMENTS

This section includes work for all necessary excavations in the performance of the Contract and shall conform to the City of St. Helens Standards and the most current version of the Oregon Standard Specifications for Construction except as modified herein. In the case of discrepancy, the more stringent provision shall apply. Work shall include, but is not limited to, excavation of ditches, trenches, embankments, and other earth-moving work, the use of sheeting, shoring, and sheet piling; all pumping and work necessary to keep trenches free from water; supporting and protecting structures, pipes, conduits, culverts, posts, poles, wires, fences, buildings, public and private property adjacent to the work; removing of all sheeting and shoring not necessary to support the sides of excavations after completion of work; removing all surplus excavated material, and backfilling and grading of compacted backfill.

#### 1.2 POTHOLING

Pothole Excavation - Pothole excavation is the removal and replacement of all materials via coring, vacuum extraction, or similar method. Prior to excavating, effort shall be made to determine whether underground installations; i.e., sewer, water, gas, electric lines, storm drain, cable TV, telephone, and fiber optics, will be encountered and, if so, where such underground installations are located. All known owners of underground facilities in the area concerned shall be advised of proposed work at least 48 hours prior to the start of actual excavation. Potholing for existing utilities shall be used to locate all potential subsurface conflicts in work area.

#### 1.3 EXCAVATION CLASSIFICATIONS

Excavation shall be classified as Common Excavation, Rock Excavation, or Unsuitable Excavation.

- A. **Common or General Excavation** is defined as all excavation, regardless of the type, character, composition, or condition of the material encountered and shall further include all debris, junk, broken concrete, boulders which do not require drilling and blasting or other approved splitting and breaking methods, and all other material. All excavation shall be considered common excavation unless provided for otherwise elsewhere in these specifications.
- B. **Rock Excavation** is defined as the removal of solid rock in ledges, bedded deposits, or unstratified masses that by actual demonstration cannot, in the opinion of the Engineer, be reasonably loosened or ripped mechanically and requires removal by wedging, sledging, barring, breaking up with power operated tools, drilling or blasting.
- C. **Unsuitable Materials** are soils exposed at the bottom an excavation or obtained from the Contractor's excavations that are compressible, expansive, contain extraneous rubble, offer uneven foundation support, or have natural moisture content three percent (or greater) in excess of its optimum moisture content. Unsuitable materials include, but is not limited to mulch, peat, expansive clays, soils in a quick condition, rubble, portions of trees or similar vegetation, or wood.
  - 1) The Contractor shall notify the Engineer immediately when unsuitable material is encountered. The Engineer will investigate questionable material to determine its suitability.



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Should the Engineer require soils testing be performed to aid in his determination. Tests revealing suitable materials shall be paid for by the Contractor.

- 2) Where the Engineer determines that unsuitable material is present which will not provide adequate support of the work, the Contractor shall remove the unsuitable material as directed by the Engineer and replace the unsuitable material with select backfill up to the bottom of the specified grade.

### 1.4 LIMITS OF EXCAVATION

- A. All excavations shall conform to the lines, grades, and cross sections established by the Contract Documents.
- B. Excavation shall allow for forms, shoring, working space, gravel base, and finish topsoil where required. Do not excavate deeper than elevation shown without approval from the Engineer. Keep the excavation width to the minimum necessary to install the Work in a safe manner.
  - 1) Trench limits shall be,
    - Depth: From six inches below the bottom of the pipe to top of ground surface
    - Width: Outside diameter of the pipe plus twelve inches, not less than two feet total width
    - Length: Per linear foot of pipe installed. Length will be the horizontal distance measured along the centerline of the pipe
    - Excavation for manholes and other structures shall be wide enough to provide a minimum of 12 inches between the structure surface and the sides of the excavation and a depth 6 inches of below the bottom of the structure.
  - 2) Excavation for roadways, ramps, sidewalks, channels, ditches, etc. shall be to the cross sections, grades, and elevations shown on the Contract Drawings.

### 1.5 EXCAVATION

- A. The Contractor shall exercise sound construction practices in excavating, backfilling, and compacting so no damage will occur to any foundation structure, pole line, pipe, or other facility. If, as a result of excavation, there is a disturbance of ground that endangers other property, the Contractor shall immediately take remedial action at the Contractor's own expense. No act of the City or his representatives shall in any way affect liability of the Contractor for damages, expenses or costs that may result from trench excavation.
- B. The site of an open cut excavation shall be first cleared of all obstructions preparatory to excavation. Wherever paved or surfaced streets are cut for installing utilities, the Contractor shall use a standard T-Cut where pavement cut shall be full depth longitudinally and transversely, under the direction of the Project Construction Inspector. Pavement cuts shall be straight and clean and shall be either parallel or perpendicular with respect to the travel lane. No jagged, broken, or undermined edges will be allowed. Any cut or broken pavement shall be removed from site during excavation. Full depth cut is defined as the thickness of asphalt from top of asphalt to top of base aggregate.

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- C. Excavated material shall be placed at locations and in such a manner that it does not create a hazard to pedestrian or vehicular traffic, nor interfere with the function of existing drainage facilities. During wet weather conditions, stockpiles shall be removed or tarped throughout the construction process.
- D. Excavation for trenches in which pipelines are to be installed shall provide adequate space for workers to place and joint the pipe properly and safely, but in every case the trench shall be kept to a minimum width. The width of trench at the top of the pipe shall not exceed the limits specified in the Contract Drawings. Unless otherwise permitted by the Engineer, trenching operations shall not be performed beyond the distance which will be backfilled and compacted the same day
- E. Cut areas as shown on the Plans, including ditches within the cut sections, and excavations for entrances, approach roads, streets, intersections, sidewalks, ramps, gutters, ditches, berm ditches, and flumes.
- F. Topsoil to be salvaged within the limits of the work in accordance the Contract Documents.
- G. Where the Plans indicate the placement of a selected material below subgrade in excavation areas, excavate to the depth necessary to place the material to its specified compacted thickness.
- H. Where unstable material is encountered below subgrade in excavations, excavate such material below subgrade as directed. Dispose of unstable materials according to Section 00330.41(a)(5) of the OSSC.
- I. The removal and disposal of existing surfacing, sidewalks, curb, or curb and gutter, structures, etc., shall be in accordance with the Contract Documents and Section 02420 – DEMOLITION & DISPOSAL

### 1.6 ROCK EXCAVATION

Excavations greater than 3 feet in depth within the City limits may consist of mainly unweathered, solid basalt rock with greater than 40,000 psi compressive strength. The City has not performed any specific geotechnical survey of the project area and any geotechnical or preparatory work needed to submit a bid and/or complete the construction shall be considered incidental to construction and no additional payment shall be made. The Contractor is fully responsible for performing geotechnical investigations and the City shall incur no costs resulting from damaged equipment, construction delays, or additional work due to unknown underground conditions.

#### A. Rock Removal

If rock is encountered, payment shall be on a per Cubic Yard basis and shall be full compensation for all permits, labor, tools, materials, machinery, transportation, equipment, testing as required, and services of all kinds required and necessary to establish and meet the requirements of this section. For additional details, refer to specification section 01620 Measurement & Payment.

#### B. Measurement for determining rock quantities shall be based on the following dimensions:

- Depth: From six inches below the bottom of the pipe to top of rock surface, or from the bottom of the specified grade to the top of rock surface

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- Width: The outside diameter of the pipe plus twelve inches, not less than two feet total width, or from the limits of the work
- Length: Per linear foot of pipe installed. Length will be the horizontal distance measured along the centerline of the pipe, or from the limits of the work
- Structures: Rock excavation for manholes, inlets, and other structures will be computed from the rock excavated to a depth 6 inches below the bottom of the structure and an area within a line parallel with, and 12 inches outside of, the actual dimensions of the manhole, inlet, or structure.

### **1.7 OVER-EXCAVATION AND SELECT BACKFILL**

When there is excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials, the Contractor shall notify the Engineer for approval to remove the unsuitable material and exercise care to avoid excavations below established grade where firm earth conditions exist. Select aggregate fill shall be as designated in Section 2.0 BACKFILL in these specifications. Contractor shall bear costs where unauthorized excavations have been carried beyond points required for the work.

### **1.8 EXCAVATION PROTECTION**

- A. The Contractor shall provide all materials, labor, and equipment necessary to adequately protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions, in compliance with all OSHA requirements, including furnishing and installing adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement or other ground movement.
- B. The method of protection shall be according to the Contractor's design. The Contractor may elect to use a combination of shoring, over break, sliding trench shields, or other methods of accomplishing the work provided the method meets the approval of all applicable local, state, and federal safety codes. Damages resulting from improper shoring, improper removal of shoring, or from failure to shore shall be the sole responsibility of the Contractor.
- C. Trench Protection shall be installed and maintained, as required, for shielding, shoring, sheeting, bracing, and trench support systems, hereinafter called "shoring", to prevent caving and to protect adjacent structures, property, utilities, workers, and the public. Contractor shall remove shoring during backfilling in a manner that will not damage adjacent structures, property, utilities, or the pipe, permit voids in the backfill, or disturb the compacted pipe bedding material between the pipe and the undisturbed trench wall. Maintain design information for shoring onsite at all times. Make this information available for the Engineer's review upon request.
- D. Bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.
- E. The Contractor shall furnish, install, and leave in place, construction sheeting and bracing when specified or where indicated or shown on the Drawings. Any construction sheeting and bracing which the Contractor has placed to facilitate its work may be ordered in writing by the Engineer to be left in place. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating an obligation on its part to issue such orders.

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- F. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
- G. Engineered Systems - Engineered Shoring is required for temporary earth support systems for excavations greater than 20 feet deep including bore pits, jacking pits, receiving pits, and shafts. Engineered Shoring is also required for areas subject to vibration, groundwater, utility crossings, or where required on the Drawings. Submit the following for each area where Engineered Shoring is required:
- 1) Detailed construction sequence descriptions. The sequence shall detail installation, excavation, maintenance, backfill, and removal requirements.
  - 2) Design Calculations shall be prepared and sealed by a State of Oregon licensed Professional Engineer and include design criteria, analysis assumptions, construction sequence requirements, and detailed design for each system and structural element of the proposed shoring system.
  - 3) Drawings shall be prepared and sealed by a State of Oregon licensed Professional Engineer. Drawings shall present an explicit representation of the character, extent, and details of the proposed shoring in relation to the project site. Working Drawings shall show the following:
    - a. Details, arrangement and method of assembly, method of disassembly of the proposed system and sequence of construction, and equipment used for installation
    - b. Method of pre-loading the bracing and pre-load values.
    - c. Full excavation depth.
    - d. Loads on the support system for various stages of excavation, bracing, and / or tieback installation and removal and concrete placement.
    - e. Expected equipment loads.
    - f. Maximum design load to be carried by the various members of the support system.
    - g. The depth below the main excavation to which the support system is to be installed.
    - h. Existing utilities and facilities: After checking locations by field investigation, revise drawings to show actual locations of facilities and excavation supports, interference with proposed work, and measures proposed to overcome such interference.
    - i. Allowable shoring deflections and proposed method of monitoring shoring movements.

## 1.9 DEWATERING

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Furnish, install, and operate all necessary machinery, appliances, and equipment to keep excavations free from water during construction. Dewater and dispose of water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies and shall have available at all times competent workmen for operation of pumping equipment. Control of ground water shall be such that softening of the bottom of excavations or visible water shall be prevented. Dewatering systems shall be designed and operated to prevent removal of natural soils. Static water level shall be drawn below bottom of excavation to maintain undisturbed state or natural soils and allow placement of backfill to required density. Dewatering system shall be installed and operated so that ground water level outside excavation is not reduced to extent that would damage or endanger adjacent structures or property. Unless otherwise shown, dewatering shall be considered incidental to construction.

### 2.0 BACKFILL

Backfill is defined as the furnishing, placing, and compacting of material for foundations, sidewalks, ramps, curbs, pavement, miscellaneous structures, or flatwork, and in the trenches above pipe zone up to bottom of the specified elevation, pavement base rock, ground surface, or surface material. No additional payment will be made for backfill material, unless specified otherwise, and it shall be considered incidental to construction.

- A. **Class A Material** shall be suitable native or common excavated material that, in the opinion of the Engineer, meets the characteristics required for the specific surface loading or other criteria of the backfill zone. Use approved native material excavated from within limits of the project, free from vegetation and other deleterious material, and containing no frozen ground. Maximum particle size shall be 3 inches. If the Engineer determines native material is not suitable, the Contractor shall use another class of backfill as directed.
- B. **Class B Material** shall be granular material consisting of gravel or crushed rock meeting the requirements of Section 00641 of the Oregon Standard Specifications for Construction. Designated size shall be 1"-0 or 3/4"-0. All gradations of crushed rock shall comply with Standard Specifications for Construction for Base Aggregates.
- C. **Class C Material**: NOT USED
- D. **Class D Material** shall be pit run or bar run material, well graded from coarse to fine. The maximum dimension shall be 3 inches. Material shall be free from organic material. Classification will be determined according to requirements of ASTM D 2487.
- E. **Class E Material** shall be Controlled Low Strength Material (CLSM). CLSM shall be composed of cement, pozzolans, fine aggregate, water, and admixtures. CLSM shall have a low cement content, be non-segregating, self-consolidating, free-flowing and excavatable material which will result in a hardened, dense, non-settling fill and a compressive strength of 100 psi to 200 psi at 28 days if not otherwise shown or specified.

Backfill located in the public right-of-way shall always be Class B. For pipe, structures located outside the public right-of-way, backfill shall be approved Class A (native) Backfill. All excavations under pavement or sidewalk must be backfilled with 3/4"-0 crushed rock. Native backfill material shall be selected from excavated native material free from roots or other organic material, trash, mud, muck, frozen material and large stones. When native excavated material is used for backfill around pipe, it shall be free of rocks, cobbles, stones or other debris having a dimension greater than 1-1/2 inches.

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The Engineer may sample excavated material to determine the suitability of the Class A material for use as backfill. Contractor shall prevent excavated material from becoming saturated beyond the critical moisture limits and replace any saturated Class A material with Class B at no additional cost to the City. In general, backfilling shall begin as soon as the work is in approved condition to receive it and shall be carried to completion as rapidly as possible. New trenching shall not be started when earlier trenches need backfilling, or the surfaces of streets or other areas need to be restored to a safe and proper condition.

### **2.1 PIPE BEDDING**

- A. Pipe Bedding material shall consist of Class B material. The minimum depth of bedding placed before installing pipe shall be 6" or as directed by the Engineer. Bedding shall be Class B material both within the public right-of-way and outside the public right-of-way.
- B. Contractor shall spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the joint. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length.
- C. For all pipes located in the public right-of-way, bedding and pipe zone material shall be Class B, and backfill shall be Class B. For pipes located outside the public-right-of-way, bedding and pipe zone material shall be Class B, and backfill shall be Class A.
- D. Bedding of pipes, trench excavation and backfill shall conform to applicable portions of Section 405 Trench Excavation, Bedding and Backfill of the OSSC and in accordance with the Contract Drawings with the following additions and modifications.
- E. No additional payment will be made for bedding or backfill material and it shall be considered incidental to construction.

### **2.2 PIPE ZONE**

- A. Pipe Zone material shall consist of Class B material. Pipe zone material shall be placed to a minimum depth of 12" above the outside diameter of the pipe barrel for the full width of the trench. Pipe zone backfill shall be Class B material both within the public right-of-way and outside the public right-of-way.
- B. Pipe zone material shall be placed in a manner that equalizes pressure on the structure and minimizes stress. Contractor shall not allow sharp, heavy pieces of material to drop directly onto or contact the pipe and shall prevent pipe from movement both horizontally and vertically.
- C. As required under the haunches of pipe and in areas not accessible to mechanical tampers or to testing, compact with hand methods to ensure intimate contact between the backfill material and the pipe or structure.

### **2.3 COMPACTION**

- A. Backfill trench above the pipe zone to the specified grade. Backfill shall be placed and compacted in lifts per the OSSC.

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- B. In-place dry density of compacted material shall be at the percent of maximum dry density specified or shown at optimum moisture content determined on the basis of the latest addition of AASHTO T-99.
- C. In general, compact all trench backfill to a minimum of 95% of Standard Proctor maximum density in paved areas and in street rights-of-ways or 90% of Standard Proctor maximum density in other areas, or as specified, with mechanical vibrating or impact tampers.
- D. Condition backfill material to within 2% of optimum moisture content required for compaction, as determined by ASTM D 698 throughout each lift of the fill. Material which does not contain sufficient moisture to obtain proper compaction shall be wetted and thoroughly mixed as directed. Material containing an excess of moisture shall be dried by manipulation, aeration, drainage or other means before being compacted.
- E. When the backfilling is complete, finish the surface area, with aggregate base material or topsoil, as specified. In paved or graveled areas, maintain the surface of the trench backfill level with the existing grade with 3/4" - 0 or 1" - 0 aggregate material, or asphalt concrete if directed, until final pavement replacement is complete and accepted.

SECTION 0330

BLASTING METHODS

1.1 BLASTING

Blasting is allowed within City limits and requires additional permits that shall be approved prior to any blasting. For blasting the Contractor shall follow these specifications, local, state, and federal regulations, the Oregon Standard Specifications for Construction, as well as the City's Construction and Blasting Objectives & Operation Methods (CABOOM). A copy of CABOOM is available from the Engineer upon request. Blasting must be approved by the Engineer and the City reserves the right to refuse any blasting operations if it is in the best interest of the City to do so.

When explosives are used for the prosecution of the work, the Contractor shall use the utmost care so as not to endanger life or property, cause slides or disturb materials outside the neat lines of the trenches or excavations. The Contractor shall be responsible for obtaining all permits required for the use of explosives and shall be responsible for the storage, transportation, handling of explosives, use, and the results of all blasting operations.

Contractor shall submit blasting plans to the Engineer for review at least 10 calendar days before beginning blasting work. Review of blasting plans by the Engineer does not relieve the Contractor of full responsibility for the accuracy and adequacy of the plans and the resulting safety when implemented in the field.

A. Handling and Storage

- 1) All explosives shall be stored in a safe, secure manner in compliance with federal, state, and local laws and ordinances, and all such storage places shall be marked clearly "Dangerous Explosives." No explosives shall be left in an unprotected manner along or adjacent to any highway, street, alley, or other area, where such explosives could endanger persons or property. Storage of the explosives shall be in accordance with the requirements of the State Industrial Accident Commission or similar appropriate body having the jurisdiction in such matters in the state in which the work is performed.
- 2) Only persons experienced in handling explosives shall be allowed to use them on the work. Where state or local laws require that explosives be handled only by licensed personnel, it shall be the Contractor's responsibility to see that this requirement is met.
- 3) The Contractor shall provide all necessary approved types of tools and devices required for loading and using explosives, blasting caps, and accessories, and shall conform acts to and shall obey all federal, state, and local laws that may be imposed by any public authority or directions that may be given from time to time by the Engineer relative to the handling, placing, and firing of explosives.

B. Blasting plan shall contain:

- 1) Full details of the blasting patterns, vibration, fly rock, and noise reduction methods
- 2) Blast area security measures
- 3) Station limits of proposed shot



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- 4) Removal of overburden
- 5) Diagrams of proposed drill pattern for controlled and production blast holes including buffer rows, free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height and sub drill depth.

Before blasting the Contractor shall expose the material by removing the common material or overburden above it, then notify the Engineer, who, with the Contractor or his representative will measure the amount of rock to be removed and will record the information.

**SECTION 04300**

**WATER PIPE ABANDONMENT**

**1.1 GENERAL REQUIREMENTS**

This section specifies the work necessary for the abandonment and capping of existing water lines in place.

**1.2 PRODUCTS**

A. Controlled Low-Strength Material (CLSM)

CLSM shall be composed of cement, pozzolans, fine aggregate, water, and admixtures. CLSM shall have a low cement content, be non-segregating, self-consolidating, free-flowing and excavatable material which will result in a hardened, dense, non-settling fill and a compressive strength at 28 days of 100 to 200 psi or as specified.

**1.3 ABANDONMENT**

- A. Waterlines to be abandoned in-place equal to or greater than 6 inches in diameter shall be filled until refusal with an approved flowable CSLM (Controlled low-strength material). CLSM shall be placed in a manner to ensure complete filling of the pipe, leaving no cavities or voids. Contractor shall install hot taps, saddles, fill lines and appurtenances as necessary for pumping CLSM from the surface into the pipe being filled. CLSM shall be pumped up grade from fill lines rigidly connected to the pipes being filled. Fill lines shall be located at elevations lower than the pipe being filled. Placement of CLSM by free-flowing non-pumped methods will not be acceptable. As the CLSM is being placed, use other fill lines as view ports to ensure complete filling of the pipes. Relocate pumping equipment as necessary to complete filling of the pipes. Excavate and cut access holes in the pipes as necessary to complete filling operations. The Contractor shall eliminate all air pockets and shall submit CLSM volume calculations for each filled segment to verify that pipelines have been completely filled.
- B. Waterlines to be abandoned in-place less than 6 inches in diameter shall be cut and capped with a manufactured plug or cap installed as recommended by the manufacturer to form a watertight seal. Unless otherwise noted on the plans, waterlines shall be capped at distance of ten feet or less from the existing pipeline.
- C. Waterlines shall be capped at within five feet from active waterline or as shown on Plans.
- D. All abandoned valve boxes shall be cut off 12" below grade, gravel filled, and asphalt plugged at no additional cost.
- E. When the Contractor removes existing pipe, gate valve units, fittings, fire hydrant units or other items to allow installation of the work specified herein, they shall haul the removed water works materials to the City's designated storage yard unless otherwise directed by the City Project Inspector.

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PLANS  
BID SCHEDULE

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### **APPLICABLE SPECIFICATIONS**

The Specifications that are applicable to the Work on this Project is the 2021 edition of the "Oregon Standard Specifications for Construction", as modified by these Special Provisions. All Sections in Part 00100 apply, whether or not modified or referenced in the Special Provisions.

All number references in these Special Provisions shall be understood to refer to the Sections and subsections of the Standard Specifications bearing like numbers and to Sections and subsections contained in these Special Provisions in their entirety.

These special provisions are intended to support St. Helens Technical Specifications as included in the project-specific Contract Documents. Where a conflict arises, the St. Helens Technical Specifications shall prevail.

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### SECTION 00110 - ORGANIZATION, CONVENTIONS, ABBREVIATIONS AND DEFINITIONS

Comply with Section 00110 of the Standard Specifications modified as follows:

**00110.05(e) Reference to Websites** - Add the following bullet list to the end of this subsection:

- City of St. Helens website  
<https://www.sthelensoregon.gov/>
- American Traffic Safety Services Association (ATSSA)  
www.atssa.com
- BidExpress  
www.bidx.com
- EquipmentWatch  
www.equipmentwatch.com
- ODOT Construction Section  
www.oregon.gov/odot/construction/pages/index.aspx
- ODOT Construction Section - Qualified Products List (QPL)  
www.oregon.gov/ODOT/Construction/Pages/Qualified-Products.aspx
- ODOT Construction Surveying Manual for Contractors  
www.oregon.gov/ODOT/ETA/Documents\_Geometronics/Construction-Survey-Manual-Contractors.pdf
- ODOT Electronic Bidding Information Distribution System (eBids)  
(Also referred to as ODOT eBids website)  
<https://ecmnet.odot.state.or.us/ebidse>
- ODOT Estimating  
www.oregon.gov/ODOT/Business/Pages/Steel.aspx
- Oregon Legislative Counsel  
www.oregonlegislature.gov/lc
- ODOT Procurement Office - Conflict of Interest Guidelines and Disclosure Forms  
www.oregon.gov/ODOT/Business/Procurement/Pages/PSK.aspx
- ODOT Procurement Office - Construction Contracts Unit Notice of Intent

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[www.oregon.gov/ODOT/Business/Procurement/Pages/NOI.aspx](http://www.oregon.gov/ODOT/Business/Procurement/Pages/NOI.aspx)

- ODOT Procurement Office - Construction Contracts Unit prequalification forms  
[www.oregon.gov/odot/business/procurement/pages/bid\\_award.aspx](http://www.oregon.gov/odot/business/procurement/pages/bid_award.aspx)
- Oregon Secretary of State: State Archives  
[sos.oregon.gov/archives/Pages/default.aspx](http://sos.oregon.gov/archives/Pages/default.aspx)
- ODOT Traffic Control Plans Unit  
[www.oregon.gov/ODOT/Engineering/Pages/Work-Zone.aspx](http://www.oregon.gov/ODOT/Engineering/Pages/Work-Zone.aspx)
- ODOT Traffic Standards  
[www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx](http://www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx)

### SECTION 00140 - SCOPE OF WORK

Comply with Section 00140 of the Standard Specifications.

### SECTION 00150 - CONTROL OF WORK

Comply with Section 00150 of the Standard Specifications modified as follows:

**00150.15(b) Agency Responsibilities** - Replace this subsection, except for the subsection number and title, with the following:

The Engineer will perform the Agency responsibilities described in the *Construction Surveying Manual for Contractors*, Chapter 1.5 (see Section 00305).

The Engineer will perform slope staking including intersections and set stakes defining limits for clearing which approximate Right-of-Way and easements.

**00150.15(c) Contractor Responsibilities** - Replace this subsection, except for the subsection number and title, with the following:

The Contractor shall perform the Contractor responsibilities described in the *Construction Surveying Manual for Contractors*, Chapter 1.6 (see Section 00305).

The Contractor shall perform slope staking including intersections and set stakes defining limits for clearing which approximate Right-of-Way and easements.

**00150.50(c) Contractor Responsibilities** – Replace the bullet that begins "Protect from damage or disturbance any Utility that remains..." with the following bullet:

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- Protect from damage or disturbance any Utility that remains within the area in which Work is being performed. Maintain and re-establish location marks according to OAR 952-001-0090(3)(a). Coordinate re-establishment of the location marks with the associated Utility;

Replace the bullet that begins "Determine the exact location before excavating within ..." with the following bullet:

- Determine the exact location before excavating within the tolerance zone according to OAR 952-001-0090(3)(c);

Replace the bullet that begins " In addition to the notification required in OAR 952-001-0090(5), notify the Engineer..." with the following bullet:

- In addition to the notification required in OAR 952-001-0090(6), notify the Engineer and the Utility as soon as the Contractor discovers any previously unknown Utility conflicts or issues. Contrary to the OAR, stop excavating until directed by the Engineer and allow the Utility a minimum of two weeks to relocate or resolve the previously unknown Utility issues; and

Add the following subsection:

**00150.50(f) Utility Information (No Anticipated Relocations)** - Within the Project limits, there are no anticipated relocations with the Utilities listed in Table 00150-1. The Contractor shall contact those Utilities having buried facilities and request that they locate and mark them for their protection prior to construction.

**Table 00150-1**

<b>Utility</b>	<b>Owner</b>	<b>Utility Contact Person</b>
Water, Sewer, & Storm	City of St. Helens	Dave Elder 984 Oregon St St. Helens, OR 97051 <a href="mailto:delder@sthelensoregon.gov">delder@sthelensoregon.gov</a> 503-936-8523
Natural Gas	Northwest Natural Gas	Rich Girard 220 NW Second Ave Portland, OR 97209 <a href="mailto:r2g@nwnatural.com">r2g@nwnatural.com</a> 503-226-4211 ext 2967
Power	Columbia River PUD	Karl Webster / Brooke Sisco PO Box 1193, St. Helens, OR 97051 <a href="mailto:kwebster@crpud.org">kwebster@crpud.org</a> 503-397-8154
Telephone	Century Link	Scott Miller / Marco Galas 8021 SW Capitol Hill Rd Portland, OR 97219 <a href="mailto:scott.miller4@centurylink.com">scott.miller4@centurylink.com</a> 503-242-4144
Telephone	Lumen	Masood Zeerak



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		1025 Eldorado Blvd. Broomfield, CO 80021 masood.zeerak@lumen.com 720-888-8568
Cable	Comcast	Ken Parris Construction Dept 445 Port Ave Suite 1 St Helens, OR 97051 <a href="mailto:Kenneth_Parris@cable.comcast.com">Kenneth_Parris@cable.comcast.com</a> 503-366-9717

The Contractor shall notify, in writing, the Utilities listed above, with a copy to the Engineer, at least 14 Calendar Days before beginning Work on the Project.

### **Northwest Natural Gas - Gas Utilities -**

The Gas Utility operates a gas pipeline within the Project limits and may require an on-site safety watcher, at no cost to the Contractor.

In the event of an emergency, and in addition to the calls required by the Utilities notification system, the Contractor shall call:

- Northwest Natural Gas 1-800-882-3377

### **Columbia River PUD - Power Suppliers -**

Energized power lines overhang portions of the Work with a minimum vertical clearance of 18 feet. The Contractor shall maintain at least 10 feet of safety clearance. Exceptions require written approval from the Power Supplier(s) and may require an on-site safety watcher, at no cost to the Contractor. The Contractor shall provide the Engineer a copy of the written approval of exception before beginning Work.

**Century Link, Lumen, Comcast - Telecommunication Utilities** - The Contractor shall obtain written approval from Telecommunication Utilities that have fiber optic communication cable facilities, for excavating or blasting within 10 feet of a buried fiber optic communications cable. Telecommunication Utilities may require an on-site safety representative at no cost to the Contractor for monitoring purposes. The Contractor shall provide the Engineer a copy of the written approval before beginning Work.

## **SECTION 00160 - SOURCE OF MATERIALS**

Comply with Section 00160 of the Standard Specifications.

## **SECTION 00165 - QUALITY OF MATERIALS**

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Comply with Section 00165 of the Standard Specifications.

### SECTION 00170 - LEGAL RELATIONS AND RESPONSIBILITIES

Comply with Section 00170 of the Standard Specifications modified as follows:

**00170.00 General** - Replace the paragraph that begins " The Contractor shall comply with all laws, ordinances, ..." with the following paragraph:

The Contractor shall comply with all laws, ordinances, codes, regulations, executive orders and administrative rules (collectively referred to as "Laws" in this Section) that relate to the Work or to those engaged in the Work. Where the provisions of the Contract are inconsistent or in conflict, the Contractor shall comply with the more stringent standard.

**00170.65(a) General** – Add the following to the end of the first paragraph:

It is the Contractor's responsibility to establish the prevailing rate of wages, which is in effect ten (10) days prior to bid opening in Columbia County.

**00170.65(b)(4) Owner/Operator Data** - Replace this subsection, except for the subsection number and title, with the following:

The Contractor shall furnish data to the Engineer for each owner/operator providing trucking services. Furnish the data before the time the services are performed and include without limitation for each owner/operator:

- Driver's name;
- Present driver license upon request;
- Vehicle identification number;
- Present vehicle registration upon request;
- Motor vehicle license plate number;
- Motor Carrier account number;
- Present ODOT Motor Carrier 1A Permit upon request; and
- Name of owner/operator from the side of the truck.

**00170.70(a) Insurance Coverages** - Add the following to the end of this subsection:

Insurance coverage shall be in the amount specified in the City's document, "STANDARD TERMS & CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS". The Contractor shall also protect the City, its officers, agents, and employees and name them as an additional insured party.

**00170.70(d) Additional Insured** - Replace the paragraph that begins " The liability insurance coverages of 00170.70(a) shall ..." with the following paragraph:

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The liability insurance coverages of 00170.70(a) shall include an Additional Insured Endorsement endorsing the “State of Oregon, the Oregon Transportation Commission and the Department of Transportation, and their respective officers, members, agents, and employees” as Additional Insureds, but only with respect to the Contractor's activities to be performed under the Contract. Coverage shall be primary and non-contributory with any other insurance and self-insurance. The liability coverages of 00170.70(a) that are permitted by the Agency to be obtained by an appropriate Subcontractor shall include all of the foregoing as Additional Insureds and shall also include the Contractor and its officers and employees as Additional Insureds.

Add the following paragraph and bullets to the end of this subsection:

Add the following as Additional Insureds under the Contract:

- The City of St. Helens and its officers, agents, and employees
- St. Helens City Council
- Otak, Inc.

**00170.70(g) Certificate(s) of Insurance** – Replace the bullet that begins “List the “State of Oregon, the Oregon Transportation...” with the following bullet:

- List the “State of Oregon, the Oregon Transportation Commission and the Department of Transportation, and their respective officers, members, agents and employees” as a Certificate holder and endorse as an Additional Insured;

**00170.70(h) Agency Acceptance** - Replace the paragraph that begins “All insurance and insurance providers are ...” with the following paragraph:

All insurance and insurance providers are subject to Agency acceptance. In addition, all of the following are subject to Agency acceptance and, if requested by Agency, the Contractor shall provide complete copies of the following to Agency's representatives responsible for verification of the insurance coverages required by the Contract: insurance policies, endorsements, self-insurance documents and related insurance documents.

**00170.72 Indemnity/Hold Harmless** - Add the following paragraph and bullet(s) to the end of this subsection:

Extend indemnity, defense and hold harmless to the Agency and the following:

- The City of St. Helens and its officers, agents, and employees
- St. Helens City Council
- Otak, Inc.

## SECTION 00180 - PROSECUTION AND PROGRESS

Comply with Section 00180 of the Standard Specifications modified as follows:

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Add the following subsection:

**00180.40(c) Specific Limitations** - Limitations of operations specified in these Special Provisions include, but are not limited to, the following:

<b>Limitations</b>	<b>Subsection</b>
Cooperation with Utilities .....	00150.50
Cooperation with Other Contractors .....	00150.55
Contract Time .....	00180.50(h)
Closed Lanes .....	00220.40(e)(1)
Special Events .....	00220.40(e)(2)(b)
Dry Weather Work.....	00280.41(e)
Noise Control .....	00290.32
Wildlife Avoidance/Harassment (High Noise) .....	00290.36(c)

The Contractor shall be aware of and subject to schedule limitations in the Standard Specifications that are not listed in this subsection.

**00180.41 Project Work Schedules** - After the paragraph that begins "One of the following Type..." add the following paragraph:

In addition to the "look ahead" Project Work schedule, a Type A schedule as detailed in the Standard Specifications is required on this Contract.

Add the following subsection:

**00180.50(h) Contract Time** - There is one Contract Time on this Project as follows:

The Contractor shall complete all Work to be done under the Contract before the elapse of 480 Calendar Days, or not later than September 15, 2024, whichever occurs first.

**00180.85 Failure to Complete on Time; Liquidated Damages:** - Replace the subsection with the following:

Project completion and liquidated damages shall be calculated per City of St Helens Technical Specification 0131.

## SECTION 00190 - MEASUREMENT OF PAY QUANTITIES

Comply with Section 00190 of the Standard Specifications modified as follows:

**00190.20(f)(2) Scale Without Automatic Printer** - Replace the paragraph that begins " If the scales require manual entry of gross weight ..." with the following paragraph:

If the scales require manual entry of gross weight information, the Agency may periodically have a representative weigh witness at the scales to observe the weighing procedures. The Contractor shall inform the Engineer of its intent to use a scale without an automatic printer

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at least 3 working days before weighing begins or before the Contractor changes to a scale that does not have an automatic printer. The Contractor shall pay costs for the weigh witness. The hourly cost of the weigh witness will be as stated in the Special Provisions. In addition, the Engineer may periodically check the weight for a load of Materials by directing the haul vehicle to reweigh on a different scale that has been inspected and certified according to 00190.20(b) and 00190.20(d).

Add the following paragraph after the paragraph that begins " If the scales require manual entry...":

Pay costs for the weigh witness at \$35.00 per hour.

**00190.20(g) Agency-Provided Weigh Technician** - Add the following paragraph to the end of this subsection:

Pay costs for the weigh technician at \$35.00 per hour.

### **SECTION 00195 - PAYMENT**

Comply with Section 00195 of the Standard Specifications modified as follows:

**00195.12(d) Steel Materials Pay Item Selection** - Add the following paragraph to the end of this subsection:

No Pay Items under this Contract qualify for the steel escalation/de-escalation program for this Project.

**00195.50(a) Progress Payments** - Replace the paragraph that begins "The estimates upon which progress payments are ..." with the following paragraph:

The estimates upon which progress payments are based are not represented to be accurate estimates. All estimated quantities are subject to correction in the final estimate. If the Contractor uses these estimates as a basis for making payments to Subcontractors and Suppliers, the Contractor assumes all risk and bears any losses that result.

**00195.80 Allowance for Materials Left on Hand** – Replace this subsection with the following subsection:

The Agency will not purchase materials left on hand. Contractor is responsible for removing and disposing of excess materials after Final Acceptance of the Project and prior to final payment.

### **SECTION 00196 - PAYMENT FOR EXTRA WORK**

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Comply with Section 00196 of the Standard Specifications.

### SECTION 00197 - PAYMENT FOR FORCE ACCOUNT WORK

Comply with Section 00197 of the Standard Specifications modified as follows:

**00197.40 Invoices for Special Services** – Add the following paragraph to the end of this subsection:

Additive or deductive change orders, initiated after start of construction, shall generally be bound in form and submittal to the following requirements:

- Breakdown, from the general and/or subcontractor and/or supplier, shall be provided to the City indicating deductive costs by item or scope for labor, materials, equipment, permits, fees, and bonds.
- Time logs shall indicate dates and times for work performed, and by whom; and labor costs provided shall be by man/by rate per prevailing wage certifications as submitted to Labor Department.
- Breakdown, from the general and/or subcontractor and/or supplier, shall be provided to the City indicating additive costs by item or scope for labor, materials, equipment, permits, fees and bonds.
- Change orders shall first indicate deductive costs then additive costs by item or scope in this sequence: labor, materials, equipment, overhead, and profit.

**00197.80 Percentage Allowances** – Replace the subsection with the following:

Mark-up for overhead, including permits and bonds, relative to direct or indirect additive costs by General Contractor or subcontractor shall not exceed the ten (10) percent of the additive work.

Profit relative to direct or indirect additive costs by General Contractor or subcontractor shall not exceed five (5) percent of the additive work.

These allowances made to the Contractor or subcontractor will constitute complete compensation for overhead, general and administrative expense, profit, and all other Force Account Work costs that were incurred by the Contractor, or by other forces that the Contractor furnished. No other reimbursement, compensation, or payment will be made.

### SECTION 00199 - DISAGREEMENTS, PROTESTS, AND CLAIMS

Comply with Section 00199 of the Standard Specifications modified as follows:

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**00199.40(c) Step 2: Agency Level Review** - Replace the paragraph that begins "If the Contractor does not accept the Step 2 ..." with the following paragraph:

If the Contractor does not accept the Step 2 decision, the Contractor may, within 10 Calendar Days of receipt of the written decision, request in writing through the Engineer that the claim be advanced to Step 3 or 4 (see (d) and (e) below), as applicable. For purposes of determining which process to use for claims under Step 3 or 4 concerning a combination of additional compensation and Contract Time or for Contract Time only, the value of the claim or portion of the claim for Contract Time will be assumed to be the appropriate Liquidated Damages as provided in 00180.85 multiplied by the number of Calendar Days in question. If applicable, advancement of the claim is subject to the provisions of 00199.60 regarding waiver and dismissal of the claim or portions of the claim.

### **SECTION 00210 - MOBILIZATION**

Comply with Section 00210 of the Standard Specifications and Section 0130 of the City's Technical Specifications.

### **SECTION 00220 - ACCOMMODATIONS FOR PUBLIC TRAFFIC**

Comply with Section 00220 of the Standard Specifications modified as follows:

**00220.02(a) General Requirements** - Add the following bullets to the end of the bullet list:

- Before activating a modified traffic signal, revising lane usage, implementing new roadway geometry, or removing a "STOP" sign, protect traffic by installing "NEW TRAFFIC PATTERN AHEAD" (W23-2) signing according to 00222.40. Keep the signs in place for 30 Calendar Days after completing the modifications.
- Protect pedestrians in pole base excavation areas by placing approved covers over all pole base excavations. Place a minimum of two B(II)LR barricades adjacent to and on either side of the excavated area, facing pedestrian traffic, or place covers and barricades as directed.

**00220.02(b) Temporary Pedestrian Accessible Route Plan** - Add the following bullet to the end of the bullet list:

- For an active Work Area controlled at each end by flaggers and pilot car, provide transportation for pedestrians and bicyclists through the active Work Area according to Section 00223 and Section 00228.

**00220.40(e)(1) Closed Lanes** - Replace this subsection, except for the subsection number and title, with the following:

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One Traffic Lane may be closed on Strand Street (Cowlitz St to Plaza Square), 1<sup>st</sup> Street (Cowlitz St to St Helens St), and Cowlitz Street (1<sup>st</sup> St to Strand St) when allowed, shown, or directed during the following periods of time except as specified in 00220.40(e)(2) or without written City permission from the City Engineer, except as shown on the plans:

- Daily, between 8:00 a.m. and 4:00 p.m.

Limit lane closures to one street at a time and on side streets intersecting 1<sup>st</sup> Street and Strand Street to one roadway at a time.

When parking is allowed along Strand Street and 1<sup>st</sup> Street west of Cowlitz Street, maintain a safe turn around and two-way traffic flow.

**00220.40(e)(2)(b) Special Events** - Add the following to the end of this subsection:

The following special events will occur during this Project:

- 13 Nights on the River at Columbia River Park, June – August, every Thursday evening
- 4th of July celebration, downtown area, July 1-4, 2022; 2023 dates (TBD); 2024 dates (TBD)
- Spirit of Halloweentown, downtown area, September 12 – November 4, 2022; 2023 dates (TBD); 2024 dates (TBD)
- Christmas Ships, downtown area, Saturday, December 10, 2022; 2023 dates (TBD); 2024 dates (TBD)

## SECTION 00221 - COMMON PROVISIONS FOR WORK ZONE TRAFFIC CONTROL

Comply with Section 00221 of the Standard Specifications modified as follows:

**00221.03 Traffic Safety and Operations** - Replace the bullet that begins “When paving operations create...” with the following bullet:

- When paving operations create an abrupt or sloped edge drop off greater than 1 inch, protect traffic by installing signing according to the "2 Lane, 2 Way Roadway Overlay Area" detail shown on the Standard Drawings. Protect longitudinal and transverse Pavement joints by placing and maintaining an asphalt concrete wedge according to 00221.07(c)(1).

**00221.06(d) Notification of Lane or Road Closures** – Add the following subsection:

The Contractor shall publish notification of lane or road closures in The Chronicle newspaper. The Chronicle newspaper is only published on Wednesdays.

Notification must be submitted to The Chronicle via fax, 503-397-4093, or email, [classified@thechronicleonline.com](mailto:classified@thechronicleonline.com), by 5 pm the Friday prior to publication. Contractor must supply The Chronicle with contact name and number, billing address, and duration of notification publication.



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The Contractor shall notify residents and businesses within an affected section of road by door hanger of road closures stating the date(s) of closure, limits of street closure, hours of construction, and detours. The door hangers shall be delivered no later than 24 hours prior to a lane closure. Prior to dissemination the Engineer shall approve the door hanger and present a copy to the City Engineer. For planning, a road is considered closed if nonemergency vehicles are delayed or delays are expected to be more than 5 minutes.

Contractor shall be responsible for informing the appropriate agencies operating within the area of the work of obstructions to either public or private roads caused by reason of Contractor's operations.

The Contractor shall notify the following agencies of lane or street closures:

Agency	Address	Phone Number
Emergency Services (911)	McNulty Way	503.397.7255
Durham School Services	540 Milton Way	503.397.9072
Fire Department	270 Columbia Blvd.	503.397.2990
Police Department	150 S. 13th St	503.397.3333
Columbia County Sheriff	901 Port Avenue	503.366.4611
Oregon State Police	35851 Industrial Way, Suite A	503.397.0325
St. Helens School District	474 N. 16th St	503.397.3085
Columbia County Education Service District	800 Port Avenue	503.397-0028 / 503.366.4100
St. Helens Post Office	1571 Columbia Boulevard	503.397.2613
Hudson Garbage Service	2115 Gable Rd	503.397.1534 / 800.422.9998
Columbia County Rider	1155 Deer Island Rd	503.366.8503 / 503.366.0159

All agencies listed, and any other potentially affected businesses or agencies, must be contacted at least one full week before construction is to begin. Calling the agency or business is recommended but does not substitute for personal notification. Door hangers for residences in the vicinity are also required. Minimum elements to be included in the notification include, but are not limited to:

- Map of construction area
- Approximate start and completion dates
- Hours of construction activities (8:00 am to 5:00 pm Mon-Fri if working in City limits)
- Alternate traffic route, if applicable
- Contractor's contact person's name and number

**00221.07(c)(1) Paving** - Replace this subsection, except subsection number and title, with the following:

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When the longitudinal joint is greater than 1 inch in height, install additional TCD according to 00221.03. Complete the placing of ACP and construction of paving joints according to 00735.48, 00735.49, 00743.45, 00744.44, 00744.45, 00745.47, and 00745.48, as applicable.

**00221.90(b) Temporary Protection and Direction of Traffic** - Delete the bullet that begins "Moving temporary barrier to and from Contractor's stockpile areas".

**00221.98 Payment, Method "B"** - Replace the second paragraph with the following:

Payment for furnishing and installing temporary work zone traffic control will be made as percentage complete of contract per construction phase and shall include full compensation for furnishing, installing, moving, operating, maintaining, inspecting, and removing traffic control devices throughout the project area according to the standard drawings, the traffic control plan (TCP) for the Project or as directed, and includes all labor, materials, tools, equipment, incidentals, and for performing all work involved in preparing and submitting traffic control plans, providing, placing, maintaining, and removal of traffic control signs and safety equipment, providing, placing, maintaining, and removal of temporary routing of sidewalks impacted by the Work, temporary relocation of existing regulatory signs, changeable message boards, project and public notification signs, flagging, transportation of flaggers and equipment, coordination efforts, and any other items necessary for vehicle and pedestrian traffic control per the Manual on Uniform Traffic Control Devices, and as specified in these Contract Documents, and no additional allowance will be made.

### SECTION 00222 – TEMPORARY TRAFFIC CONTROL SIGNS

Comply with Section 00222 of the Standard Specifications modified as follows:

**00222.40(e) Temporary Sign Placement** - Add the following to the end of the bullet list:

- Place a "WAIT FOR FLAGGER" (CR4-23) sign approximately 50 feet in advance of each flagger station, facing incoming pedestrian traffic. Install the sign on a conical marker or other temporary sign support, as shown or as directed. Do not allow the sign installation height or location to block the visibility of the flagger for incoming public traffic.
- At least ten Calendar Days before closing a pedestrian pathway or sidewalk, place a "SIDEWALK CLOSED, Full Time" (CW11-4) sign in advance of each future closure point. Locate the sign so it is legible from the nearest alternate pedestrian pathway facing incoming pedestrian traffic. The sign may be mounted between the panels of a Type II barricade or on a single-post TSS. Do not place the sign or sign support such that it narrows the pedestrian pathway to a width of less than 4 feet.
- Before opening the TPAR, place TPAR signing and other TCM as shown, or as directed. Maintain the "SIDEWALK CLOSED, Full Time" (CW11-4) signs while the TPAR is open to pedestrian traffic.

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- At least ten Calendar Days prior to the start of work, place a "SIDEWALK OPEN" (CW11-3) sign in advance of each end of the Work Area. Locate the sign so it is legible from the nearest alternate pedestrian pathway facing incoming pedestrian traffic. The sign may be mounted between the panels of a Type II barricade, or on a single-post TSS. Do not place the sign or support such that it narrows the pedestrian pathway to a width less than 4 feet.
- Before starting work, place pedestrian-specific TCM as shown in the TCP, or as directed. Maintain "SIDEWALK OPEN" (CW11-3) signs while work is affecting the pedestrian pathway.
- Place a "PEDESTRIANS ON ROADWAY" (CW11-2) sign at the beginning of each end of the Work Area, facing incoming traffic as shown, or as directed.
- Install "ROAD WORK AHEAD" (W20-1-48) signs with a 36 by 24-inch "FINES DOUBLE" (R2-6aP) rider on each roadway approach entering the work zone, including but not limited to 1<sup>st</sup> Street, Cowlitz Street, and Strand Street, according to the "TCD Spacing Table" shown on the Standard Drawings or as modified by the Plans except do not install the "FINES DOUBLE" rider on concrete barrier mounted signs.
- Install beyond each end of the Project, facing outgoing traffic, an "END ROAD WORK" (CG20-2A-24) sign a distance of  $(A \div 2)$  according to the "TCD Spacing Table" shown on the Standard Drawings or as modified by the Plans.
- Install two sign flag boards, as shown on the Standard Drawings, above the following detour and road closed advance warning signs, where applicable:
  - "DETOUR AHEAD", "DETOUR XXXX FT", "DETOUR X/X MILE" (W20-2) signs.
  - "ROAD CLOSED AHEAD", "ROAD CLOSED XXXX FT", "ROAD CLOSED X/X MILE" (W20-3) signs.
- Install the following warning signs for each new "STOP" sign installed in the intersection. Install a "Stop Ahead" (W3-1) symbol sign approximately 100 feet in advance of the "STOP" sign. Install a "NEW TRAFFIC PATTERN AHEAD" (W23-2) sign approximately 100 feet in advance of the "Stop Ahead" sign. Keep the "NEW TRAFFIC PATTERN AHEAD" signs in place 30 Calendar Days after installing the "STOP" sign.
- Install a "NEW TRAFFIC PATTERN AHEAD" (W23-2) sign approximately 100 feet in advance of Plaza Square, facing southbound incoming traffic.
- Keep the "NEW TRAFFIC PATTERN AHEAD" signs in place 30 Calendar Days after installing the ONE WAY.
- Install an 18 by 24-inch "NO PARKING" (R8-3a) sign in every block where on-street parking is prohibited, facing incoming traffic.

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- For paving operations on non-freeways, place “ABRUPT EDGE” (CW21-9) and “ROAD WORK XX MPH” (CW20-1a) signs as shown. Use an “XX” value equal to 10 mph below the current posted regulatory speed. If a speed is posted for a temporary regulatory speed reduction, that speed is the current posted regulatory speed.
- For all other moving operations that do not create an abrupt edge adjacent to traffic, omit the “ABRUPT EDGE” signs.
- When construction requires bicycles to use the Traffic Lanes, install a "Bicycle ON ROADWAY" (CW11-1) symbol sign on 1/2 mile spacing through the affected area. Keep the signs in place until completion of the Shoulder or bikeway final surface.

### **SECTION 00223 - WORK ZONE TRAFFIC CONTROL LABOR AND VEHICLES**

Comply with Section 00223 of the Standard Specifications modified as follows:

**00223.31(b) Traffic Control Inspection Without TCS** - Replace the bullet that begins “Prepares and signs a daily “Traffic Control Inspection Report”...” with the following bullet:

- Prepares and signs a “Traffic Control Inspection Report” (Form No. 734-2474) upon the initial installation of TCM and each working day when any modification, removal, or reinstallation of TCM are made, or as directed by the Engineer. Submit completed reports to the Engineer no later than the end of the next working day.

### **SECTION 00224 - TEMPORARY TRAFFIC CHANNELIZING DEVICES**

Comply with Section 00224 of the Standard Specifications modified as follows:

**00224.46 Pavement Edge Delineation** - Replace the paragraph that begins “Place tubular or conical markers...” with the following paragraph:

Place tubular or conical markers to delineate the edge of Pavement immediately after construction Work or paving operations create an abrupt or sloped edge drop-off greater than 1 inch in height along the right hand or left hand Shoulder.

### **SECTION 00225 - TEMPORARY PAVEMENT MARKINGS**

Comply with Section 00225 of the Standard Specifications modified as follows:

**00225.42(b) Wearing Course** - Replace the bullet that begins “For left hand solid lines...” with the following bullet:

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- For left hand solid lines and skip lines striping, use temporary removable tape or pavement markers.

### SECTION 00228 - TEMPORARY PEDESTRIAN AND BICYCLIST ROUTING

Comply with Section 00228 of the Standard Specifications modified as follows:

**00228.00 Scope** - Replace this subsection, except subsection number and title, with the following:

In addition to the requirements of Section 00221, this Work consists of furnishing, installing, operating, maintaining, inspecting, and removing temporary devices for accommodating pedestrians and bicyclists through a work zone.

**00228.13 Temporary Curb Ramps** - Add the following sentence to the end of this subsection:

Furnish truncated dome detectable warning surface for temporary curb ramps from the QPL according to 00759.12.

**00228.43 Temporary Curb Ramps** - Add the following paragraph to the end of this subsection:

Install a minimum 2 foot wide truncated dome detectable warning surface on temporary curb ramps at pedestrian street crossings. Omit truncated dome detectable warning surfaces on temporary curb ramps that are not at a pedestrian street crossing.

**00228.80(a) Length Basis** - Replace this subsection, except subsection number and title, with the following:

Pedestrian channelizing devices and bicycle channelizing devices will be measured on the length basis upon delivery to the Project. The quantities will be limited to those in the approved TCP.

**00228.90 Payment** - Add the following paragraph after the paragraph that begins "In item (c), the type...":

Item (c) includes furnishing and installing truncated dome detectable warning surfaces.

### SECTION 00280 - EROSION AND SEDIMENT CONTROL

Comply with Section 00280 of the Standard Specifications modified as follows:

**00280.00 Scope** - Add the following paragraph to the end of this subsection:

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The Agency’s NPDES 1200-CA Permit is applicable to the Project.

**00280.02 Definitions** – Add the following definition:

**Dry Weather Work** – Dry weather work is work that is to be conducted during a period of time where the local National Oceanic and Atmospheric Administration (NOAA) weather forecasting station shows no greater than 10% chance of precipitation in the specified time period. The local weather forecasting station shall be Woodland (TPARA), Latitude 45.86N 122.8W.

Add the following item:

**00280.16(l) Orange Construction Fencing** – Furnish orange construction fencing from the QPL meeting the requirements for work zone delineation fencing.

**00280.41 Work Restrictions** - Add the following to the end of this subsection:

**(e) Dry Weather Work** – Ground-disturbing activities in areas requiring Dry Weather Work shall not commence unless the local weather forecast shows no greater than 10% chance of precipitation in the next seven (7) days. During Dry Weather Work, the local weather forecast shall be checked daily using the local weather forecasting station defined for Dry Weather Work. If ground disturbing activities have commenced and the weather forecast shows a greater than 10% chance of precipitation in the next three (3) days, then work in the designated area must be stopped, and ground-stabilizing measures must immediately be put in place. Ground-disturbing activities may only recommence once precipitation has ceased and the local weather forecast shows no greater than 10% chance of precipitation in the next seven (7) days.

**00280.46(j) Orange Construction Fencing** – Install orange construction fencing as shown or as directed.

**00280.48 Emergency Materials** - Add the following paragraphs after the paragraph that begins "Provide, stockpile, and protect...":

Provide and stockpile the following emergency materials on the Project site:

<b>Item</b>	<b>Quantity</b>
Plastic Sheeting .....	500 Square Yard
Temporary Mulching, Straw .....	0.3 Acre

**00280.62 Inspection and Monitoring** - Replace this subsection, except for the subsection number and title, with the following:

Inspect the Project Site and all ESC devices for potential erosion or sediment movement on a weekly basis and when 0.10 inch or more of rainfall occurs within a 24-hour period, including weekends and holidays.

If a significant noncompliance or serious water quality issue occurs that could endanger health or the environment, verbally report it to the Engineer within 24 hours.

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**00280.90 Payment** - In the paragraph that begins "Item (a) includes..." delete the bullet that specifies "providing the Erosion and Sediment Control Manager". Add the following bullets, "Developing a dust control plan," and, "furnishing and applying water for dust control activities."

Replace the paragraph that begins "When only Item (a) is..." with the following paragraph:

Additional ESC devices required for permit compliance will be paid for as Extra Work according to Section 00196.

**00280.91 Payment** – Add the following pay item:

- (p) Orange Construction Fencing .....Foot

### SECTION 00290 - ENVIRONMENTAL PROTECTION

Comply with Section 00290 of the Standard Specifications modified as follows:

**00290.20(c)(2) Clean Fill** - Add the following paragraph to the end of this subsection:

Manage all excavated soil that does not meet the definition of clean fill according to Section 00294.

Add the following subsection:

**00290.30(a)(7) Water Quality:**

- Do not discharge contaminated or sediment-laden water, including drilling fluids and waste, or water contained within a work area isolation, directly into any waters of the State or U.S. until it has been satisfactorily treated (using a best management practice such as a filter, settlement pond, bio-bag, dirt-bag, or pumping to a vegetated upland location).
- Do not use permanent stormwater quality treatment facilities to treat construction runoff unless prescribed by an ESCP approved under Section 00280.
- If construction discharge water is released using an outfall or diffuser port, do not exceed velocities more than 4 feet per second, and do not exceed an aperture size of 1 inch.
- Do not use explosives under water.
- Implement containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, fuel or petroleum products, concrete cure water, silt, welding slag and grindings, concrete saw cutting by-products and sandblasting abrasives, from entering waters of the State or U.S.
- Implement containment measures adequate to prevent flowing stream water from coming into contact with concrete or grout within the first 24 hours after placement.
- Do not end-dump riprap into the waters of the State or U.S. Place riprap from above the ordinary high water line.

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- Cease Project operations under high flow conditions that may result in inundation of the Project area, except for efforts to avoid or minimize resource damage.
- The Engineer retains the authority to temporarily halt or modify the Work in case of excessive turbidity or damage to natural resources.
- If Work activities violate permit conditions or any requirement of this subsection, stop all in-water work activities and notify the Engineer.
- Do not cause a visible sediment plume in waters of the State or U.S.

**00290.32 Noise Control** - Add the following paragraphs to the end of this subsection:

Review City of St. Helens Municipal Code Title 8 which describes noise control regulations. Comply with the applicable noise control requirements of the permit for Project Work.

Copies of the noise variance permit for this Project are available from the Engineer.

**00290.36(a) Migratory Birds** - Add the following to the end of this subsection:

Do not disturb migratory bird nesting habitat (shrubs, trees, and structures), or clear vegetation from March 1 to September 1 of each year without prior written approval from the Engineer. Notify the Engineer, in writing, a minimum of 10 calendar days prior to starting activities that could harm nesting birds.

Add the following subsection:

**00290.36(c) Wildlife Avoidance/Harassment (High Noise)** - For purposes of this project, "high noise" is defined as sound pressure levels greater than 10 dBA above the ambient as measured by the  $L_{AFmax}$  and  $L_{AFeq}$  at sensitive habitat as shown:

- Blasting and high-noise producing activities are allowed only between September 1 and October 31.

## SECTION 00293 – LIFT STATION DECOMMISSION

Section 00293, which is not a Standard Specification, is included in this Project by Special Provision.

### Description

**00293.00 Scope** - In addition to the requirements of Section 00290, decommission lift stations according to the following Specifications.

Decommission the following lift station listed in Table 00293-1:

**Table 00293-1**

Location/Station	Number of LS	LS contents	Decommission Method
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			<b>(Removal or In-place)</b>
34+60, 30RT	1	Removal of all Equipment, see decommissioning details in the Plans.	In-Place

**00293.02 Definitions:**

**Decommission by Filling In-Place** - Decommissioning lift stations by filling them in place with inert material.

**Decommission by Removal** - Decommissioning lift stations by removing them.

**Lift Station (LS)** – Lift Stations

**Construction**

**00293.40 Lift Station Demolition** - Demolish lift stations according to the following, unless specified in the plans:

- Gravity flow diversion shall be complete prior to demolition of pump stations
- Contractor to backfill lift station decommission location
- Cap all pipes coming into the lift station
- Coordinate with City operations staff to completely empty existing wet well/pumping tank of all fluids and solids. City will be responsible for vacuum pumping, hauling, and disposal of wastewater and solids. Contractor shall notify the City a minimum of 2 weeks prior to schedule the work. Fill the wet well, vaults, basins, or any remaining portions with granular material meeting the grading requirements of Class B material in accordance with 00405.14(a). Compact the material to 92% of maximum density according to AASHTO T99.
- Fill the valve vault in the same manner as the wet well described above.
- If present, remove any above ground fixtures such as vents, lids, etc.
- Remove any remaining structures and appurtenances to a depth of 2 feet below existing ground surface and backfill in the same manner as described for the wet well above.
- Perforate the bottom of the existing vault to allow groundwater drainage.
- Demolish concrete pavement and restore site surface with gravel.

**Measurement**

**00293.80 Measurement** - The quantities of Work performed under this Section will be measured on the lump sum basis.

Excavating, transporting, and disposing of contaminated media will be considered incidental to this Work.

**Payment**

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**00293.90 Payment** - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following item:

<b>Pay Item</b>	<b>Unit of Measurement</b>
(a) Decommission Lift Station .....	Lump Sum

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified. Decommission lift station shall include all work described in the plans.

**SECTION 00294 - CONTAMINATED MEDIA**

Section 00294, which is not a Standard Specification, is included in this Project by Special Provision.

**Description**

**00294.00 Scope** - In addition to the requirements of Section 00290 and the Specifications, this Work consists of the following:

- Excavate, segregate, stockpile, transport, and dispose of Contaminated Soils, as defined by Section 00294.01, throughout the Project.
- In areas where excavation is not required, leave contaminated material and clearing and grubbing material in place.
- Pump, test, treat, and dispose of contaminated groundwater from the following locations in Table 00294-2:

**Table 00294-2**

<b>Location/Station</b>	<b>Depth below grade (feet)</b>	<b>Known Contaminants</b>
1 <sup>st</sup> Street: Sta 18+00 through 25+00	3.5 to >16.5	Petroleum, metals, PAHs, VOCs

- Prepare a Health and Safety Plan (HASP) for work within the contaminated areas of the Project.

The January 7, 2022 NV5 report, titled Soil Characterization Investigation documenting the contaminated media identified within the Project, is available from the Engineer.

- Prepare a written lead compliance plan for work within contaminated areas of the Project.

**00294.01 Definitions:**

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**Contaminated Soil** - Soil that does not meet the DEQ definition of "Clean Fill", as defined by OAR 340-093-0030(18). This Contaminated Soil is a regulated waste, subject to OAR 340-093-0005 through OAR 340-093-0290. If the grubbing material has been determined to be contaminated, it will be considered and treated as Contaminated Soil for the purposes of this Section.

**Shoulder Soil** - Soil outside of the existing Highway Pavement and within Highway Right-of-Way generated during Highway maintenance or construction activities. This definition applies to excess Soil generated to a maximum depth of 1.5 feet below ground surface. This definition does not apply to Soil that is covered by existing impervious surfaces, including but not limited to curbs, sidewalks and parking lots constructed of asphalt or concrete.

**ODOT Beneficial Use Determination (ODOT BUD)** - The statewide ODOT Beneficial Use Determination (ODOT BUD), approved by DEQ (No. BUD-20181204), outlines a series of pre-approved non-residential reuse options for excess Soil materials that do not meet DEQ's Clean Fill Standards in some circumstances. These options may vary based on project scope and location, and documentation may vary, as directed by the Engineer.

**00294.02 Testing of Contaminated Soil and Groundwater** - When additional testing of Contaminated Soil or groundwater is required to characterize the material for reuse, recycle, or disposal, conduct the tests according to the Oregon Department of Environmental Quality (DEQ)-approved Contaminated Media Management Plan (CMMP) for the Boise Cascade Veneer Plant dated June 18, 2015, prepared by Maul Foster Alongi, which is available from the Engineer.

Contaminated Soil and groundwater sampling must be overseen by an Oregon Registered Geologist or Professional Engineer who has experience characterizing contaminated media.

In accordance with the CMMP, collect at least one 5-point composite Soil sample per 100 cubic yards of soil and submit for the following required testing:

- TPH-Gx and TPH-Dx by Northwest methods.
- Polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270SIM.
- Polychlorinated biphenyls (PCBs) by EPA Method 8082.
- Total metals (RCRA 8) by EPA 6000 and 7000 series.
- One TCLP lead by using EPA Method 1311.

**00294.03 Submittals** - Submit the following documents:

- A Project-specific written lead compliance plan, meeting the project applicable requirements of 29 CFR 1926.62(e)(2), at least 10 Calendar Days before the pre-construction conference. When applicable, include compliance procedures for cadmium and chromium VI, according to 29 CFR 1926.1127 and 29 CFR 1926.1126.
- Modifications to the written lead compliance plan that are requested by the Engineer within 7 Calendar Days of the request.
- The site-specific HASP, completed and signed by a qualified health and safety professional meeting the requirements of Section 00294.30.

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- The name and qualifications of the qualified health and safety professional.

Submit all modifications to the HASP that are requested by the Engineer or the qualified health and safety professional within 7 Calendar Days of the request.

- Current employee training certificates and medical surveillance information before beginning Work within the contaminated areas.

Submit the following documents within 48 hours of removal of contaminated media:

- Permits, permit applications, and documentation of compliance.
- All reuse, recycled, and disposal receipts.
- Final quantities of Soil and groundwater reused, recycled, and disposed and their final location.
- All analytical test results.

**00294.05 Health and Safety Plan** - Prepare a site specific HASP that meets or exceeds the requirements of 29 CFR 1910.120 and include a personnel and equipment decontamination plan that details how decontamination media will be contained and disposed.

Maintain a copy of the HASP on site at all times and readily available to employees and inspectors during construction activities. If additional information becomes available regarding the site specific conditions, revise the HASP and submit the revised version to the Engineer. Review or acknowledgment of the HASP by the Engineer is not an indication or representation that the HASP is fully compliant with State or federal requirements. Compliance is the responsibility of the Contractor. Review by the Engineer will not impose liability upon the Agency or relieve the Contractor of any responsibilities under the Contract.

Do not begin Work in contaminated areas until the Engineer provides written acknowledgement of the HASP.

All personnel entering contaminated areas shall follow the requirements of the HASP.

### Labor

**00294.30 Personnel Qualifications** - Provide employees meeting the following requirements when working in Restricted Areas as shown in the CMMP:

- Hazardous Waste Operations and Emergency Response (HAZWOPER) trained workers (29 CFR 1910.120) that:
  - Have completed a 40 hour HAZWOPER training course.
  - Have completed an 8 hour HAZWOPER refresher training course within the last 12 months.
  - Participates in the HAZWOPER Medical Surveillance Program.
- A Supervisor that:
  - Meets the HAZWOPER training requirements.

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Outside of the Restricted Areas as shown in the CMMP, provide employees meeting the following requirements:

- A Supervisor that:
  - Has completed a 40 hour HAZWOPER training course.
  - Has completed an 8 hour HAZWOPER refresher training course within the last 12 months.

### **Construction**

**00294.40 Contaminated Soil Excavation** - Excavate and handle Contaminated Soil from Project excavations according to the following:

- Notify the Engineer 3 Calendar Days before beginning excavation activities within contaminated areas.
- Allow the Engineer access to field screen Soils for contaminants during excavation.
- Segregate non-Contaminated Soil from Contaminated Soil during excavation activities, as directed.
- Load Contaminated Soil directly into trucks and transport directly to the recycling or disposal facility, or on-site reuse areas or, when approved by the Engineer, temporarily store Contaminated Soil on-site.
- Store Contaminated Soil that cannot be directly loaded for disposal as specified in the CMMP.
- Remove contaminated media from the exterior of all vehicles before they leave the Project Site
- Cover trucks transporting contaminated materials to prevent spillage during transit to the disposal facility according to OAR 340-093-0220.
- Where over excavation is required, backfill the excavation according to Section 00330.42.

**00294.41 Contaminated Soil Management** - Reuse, recycle, or dispose of Contaminated Soil according to any of the following:

#### **(a) Landfill Disposal:**

- Obtain the Engineer's approval of the disposal facility before disposing of the Contaminated Soil.
- Transport the Contaminated Soil to a DEQ permitted municipal solid waste landfill or a permitted construction and demolition landfill for disposal. Dispose of temporarily stored Contaminated Soils within 30 Days of beginning excavation work or before Second Notification, whichever occurs first.
- Complete and sign all manifests and bill-of-lading forms for handling, loading, transporting, and disposing of the Contaminated Soil.
- Pay all filing and permit fees.

#### **(b) Recycling:**

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- Obtain the Engineer's approval of the recycling facility before disposing of the Contaminated Soil.
- Transport Contaminated Soil to a DEQ permitted recycling facility or asphalt batch plant. Recycle temporarily stored Contaminated Soils within 30 days of beginning excavation or before Second Notification, whichever occurs first.
- Complete and sign all manifests and bill-of-Lading forms for handling, loading, transporting, and recycling the Contaminated Soil.

### **(c) Reuse On-Site Under a DEQ Solid Waste Letter of Authorization or Beneficial Use Determination:**

- If authorized by the Engineer, obtain a DEQ Solid Waste Letter of Authorization (SWLA) or Beneficial Use Determination (BUD) to reuse the Contaminated Soil either onsite or at an approved offsite location. Complete all submittals, including the land use compatibility statement (LUCS) from the local planning authority, and pay all fees required to obtain a SWLA or BUD. Sign the application form and provide the signed application form to the Engineer.
- Temporarily stockpile the Contaminated Soil referred to in the SWLA or BUD.
- Complete all reuse covered by the SWLA or BUD, before expiration of the SWLA or BUD. Transport all Contaminated Soil that is not reused within 30 Calendar Days of completing the Soil reuse work, or before Second Notification, whichever occurs first, to a DEQ permitted municipal solid waste landfill or other DEQ-approved facility.

### **00294.43 Contaminated Groundwater Pumping** - Remove and handle contaminated groundwater as follows:

- Allow the Engineer to collect groundwater samples during pumping activities and subsequent storage.
- Remove contaminated groundwater from the Project or, when approved temporarily store contaminated groundwater on-site in water tight containers compatible with the contaminants. Label each container with the contents and dates of accumulation.
- Dispose of stored contaminated groundwater within 30 Days from the date of beginning generation of it or before Second Notification, whichever occurs first, according to 00294.44.

### **00294.44 Contaminated Groundwater Management** - Recycle or dispose of contaminated groundwater according any of the following:

- **Discharge to a Permitted Sanitary Sewer Facility:**
  - Submit all groundwater analytical data and proposed treatment information to the local sewer authority, and obtain written permission or a permit to discharge the contaminated groundwater to the sanitary sewer system.
  - Complete and sign the sewer permit application as the applicant and pay all associated fees.

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- Comply with all permit requirements and all other local sewer authority requirements.
- **Discharge to Surface Water or Storm Sewer:**
  - Register for a general National Pollution Discharge Elimination System (NPDES) permit 1200C.
  - Complete and sign the NPDES permit application as the applicant and pay all associated fees.
  - Comply with all permit requirements.
- **Transport to an Off-Site Recycling or Disposal Facility:**
  - Submit all groundwater analytical data to the receiving facility and obtain written acceptance from that entity.
  - Complete and sign bill-of-lading forms and all other documentation required by the receiving facility.
  - Pay all permit fees.

### Measurement

**00294.80 Measurement** - Work performed under this Section will be measured according to the following:

No measurement of quantities will be made for the following:

- HASP.
- Lead compliance plan.
- Segregate and stockpile Contaminated Soil.
- Contaminated groundwater mobilization.

Soil sample and analytical testing will be measured on the unit basis for each sample submitted and tested according to Section 00294.02 when test results are submitted according to Section 00294.03.

The quantities of Contaminated Soil disposed will be measured on the weight basis, based on weigh tickets from the recycling or disposal facility.

The quantities of contaminated groundwater removed and disposed will be measured on the volume basis, per gallon, based on the receiving facility approved meter tickets or approved on-site meters.

Clearing and grubbing will be measured according to Section 00320.80.

### Payment

**00294.90 Payment** - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

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<b>Pay Item</b>	<b>Unit of Measurement</b>
(a) Health and Safety Plan .....	Lump Sum
(b) Lead Compliance Plan.....	Lump Sum
(c) Segregate and Stockpile Contaminated Soil .....	Lump Sum
(d) Soil Sample Collection and Analytical Testing .....	Each
(e) Contaminated Soil Disposal.....	Ton
(f) Contaminated Groundwater Mobilization .....	Lump Sum
(g) Contaminated Groundwater Removal.....	Gallon

Item (c) includes segregating, handling, and stockpiling Contaminated Soil within the Project Site for the purpose of analytical testing, on-site reuse, or disposal.

Item (d) includes mobilization, Soil sampling, testing, analyses, and preparation of reports for tests required in 00294.02. Additional testing beyond that listed in Section 00294.02 will only be paid if authorized by the Engineer.

Item (e) includes all costs involved with the disposal of Contaminated Soil at a recycling or disposal facility.

Item (f) includes all mobilization costs for groundwater removal work.

Item (g) includes obtaining all permits and furnishing all Equipment and labor necessary to treat and store contaminated groundwater. The accepted quantity of Contaminated Groundwater Removal will be paid for at the Contract unit price, per unit of measurement, and shall not to exceed the bid item quantity for the Contract. If quantity approaches or exceeds bid item quantity, Contractor may renegotiate unit price with Engineer.

No separate or additional payment will be made for the excavation or reuse of Contaminated Soil. Payment will be included in payment made for the appropriate items under which the excavation or reuse of Contaminated Soils is required.

Clearing and grubbing will be paid for according to Section 00320.90.

Payment will be payment in full for removing and disposing of all Materials, and for furnishing all Equipment, labor, Plans, test results, and Incidentals necessary to complete the Work as specified.

### **SECTION 00305 - CONSTRUCTION SURVEY WORK**

Comply with Section 00305 of the Standard Specifications.

### **SECTION 00310 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Comply with Section 00310 of the Standard Specifications modified as follows:



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**00310.90 Payment** - Add the following to the end of this subsection:

No separate or additional payment will be made for removal or disposal Work included in Section 00330 according to 00310.02.

**00310.92 Separate Item Basis** - Add the following pay items:

- (q) Removal of Fences .....FT
- (r) Removal of Concrete Planters.....Lump Sum
- (s) Removal of WWTP Junction Structure Slidegate.....Lump Sum

### SECTION 00320 - CLEARING AND GRUBBING

Comply with Section 00320 of the Standard Specifications.

### SECTION 00330 - EARTHWORK

Comply with Section 00330 of the Standard Specifications modified as follows:

**00330.03 Basis of Performance** - Add the following paragraph to the end of this subsection:

Perform all earthwork under this Section on the excavation basis.

**00330.14 Selected Granular Backfill** - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

**00330.15 Selected Stone Backfill** - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

**00330.41(a)(4) Excess Materials** - Replace this subsection, except for the subsection number and title, with the following:

If the quantities of excavated materials are greater than required to construct embankments and to do all filling and backfilling, the Contractor may use the remaining materials to uniformly widen embankments or to flatten slopes in a manner satisfactory to the Engineer.

**00330.41(a)(5) Waste Materials** - Replace this subsection, except for the subsection number and title, with the following:

Dispose of waste materials according to Section 00236.

**00330.92 Kinds of Incidental Earthwork** - Add the following bullets to the end of the bullet list:

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- Excess material used to widen embankments or flatten slopes according to 00330.41(a)(4).
- Earthwork required for driveways and road approaches. Earthwork for driveways and road approaches will be that which is outside the Neat Line limits shown on the typical sections.

### **SECTION 00335 - BLASTING METHODS AND PROTECTION OF EXCAVATION BACKSLOPES**

Comply with and Section 0320 of the City's Technical Specifications and Section 00335 of the Standard Specifications modified as follows:

**00335.40(h) Blasting Report** - Add the following to the end of the bullet that begins "A copy of the color video recording..."

Use a free standing recording device that is not a cell phone or similar device, as approved by the Engineer. Submit the type of recording device to be used at least 7 Calendar Days before the blast.

### **SECTION 00350 - GEOSYNTHETIC INSTALLATION**

Comply with Section 00350 of the Standard Specifications modified as follows:

**00350.01 Definitions** - Add the following to the end of this subsection:

**Geomembrane** – A very low-permeability synthetic membrane liner to control fluid migration or containment of waste materials.

**Impermeable Liner** – For installation as a liner in a swale to prevent migration of water from one soil or material to another.

**00350.10 Materials** - Add the following to the end of this subsection:

Impermeable Liner material shall be 30 mil High Density Polyethylene (HDPE) geomembrane or plastic sheeting, textured on both sides or approved equal. An experienced firm regularly engaged in manufacturing textured HDPE shall manufacture the geomembrane.

**00350.41 Geotextile Installation Requirements** – Add the following to the end of this subsection:

**(g) Impermeable Liner Deployment:**

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- (1) Preparation** – Prior to installing the liner, inspect the subgrade, remove all foreign matter and sharp, protruding or loose material that could penetrate or otherwise damage the liner, and compact the subgrade to the specifications.
- (2) Inspection** – During installation, visually inspect the liner for imperfections, defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Mark and repair faulty or suspect areas.
- (3) Cuts and Welds** – Perform all cuts, welds and penetrations per manufacturer’s specifications. Shingled overlaps shall be a minimum of 3-feet in the downslope direction.
- (4) Cover** – Cover fill material shall be free of foreign objects or sharp material that could penetrate or otherwise damage the geomembrane. Place and spread over the liner in a manner that prevents punctures or other damage to the liner.

**00350.90 Payment** – Add the following pay item to this subsection:

(g) Impermeable Liner .....Square Yard

**SECTION 00390 - RIPRAP PROTECTION**

Comply with Section 00390 of the Standard Specifications.

**SECTION 00405 - TRENCH EXCAVATION, BEDDING, AND BACKFILL**

Comply with Section 00405 of the Standard Specifications and Section 0320 of the City’s Technical Specifications.

**SECTION 00415 - VIDEO PIPE INSPECTION**

Comply with Section 00415 of the Standard Specifications modified as follows:

**00415.42(a) Remote Video Inspection with Laser Profiler** - Replace the paragraph that begins "Use video inspection equipment meeting..." with the following paragraph:

Use video inspection equipment meeting the requirements of 00415.22. Calibrate the laser profiler according to the manufacturer’s specifications and ASTM F3080 Section 9.

**SECTION 00440 - COMMERCIAL GRADE CONCRETE**

Comply with Section 00440 of the Standard Specifications.

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**00440.12 Properties of Commercial Grade Concrete** - Replace the bullet that begins "Slump - 5 inches..." with the following bullets:

- **Slump** - 5 inches or less
  - For concrete sidewalks, ramps, driveways, or other hand finished surface applications, and when using a high range water reducing admixture, provide a slump of 8 inches or less as approved by the Engineer.
- **Compressive Strength** – ASTV minimum of 3,000 psi at 28 days
  - For concrete curbs, sidewalks, ramps, driveways, or other hand finished surface applications, and when using a high range water reducing admixture, provide a compressive strength of 3,300 psi at 28 days or as approved by the Engineer.

**00440.13 Field-Mixed Concrete** - Replace the subsection, except for subsection number and title, with the following:

CGC Work items listed in 00440.14(a) may be field-mixed conventionally, or by volumetric/mobile mixers conforming to ASTM C685. When approved, concrete sidewalks, concrete curb ramps, concrete driveways, and other flat concrete surfaces may be field-mixed using volumetric/mobile mixers conforming to ASTM C685, request approval prior to placement. For all other CGC applications, submit written request to the Engineer for approval to use volumetric/mobile mixers conforming to ASTM C685 at least 21 Days prior to placement.

Pre-packaged dry blended concrete from the QPL may be used for Work items listed in 00440.14(a).

**00440.40(b) Placing** - Add the following bullet to the end of the bullet list:

- When haul time or placement conditions warrant exceeding the time of discharge, submit a detailed breakdown of the estimated time needed from batching to discharge of a load along with the measures that will be taken to ensure slump, temperature and uniformity will be maintained. Submit in advance to establish a new time limit at the Engineer's discretion.

### **SECTION 00442 - CONTROLLED LOW STRENGTH MATERIALS**

Comply with Section 00442 of the Standard Specifications.

### **SECTION 00445 - SANITARY, STORM, CULVERT, SIPHON, AND IRRIGATION PIPE**

Comply with Section 00445 of the Standard Specifications modified as follows:

**00445.11 (h) Conduit Pipe, 2-inch and 3-inch** – Use polyvinyl chloride pipe per Section 2415.50.

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**00445.40(d) Laying Pipe on Curves** - Replace this subsection, except for the subsection number and title, with the following:

Lay pipe on horizontal or vertical curves as shown or approved. When deflecting the pipe from a straight line, either in the vertical or horizontal plane, or when long radius curves are shown, the amount of deflection allowed shall not exceed 50% of the manufacturer's recommendation.

**00445.72(b) Hydrostatic Testing** – Add the following to the end of this section:

All force mains shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 psi, whichever is greater. Loss of water pressure during test shall not exceed 5 psi in a 2-hour period. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 1500 feet.

Conduct the tests after the trench has been backfilled or partially backfilled. Where any section of pipe is provided with concrete reaction blocking, do not make the pressure tests until at least five days have elapsed after the concrete thrust blocking is installed. If high-early cement is used for the concrete thrust blocking, the time may be cut by two days or as permitted by the engineer.

**00445.73 Deflection Testing for Flexible Pipe** – Replace the last sentence in the first paragraph in this section with the following:

The diameter of the mandrel shall be 95 percent of the nominal pipe diameter. The mandrel shall be a rigid, nonadjustable, odd numbering leg (nine legs minimum) mandrel having an effective length of not less than its nominal diameter.

Replace the first sentence in the second paragraph with the following sentence:

Conduct testing on a manhole-to-manhole basis after the line has been completely balled and flushed out with water.

**00445.91 Payment** – Add the following pay items:

- (5) 2-inch Conduit.....LF
- (6) 3-inch Conduit.....LF

**SECTION 00470 - MANHOLES, CATCH BASINS, AND INLETS**

Comply with Section 00470 of the Standard Specifications modified as follows:

**00470.18 Precast Concrete Vaults** – All precast concrete vaults and related structures shall be furnished according to Oldcastle manufacturing details shown in plans. Structure types include the following:

- 575-CRPUD UV Switching Vault

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- Concrete Hand Hole
- 575-PGE Vault
- Parallel Transformer Vault (UV Trans Apara)
- Padmounts-PGE

**00470.40(b) Pipe Connections** – replace this subsection with the following:

Place connecting pipe at the required alignment and grade. Set the connecting pipe through the full thickness of the wall flush with the inner face of the wall. Ensure that pipe connections to the Structure are completely watertight. Connect all pipe to manholes according to the manufacturer’s recommendations.

Use rubber manhole gasket materials for concrete pipe connections to manholes so they are watertight, conforming to Section 02440.40(b). All rigid non-reinforced pipe entering or leaving manholes shall be provided with a flexible joint within 1-foot of the outside wall of the manhole structure and shall be placed on firmly compacted bedding.

Connect flexible pipe to manholes using an adapter specifically manufactured for the intended service. Flexible pipe adapters are required to be watertight after installation. Follow the manufacturer’s recommendations. Do not use field fabricated water stops, improvised adapters or adapters requiring the use of grout for installation.

Connect the proposed Force Main to existing structures using a Link Seal connection or approved equal.

**00470.41(c) Grates, Frames, Covers and Fittings** - Replace this subsection, except for the subsection number and title, with the following:

Set metal frames for manholes on full non-shrink grout beds to prevent infiltration of surface water or groundwater between the frame and the concrete of the manhole section. If concrete is to be poured around the frames, coat the portion of the frame that will contact the concrete with hot asphalt before placing the concrete. Set frames, covers and grates true to the locations and grades established. Clean bearing surfaces and provide uniform contact. The use of a bolt adjustment system for frames from the QPL is allowed. Secure all fastenings. Construct all mortared, sanitary sewer manhole necks and all riser ring joints made with non-shrink grout using an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted.

**00470.42 Precast Concrete Catch Basins and Inlets** - Add the following sentence to the end of this subsection:

Grade adjustments using a bolt system from the QPL is allowed.

**00470.49 Precast Concrete Vaults** – Install precast concrete vaults and related structures to the specified line and grade and according to manufacturer’s recommendations.

**00470.90 Payment** – Add the following pay items:

(l)	575-CRPUD Vaults (UV SWITCH 3P).....	Each
(m)	1730 Concrete Hand Hole.....	Each

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- (n) UV TRANS APARA (UT 1-PH BANK).....Each
- (o) 575-PGE VAULT (UT 2-PH BANK).....Each
- (p) PADMOUNT NO. 7272-1542-TRANSPAD PGE (UT 3-PH BANK).....Each

**SECTION 00490 - WORK ON EXISTING SEWERS AND STRUCTURES**

Comply with Section 00490 of the Standard Specifications.

**00490.43 Abandoning Pipe in Place** – Replace second paragraph with the following:  
Fill abandoned pipes greater than 6 inches in diameter with controlled low-strength material, meeting the requirements of Section 00442.

**00490.90 Payment** – Add the following pay items:

- (a) Filling Abandoned Pipe.....Foot

Replace the paragraph that begins, “Item (h)” with the following:

Item (h) applies to filling abandoned manholes, inlets, boxes and other similar Structures and includes all material and labor required to complete the work as specified.  
Item (j) applies to filling abandoned pipes and includes all material and labor required to complete the work as specified.

**SECTION 00495 - TRENCH RESURFACING**

Comply with Section 00495 of the Standard Specifications.

**SECTION 00596C - CAST-IN-PLACE CONCRETE RETAINING WALLS**

Comply with Section 00596C of the Standard Specifications modified as follows:

Add the following subsections:

**00596C.11 (C) Lightweight Backfill** – Provide one of the following options for lightweight backfill to be placed as indicated and to the limits shown on the project plans:

- Expanded Polystyrene Foam (EPS) meeting the requirements of ASTM D6817 (EPS 46 or 39)
- Tire Derived Aggregate (TDA) meeting the requirements of ASTM D6270, Type A

Install EPS with impervious barrier wrapping that fully encloses EPS blocks in a water tight condition according to manufacturer’s recommendation.

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**00596C.40 General** – add the following sentence to the end of this text:

Submittals are required. See Section 00596C.43(d), (e) and (f) for submittal information.

**00596C.43 Wall Construction** – add the following subsections:

**(g) Cast-in-place concrete retaining wall extension**

- Submit shop drawings of concrete caps for approval by Engineer prior to installation. Indicate layout, location quantities of concrete, reinforcing and lightweight backfill required as indicated on the contract plans.

**00596C.80 Measurement** - Add the following to the end of this subsection:

The estimated quantities of retaining walls are:

<b>Station Limits</b>	<b>Area</b>
Sta. 17+82.16 to Sta.18+57.01 Rt.	160 sq. ft.
Sta. 18+65.63 to Sta. 19+39.20 Rt.	36 sq. ft.

**00596C.90 Payment** – Add the following pay items:

- (f) Retaining wall, Sta. 17+82.16 to Sta.18+57.01 .....Lump Sum
- (g) Retaining wall, Sta. 18+65.63 to Sta.19+39.20 .....Lump Sum

**SECTION 00620 - COLD PLANE PAVEMENT REMOVAL**

Comply with Section 00620 of the Standard Specifications modified as follows:

**00620.40(e) Warning Signs** - Replace this subsection, except for the subsection number and title, with the following:

Provide warning signs as required where abrupt or sloped drop-offs occur at the edge of the existing or new surface according to Sections 00221 and 00222.

**SECTION 00640 - AGGREGATE BASE AND SHOULDERS**

Comply with Section 00640 of the Standard Specifications.



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**SECTION 00730 - EMULSIFIED ASPHALT TACK COAT**

Comply with Section 00730 of the Standard Specifications modified as follows:

**00730.11 Emulsified Asphalt** - In the paragraph that begins "Obtain samples according to AASHTO T 40..." replace the words "AASHTO T 40" with the words "AASHTO R 66".

**00730.90 Payment** - Replace this subsection, except for the subsection number and title, with the following:

No separate or additional payment will be made for Emulsified Asphalt tack coat. Approximately 4.20 Tons of Emulsified Asphalt in tack coat will be required on this Project.

**SECTION 00744 - ASPHALT CONCRETE PAVEMENT**

Comply with Section 00744 of the Standard Specifications modified as follows:

**00744.11(a) Asphalt Cement** - Add the following to the end of this subsection:

Provide PG 64-22 grade asphalt cement for this Project.

**00744.90 Payment** – Add the following pay item:

(a) PG 64-22 Asphalt in Level 2 ACP.....Ton

**00744.90 Payment** - Replace the bullet that begins "asphalt cement..." with the following bullet:

- Mineral filler, lime, and anti-stripping or other additives

**SECTION 00749 - MISCELLANEOUS ASPHALT CONCRETE STRUCTURES**

Comply with Section 00749 of the Standard Specifications modified as follows:.

**00749.92 Payment** – Add the following pay item:

(b) Temporary AC Pathway .....Square Foot

**SECTION 00755 - CONTINUOUSLY REINFORCED CONCRETE PAVEMENT**

Comply with Section 00755 of the Standard Specifications modified as follows:

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**00755.15(a) Concrete Mixture** - Replace this subsection, except for the subsection number and title, with the following:

- Sample and test according to the MFTP.
- For all continuously reinforced concrete pavement, provide personnel according to 00755.30 to sample and test the mix for temperature, air content, slump, water-cementitious ratio, density and yield, from the first load of each placement, whenever there is a visible change in the slump of the concrete, and when a set of cylinders is obtained.
- If the results of any test are outside of the Specification limits, stop the placement of the load. Correct the load or reject it and do not incorporate it into the Work. Test subsequent loads before any further concrete placement. Correct the subsequent loads if any of the tests are still outside the Specification limits. If the load cannot be corrected, reject it and do not incorporate it into the Work. Testing of subsequent loads may return to the specified frequency when the test results from two consecutive loads are shown to meet the Specification limits.

**00755.80 Measurement** - Replace the paragraph that begins " The quantities of terminal anchors..." with the following paragraph:

The quantities of terminal anchors and terminal expansion joints will be measured on the length basis, along the centerline of each anchor and joint as constructed.

**00755.90 Payment** - Add the following pay item to the pay item list:

(g) Terminal Expansion Joint.....Foot

Add the following paragraphs to the end of this subsection:

Item (e) includes the excavation for the terminal anchor trenches.

Item (f) includes the transition panel, excavation, and dowelled expansion joint.

Item (g) includes the sleeper slab, excavation for the sleeper slab, and dowelled expansion joint.

ACP will be paid for according to 00744.90, and 00745.90, as applicable.

**00755.95(a) General** - Replace the bullet that begins "The average of the IRI for both..." with the following bullet:

- The IRI in each wheel path is 65.0 inches per mile or less.

**SECTION 00756 - PLAIN CONCRETE PAVEMENT**

Comply with Section 00756 of the Standard Specifications modified as follows:

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**00756.15(a) Concrete Mixture** - Replace this subsection, except for the subsection number and title, with the following:

- Sample and test according to the MFTP.
- For all plain concrete pavement, provide personnel according to 00756.30 to sample and test the mix for temperature, air content, slump, water-cementitious ratio, density and yield, from the first load of each placement, whenever there is a visible change in the slump of the concrete, and when a set of cylinders is obtained.
- If the results of any test are outside of the Specification limits, stop the placement of the load. Correct the load or reject it and do not incorporate it into the Work. Test subsequent loads before any further concrete placement. Correct the subsequent loads if any of the tests are still outside the Specification limits. If the load cannot be corrected, reject it and do not incorporate it into the Work. Testing of subsequent loads may return to the specified frequency when the test results from two consecutive loads are shown to meet the Specification limits.

**00756.95(a) General** - Replace the bullet that begins “The average of the IRI for both...” with the following bullet:

- The IRI in each wheel path is 65.0 inches per mile or less.

### SECTION 00759 - MISCELLANEOUS PORTLAND CEMENT CONCRETE STRUCTURES

Comply with Section 00759 of the Standard Specifications modified as follows:

**00759.03(b) Curb Ramp Plan** - Replace the bullet that begins “Compliance with Working Drawings and details...” with the following bullet:

- Comply with Working Drawings and details submitted under 00759.03(a)

**00759.90 Payment** - Replace the paragraph that begins " Item (k) includes the additional Work required ..." with the following paragraph:

Item (k) includes the additional Work required to construct a curb ramp or replace an existing curb ramp. Payment for the area of the curb ramp will be made under the concrete walks Pay item.

**00759.90 Payment** – Replace pay item (h) with the following pay item:

- (h) Concrete Stairs.....Square Foot

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### SECTION 00760 - UNIT PAVERS

Section 00760, which is not a Standard Specification, is included in this Project by Special Provision.

#### Description

**00760.00 Scope** - This Work consists of furnishing and installing masonry unit pavers at locations shown or directed.

#### Materials

**00760.10 Unit Paving Material** - Furnish pavers and related material meeting the following requirements:

- **Paving Unit Type** - Brick Pavers
- **Basis of Design** - Endicott Brick Pavers
- **Unit Color** - Manganese Ironspot
- **Unit Size** - 1-1/4" x 4" x 8"
- **Unit Strength** - Conform to ASTM C12728,000 psi with a maximum of 5 percent absorption (ASTM C 936)
- **Setting Material** - 3/4" bituminous setting bed complying with ASTM D3381 with neoprene modified asphalt adhesive with 2 percent neoprene, 10 percent asbestos-free fibers and 88 percent asphalt. Fine PCC aggregate conforming to 02690.30(g).

Submit proposed equivalent products to the Engineer for consideration. See Sections 00120.16 and 00180.31.

#### Construction

**00760.40 General** - Install pavers per the drawings and according to the manufacturer's instructions.

**00760.44 Unit Pavers** - See drawings for laying pattern of all unit pavers.

**00760.45 Joint Sand and Compaction** - After placing pavers, sweep joint sand into the joints. Use a vibrating mechanical tamper to compact.

**00760.46 Surface Tolerance** - Do not deviate the longitudinal and transverse surface grades by more than 1/4 inch in 12 feet.

**00760.47 Clean Up** - Remove excess sand and broken paving material from the site when complete.

#### Measurement

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**00760.80 Measurement** - The quantities of unit pavers will be measured on the foot basis.

### **Payment**

**00760.90 Payment** - The accepted quantities of unit pavers will be paid for at the Contract unit price per square foot for the item "Unit Pavers".

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

No separate or additional payment will be made for Base preparation.

## **SECTION 00815 - BOLLARDS**

Comply with Section 00815 of the Standard Specifications modified as follows:

**00815.11 Bollard** Replace this subsection with the following:

Furnish bollard according to the following requirements:

- Material: cast iron bollard
- Size: 3'-7" high, 12" square base
- Anchoring: (4) 3/4" diam. X 18" long, hot-dip galv., L-type anchor bolts in concrete foundations.
- Color: Match light poles.
- Basis of design: Holophane model PCBOL
- Conform to ASTM A48, ASTM D1654, and ASTM B117.

**00815.12 Plates, Shapes, Fasteners, and Hardware** – Delete this subsection.

**00815.13 Galvanizing** – Delete this subsection.

**00815.14 PVC Pipe** – Delete this subsection.

**00815.15 Painting Bollards** – Delete this subsection.

**00815.40 Bollards** – Replace text in this subsection with the following:

Install bollards as shown on plans and per manufacturer's instructions. Submit cut sheets of bollard to the Engineer for approval prior to installation.

**00815.90 Payment** – Delete Pay Items (b) and (c) from the Pay Item list.

## **SECTION 00850 - COMMON PROVISIONS FOR PAVEMENT MARKINGS**

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Comply with Section 00850 of the Standard Specifications.

### **SECTION 00860 - LONGITUDINAL PAVEMENT MARKINGS - PAINT**

Comply with Section 00860 of the Standard Specifications.

### **SECTION 00865 - LONGITUDINAL PAVEMENT MARKINGS - DURABLE**

Comply with Section 0865 of the Standard Specifications.

### **SECTION 00867 - TRANSVERSE PAVEMENT MARKINGS - LEGENDS AND BARS**

Comply with Section 00867 of the Standard Specifications.

### **SECTION 00869 - CURB AND NON-TRAVERSABLE MEDIAN MARKINGS**

Section 00869, which is not a Standard Specification, is included in this Project by Special Provision.

#### **Description**

**00869.00 Scope** - In addition to the requirements of Section 00850, 00860, and 00865, install curb markings and non-traversable median markings according to the following Specifications.

#### **Labor**

**00869.31 Manufacturer-Certified Installers** - Provide certified installers according to 00850.31 for thermoplastic applications.

#### **Construction**

**00869.45 Installation** - Apply curb markings and non-traversable median markings only when the following conditions are met:

- The ambient temperature is at least 50 °F and rising
- The pavement has been dry for at least 48 hours
- 30 Calendar Days of cure time for new concrete curb or median.

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Apply the Material to the pavement according to the manufacturer’s installation instructions to the full height and width of curb or median as shown in the Plans.

Apply one or more of the following marking material types:

- **Paint** - Apply according to 00860.45 along full height of curb face and along full width of top of curb or non-traversable median.
- **Thermoplastic, Sprayed** - Apply according to 00865.45, using Method B Spray Markings to the full height of curb face and along full width of top of curb or non-traversable median.
- Apply each application of painted thermoplastic marking at a thickness of 60 mils.

**Measurement**

**00869.80 Measurement** - The quantities of non-traversable median markings will be measured on the area basis. The quantities of curb markings will be measured on the length basis.

**Payment**

**00869.90 Payment** - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

**Pay Item**

**Unit of Measurement**

(b) Curb Marking, Paint..... Foot

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

**SECTION 00905 - REMOVAL AND REINSTALLATION OF EXISTING SIGNS**

Comply with Section 00905 of the Standard Specifications.

**SECTION 00930 - METAL SIGN SUPPORTS**

Comply with Section 00930 of the Standard Specifications modified as follows:

**00930.80 Measurement** - Add the following to the end of this subsection:

The estimated quantities of structural steel are as follows:

**Item**

**Estimated Quantity  
(Pound)**

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### Minor Sign Supports

Pipe Breakaway Sign Supports

6,215

### SECTION 00940 - SIGNS

Comply with Section 00940 of the Standard Specifications.

### SECTION 00960 - COMMON PROVISIONS FOR ELECTRICAL SYSTEMS

Comply with Section 00960 of the Standard Specifications modified as follows:

**00960.30 Licensed Electricians** - Replace the paragraph that begins "According to the Oregon Administrative Rule ..." with the following paragraph:

According to the Oregon Administrative Rule 918-282-0120(1), no person or entity shall allow any individual to perform electrical work for which the individual is not properly registered or licensed. Every person who installs electrical systems on the Project shall submit a copy of their electrical license or apprentice registration to the Engineer prior to performing any Work. They must be licensed as an S or a J under Oregon Administrative Rule 918-282.

**00960.46 Service Cabinet and Electrical Energy** - Replace this subsection, except for the subsection number and title, with the following:

Install service cabinet and associated equipment, then arrange for the Utility providing power to have the service cabinet inspected and make the electrical hook-up prior to field testing. Field test according to 00990.70(g) for traffic signals, or according to 00970.70 for illumination.

Table 00960-1 contains Utility contact information to arrange for the Utility to make electrical hookups:

**Table 00960-1**

Location	Utility	Utility Contact Person's Name, Email and Phone Number	Utility Job Number
Tualatin St/1 <sup>st</sup> St	Columbia River PUD	Karl Webster, <a href="mailto:kwebster@crpud.org">kwebster@crpud.org</a> , 503-397-8154	N/A
Strand St/Cowlitz St	Columbia River PUD	Karl Webster, <a href="mailto:kwebster@crpud.org">kwebster@crpud.org</a> , 503-397-8154	N/A

Furnish and install a meter base approved by the serving Utility (with cover by the Utility), where shown.



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Electrical energy costs will be billed to the Agency for permanent installations.

### SECTION 00962 - METAL ILLUMINATION AND TRAFFIC SIGNAL SUPPORTS

Comply with Section 00962 of the Standard Specifications modified as follows:

**00962.46(j)(2)(a) Anchor Rods for Signal Supports and Fixed Base Luminaire Supports** - Replace the paragraph that begins "Mark the position of each turned element..." with the following paragraph:

Mark position of each anchor rod and an outside ridge of each first nut above the base plate with a felt tip pen or similar marker to verify subsequent nut rotation. Rotate all first nuts above the base plate past snug tight an additional amount shown in 00962.46(j)(2)(d) in two passes. "Cheater" bars or slugging wrenches are allowed if required for large diameter anchor rods. After final tightening of the first nut above the base plate, tighten the second nut to a snug tight condition for assemblies with two nuts above the base plate.

### SECTION 00970 - HIGHWAY ILLUMINATION

Comply with Section 00970 of the Standard Specifications.

### SECTION 01030 - SEEDING

Comply with Section 01030 of the Standard Specifications modified as follows:

**01030.13(c) Pure Live Seed** - Replace this subsection, except subsection number and title, with the following subsection:

Use the PLS specified rate listed in 01030.13(f) for determining PLS application rates. Ensure the PLS application rate meets the PLS specified rate. Apply pre blended seed mixes, with multiple species, at a PLS application rate ensuring all species meet or exceed the PLS specified rate for each species in the seed mix.

PLS application rate for an individual seed species is determined as follows:

- PLS specified rate is listed in 01030.13(f)
- PLS factor is obtained by multiplying the seed label germination percentage times the seed label purity percentage. Use the purity and germination percentages from the label on actual bags of seed to be used on the Project.
- PLS application rate is obtained by dividing the PLS specified rate by the PLS factor.

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For a seed mix, make this calculation for each seed species in the mix and then adjust as follows:

- Using the seed tag, determine the weight of each seed species in the bag and use this information to find the percentage, by weight, of each seed species in 1 pound for the pre-blended mix.
- Divide the percentage by weight of each seed species, per pound, for the pre-blended mix, by the PLS application rate for that specific seed species.

Determine the highest application rate in the seed mix and apply the seed mix at that application rate.

**01030.13(f) Types of Seed Mixes** - Add the following to the end of this subsection:

Provide the following seed mix formulas:

- **Native Plant Seeding:**

<b>Name (Common Name)</b>	<b>PLS Specified Rate (lb/acre)</b>
Basis of design: Northwest Prairie Mix	10.0 lbs/acre

From Northwest Meadowscapes ([www.northwestmeadowscapes.com](http://www.northwestmeadowscapes.com))

- **Water Quality Seeding:**

<b>Name</b>	<b>PLS Specified Rate (lb/acre)</b>
Bromus carinatus *	
(California brome grass)	4.0 lbs/acre (25% of mix)
Carex densa *	
(Dense sedge)	3.0 lbs/acre (25% of mix)
Elymus Glaucus *	
(Blue wildrye)	6.0 lbs/acre (25% of mix)
Juncus patens *	
(Spreading rush)	2.0 lbs/acre (25% of mix)

\* Oregon Certified Seed

- **Lawn Seeding:**

<b>Name</b>	<b>PLS Specified Rate (lb/acre)</b>
Basis of design: Diamond Green Mix	350.0 lbs/acre

From Sunmark Seeds International ([www. https://www.sunmarkseeds.com/](http://www.sunmarkseeds.com/))

**01030.13(g) Availability** - Add the following sentence to the end of this subsection:

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Submit the seed and seed mixes to be used on the project according to 00150.37.

Add the following subsection:

**01030.14(b)(4) Organic Fertilizer** - Furnish organic fertilizer that analyzes 12% nitrogen, 4% phosphoric acid, and 8% soluble potash. Furnish fertilizer that has no toxicity to sites where it will be applied.

**01030.40 General** - Add the following sentence after the sentence beginning “Notify the Agency...”:

**01030.44(c) Organic Fertilizer** - Apply organic fertilizer at a rate of 200 pounds per acre at the following locations:

- Native Meadow

**01030.60 General** - Add the following sentence(s) after the last bullet:

The minimum living plant coverage for Native Meadow seeding is 70 percent of ground surface.

**01030.62 Establishment Work** - Revise the first sentence of (b) (4) Mowing subsection to read:

Mowing is required for lawn seeding only.

**01030.62 Establishment Work** – Add the following after (b) (4) Mowing subsection:

**(5) Flail Mowing** – Flail mow native meadow and stormwater zone “A”. Knock meadow down to 4” twice a year (early spring and end of June). Flail mow stormwater zone “A” to 6” once a year in early spring.

**(6) Repair and Restore** - Repair and restore Soil grades and re-seed damaged, settled, or unproductive areas to the specified conditions of this Section at no additional cost to the Agency.

**01030.80 Measurement** - Add the following to the end of this subsection:

Soil testing will be measured according to 01040.80

**01030.90 Payment** – Replace pay items (f), (h), (k), and (m) with the following unit of measurement:

(f) Water Quality Seeding.....	Square Foot
(h) Native Plant Seeding .....	Square Foot
(k) Lawn Seeding.....	Square Foot
(m) Mulching .....	Square Foot

**01030.90 Payment** - Add the following to the end of this subsection:

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Soil testing will be paid for according to 01040.90.

### SECTION 01040 - PLANTING

Comply with Section 01040 of the Standard Specifications modified as follows:

**1040.13 Soil Testing** – Replace the subsection below with the following:

**(a) Sampling and Testing** - Submit two (2) samples of Imported topsoil. Send one (1) set to the soil lab for testing and send other set the Engineer for approval. Instruct the lab that their soil recommendations are needed for ornamental landscapes and for seeded meadow.

Soil testing by A & L Western Laboratories or approved equal. The report is to contain the following:

- (1) Name and address of laboratory
- (2) Phone, name and e-mail address of point of contact at lab.
- (3) Test date, including the name and date of the test procedures.
- (4) Soil Test Data in Graphic Format
- (5) Complete soil fertility analysis including macro- and micro-nutrients, pH, cation exchange capacity and organic matter
- (6) Soil texture (% sand, % silt and % clay)

The Analysis shall make all amendment recommendations necessary to achieve the optimum condition for use for ornamental landscape plants and seeded meadow.

Soil Lab Contact Information: A&L Western Laboratories, Inc. 10220 SW Nimbus Ave. Bldg. K-9, Portland, OR 97223, Phone: (503) 968-9225

Submit the lab results to Engineer for approval. Submit reports at least three weeks prior to beginning soil amendment work. The results must include the laboratory's recommendations for soil amendments and fertilizers required to meet the specifics of each planting area as outlined in this specification.

**01040.14(a) Selected Topsoil** – Remove this subsection. All planting topsoil on the project shall be imported, see subsection 01040.14(b).

**01040.20 Mulch** – Replace the subsections below with the following:

**(a) Bark Mulch** – Ground or shredded particles from the bark of fir and/or hemlock trees which is free of non-bark debris, harmful bacteria, disease spores, pests, and substances toxic to plant growth. Provide mulch that is  $\frac{3}{4}$ " minus.

**01040.48 Planting Area Preparation** - Revise/amend (c) with the following:

Method "C" (Native Meadow Areas and Lawn Areas).

**01040.70 General** – Replace the first sentence with the following:

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The Contractor is responsible for the survival of all plant material until the end of a plant Establishment Period of 2 calendar years. Refer to City's Technical Specifications Section 0171.

**01040.80(d) Plant Materials** – Replace the bullet that begins “Average Area...” with the following:

- **Average Area** – Under this method, plant Materials will be measured on an area basis.

**01040.80(d) Plant Materials** – Remove the fourth bullet that begins “1 to 5 percent...”.

### SECTION 01069 - METAL HANDRAIL AND PEDESTRIAN FENCE

Section 01069, which is not a Standard Specification, is included in this Project by Special Provision.

#### Description

**01069.00 Scope** - This Work consists of furnishing and installing metal handrails and guardrails as shown or directed.

#### Materials

**01069.10 Materials** - Furnish Materials meeting the following requirements:

Commercial Grade Concrete .....	00440
Metal Handrail.....	02830

#### Construction

**01069.40 Metal Handrail and Pedestrian Fence:**

(a) **Handrail** - Fabricate and install imbedded metal handrail as shown.

(b) **Guardrail** – Fabricate and install metal guardrail as shown.

**01069.41 Welding** - Welding, welder qualifications, prequalification of weld details and inspection of welds shall conform to AWS D1.1 or AWS D1.2. Submit all welding procedure specifications 7 Days prior to fabrication to the Engineer for approval.

**01069.42 Concrete Footings** - Dimensions of footings shall not be less than shown and shall fill the excavated areas. Place the concrete with contact against firm Soil at the sides and bottom and tamp around the posts and brace ends after the posts and braces have been brought to and firmly held in proper position. Strike off, slope or crown and smooth the surface of the concrete at the ground level to shed water. Allow to cure for at least 5 Calendar Days before subjecting the posts to strain.

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Excavate for concrete footings to reasonably Neat Lines, but not less than the specified dimensions in Soil, or not less than 18 inches deep in Rock. Prevent disturbance of original ground at the sides and bottom of the excavation.

Dispose of Materials removed under these provisions, including excess excavation, in a satisfactory manner.

### Measurement

**01069.80 Measurement** - The quantities of Work performed under this Section will be measured according to the following:

- **Length Basis** - Metal handrail will be measured on the length basis, by measuring along the top rail member, from center of end post to center of end post.

### Payment

**01069.90 Payment** - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Metal Handrail .....	Foot
(b) Metal Guardrail .....	Foot

In the items above the number of rails will be inserted in the blank.

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

## SECTION 01095 - SITE FURNISHINGS

Section 01095, which is not a Standard Specification, is included in this Project by Special Provision.

### Description

**01095.00 Scope** - This Work consists of constructing site furnishings such as benches, trash cans bicycle racks, specialty signs, pet waste bag dispensers, drinking fountains, basalt columns, traffic barrier arm, and other furnishings as shown or directed. This work also includes freestanding stone veneer seatwalls and end columns, with precast concrete caps and skate deterrent.

### Materials

**01095.10 General:**

- (a) **Benches** - Provide benches meeting the following requirements:

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- Material: All-steel, welded construction with vertical slats, fully assembled with tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 60" length
- Basis of Design: OCC Outdoors Products, 5ft Main Street Park Bench

### (b) **Bicycle Racks** - Provide bicycle racks meeting the following requirements:

- Material: Steel tubing with pre-drilling surface mounting plates and tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 35" L x 2-1/2" W x 33" H
- Basis of Design: OCC Outdoors Products, Circle Style Surface Mount Bike Rack

### (c) **Interpretive Panels** - Provide interpretive panels meeting the following requirements:

- Furnish completed fabricated sign using painted aluminum sheeting, steel supports and powder coated graphics as shown.
- Use artwork provided by Engineer.
- Color to conform to the City of St. Helens Branding and Wayfinding Master Plan.
- For stone veneer base requirements, see Section 01095.10(j) below.

### (d) **Pedestrian Directional Sign** –

- Furnish completed sign using manufactured unit indicated in drawings.
- Use artwork provided by Engineer.
- Color to conform to the City of St. Helens Branding and Wayfinding Master Plan.

### (e) **Basalt Column** - Provide basalt columns meeting the following requirements:

- Columbia Basin Basalt Columns, sourced locally.
- Size: 12-30" diameter, up to 36" length.

### (f) **Drinking Fountain** - Provide drinking fountain meeting the following requirements:

- Pedestal steel drinking fountain with powder coat finish, corrosion resistant for outdoor use, with 2 stainless steel, ADA compliant drinking stations and 1 pet bowl.
- Includes tamper-proof anchor bolts for free-standing surface mount.
- Includes vandal-resistant bubblers, pushbutton activation, automatic stream height regulator, inlet strainer, water inlet, drain outlet, and access panel.
- Size: 42" height, 31" width overall
- Color: Submit color options for approval by Engineer.
- Basis of Design: Elkay Bi-Level, Tubular Pedestal Barrier-Free Fountain with Pet Fountain, Model LK4420DB.

### (g) **Traffic Barrier Arm** - Provide custom traffic barrier arm per plans and meeting the following requirements:

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- Permanent 2"x8" and 2"x10" Alaskan Yellow Cedar elements, grade A & better clear. Bolted to custom steel brackets.
- Drop arm 2"x8" Alaskan Yellow Cedar, grade A & better clear. Bolted to custom steel bracket and counterweight.
- All steel components to be stainless steel.
- PIC concrete base with stone veneer and precast concrete top, see Section 01095(j).
- All wood components to receive two coats of non-toxic waterproofing following manufacturer's instructions. Use Internal Wood Stabilizer from TimberPro (<https://timberprocoatingsusa.com/products/internal-wood-stabilizer/>) or approved equal.

### (h) **Trash Can** – Provide trash cans meeting the following requirements:

- Material: All-steel, welded construction with vertical slats, fully assembled, surface mounted with tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 42" H x 29-1/2" outer diameter
- Basis of Design: OCC Outdoors Products, 36-Gallon Colonial Trash Receptacle with Side Access

### (i) **Pet Waste Bag Dispenser** - Provide pet waste bag dispensers meeting the following requirements:

- Material: Powder coated, aluminum, weather resistant, locking pet waste bag dispenser, designed to fit standard roll bags. Includes minimum of 2 dispenser keys, galvanized square post, and tamper-resistant mounting hardware.
- Size: 18" L x 11" W x 4" D
- Basis of Design: Zero Waste USA, Roll Bag Dispenser

### (j) **Stone Veneer Seatwalls and End Columns** – Provide freestanding stone veneer seatwalls and end columns, with precast concrete caps and skate deterrent that meet the following requirements:

- **Cast-in-place concrete:** Reinforced per drawings. See Section 00596C for additional requirements.
- **Stone Veneer:**
  - Material: Camas Basalt stone, square and rectangular shapes, dark gray color, locally available.
  - Size: 3" nominal thickness. Widths and lengths to be 6" – 16", not to exceed 16". Saw cut back and sides with split face.
  - Quality Assurance: Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties. Engage an experienced installer who specializes in site stone layout and has completed projects using stone similar in material, design and extent to that indicated for the project that has resulted in construction within a ten-year record of successful in-service performance.
- **Precast Concrete Cap** – Provide precast concrete caps meeting the following requirements:



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- Material: Precast Architectural Concrete Units:
  - Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
  - Unit Description: Prefabricated concrete caps for seatwalls, end columns and other stone veneer site furnishings. See Landscape Plans for size and location.
  - Concrete: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent; comply with ACI 301.
  - Finish: Light gray concrete with light acid etch finish.
- Quality Assurance:
  - Provide shop drawings and samples, see Section 01095.45.
  - Fabricator Qualifications: Firm having at least 5 years of documented experience in production of architectural precast concrete of the type required. Completed a minimum of 3 projects of similar size and scope. Fabricator to show plant has experienced personnel, physical facilities, established quality control procedures and management capability to produce required units without causing delay to project. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.
- **Mortar** – PremiumPlus Thin-set Mortar with CustomFlex Ultra-Strength Thin-set Additive, or approved equal.
- **Grout** – Polyblend sanded grout, color to match stone.
- **Skate Deterrent** – Furnish skate deterrents meeting the following requirements:
  - Material: Stainless steel skate deterrent with locking pin for grout joint installation. Insert shall have a chamfer to match the chamfer of the precast concrete cap.
  - Basis of design: D135-12 for Chamfer, manufactured by Intelliccept Skatestoppers.
  - Contact information: Tel 619-447-6374, [info@skatestoppers.com](mailto:info@skatestoppers.com)

### Construction

**01095.40 General** - Submit product information for site furnishings for approval in advance of installation. Install all benches, bike racks, trash cans and pet waste bag dispensers as shown and according to the manufacturer's recommendations.

**01095.41 Specialty Signage** – Includes Interpretive Panels and Pedestrian Directional Signage.

#### (a) Fabrication

- Shop Drawings – Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Notify Engineer of conflicts.
- Product Data – Submit manufacturers product specifications for all products.

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- Quality – Sign fabricator shall have a minimum of five year of experience completing similar work. Sign panels shall show no visual distortion, gaps or defects when viewed from a normal viewing distance in the installed position. Provide color and material samples prior to fabrication.
- Aluminum Fabrication – Provide aluminum in the form indicated complying with the following American Society for Testing Materials ASTM B 209, 5052-H32 for sheets. Aluminum shall be new material, cut to shape and size shown. Welds shall be concealed and ground smooth at sign exterior. Sign shall be free of buckles, warps, dents, burrs and defects resulting from fabrication.
- Steel Fabrication – Provide steel in form indicated complying with ASTM A 500, Grade B for tube supports.
- Powder Coated Aluminum Graphic Panel – Provide graphic embedded in clear powder coat as provided by the following manufacturers:
  - a. SH Immersive, Alto Product
  - b. Direct Embed Coating Systems
  - c. Gopher Sign Company
- Manufactured Units – Sternberg banner arm & sign blade as shown
- Fasteners – Of same basic metal and alloy as fastened metal, unless indicated. Do not use metals which are corrosive or otherwise incompatible with metals joined. Conceal fasteners when possible. Where exposed to view match adjacent material finish.
- Graphics – Graphics, symbols, text and colors shall be executed in such a manner that all edges and corners are true, clean and match provided artwork.

### (b) Installation

- Obtain all necessary permits and inspections required by the governing authorities having jurisdiction over this work. Include associated fees in proposal. Furnish a certificate of approval from the inspection authority at the completion of the work prior to the application of payment.
- Construct stone veneer base per drawings and Section 01095.45.
- Deliver completed signs to project site when adjacent finishes are complete and ready for immediate installation.
- Protect finished products to not damage or mar surfaces in transit or installation.
- Protect adjacent materials prior sign installation. Repair adjacent materials if damaged during installation.
- Erect all signs at the locations as staked or directed on site. Signs not mounted as directed will not be accepted.
- Install directional sign panels to be level and plumb at the height indicated. Align sign face with pathways.
- Provide cleaning and maintenance data including field paint repair and graffiti removal.

### 01095.42 Traffic Barrier Arm:

- Custom fabrication, submit shop drawings for approval prior to installation.
- See Section 01095.45 for fabrication and installation requirement for stone veneer and precast concrete components.

**01095.43 Drinking Fountain** – Install per manufacturer’s requirements. See add reference to plumbing section.

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**01095.44 Basalt Columns** – See plans.

**01095.45 Stone Veneer Seatwalls and Stone Veneer End Columns:**

**(a) Stone Veneer Seatwalls and Stone Veneer End Columns**

- Submit one set of stone veneer samples illustrating minimum and maximum stone sizes, color range and texture. Submit mortar samples showing full range of colors expected in the finished construction.
- Construct cast-in-place concrete core with reinforcement per the drawings.
- Construct stone veneer as shown in drawings.
- Fully grouted joints in all stone veneer installations not to exceed 3/8" width.

**(b) Precast Concrete Caps**

- Submit shop drawings of concrete caps for approval by Engineer prior to installation. Indicate layout, location, configuration, connection details, dimensions, openings, and relationship to adjacent materials. Include details of mix designs and finishes.
- Submit one sample, min. 12 inch by 12 inch, of appropriate thickness, mixture, finish, color and edge conditions for approval by Engineer.
- Fabricate in conformance with PCI MNL-117 and PCI MNL-135.
- Install precast concrete caps level and plumb within allowable tolerances. Grout connections where indicated on drawings.

**(c) Skate Deterrent** – Submit product for approval by Engineer prior to installation. Install as shown in drawings and per manufacturer’s instructions.

**Measurement**

**01095.80 Measurement** - The quantities of site furnishings will be measured on the unit basis.

The quantities of custom traffic barrier arm will be measured as lump sum.

The quantities of Stone Veneer Seatwall with Precast Concrete Cap will be measured on the linear foot basis.

**Payment**

**01095.90 Payment** - The accepted quantities of site furnishings will be paid for at the Contract unit price, per unit of measurement, for the following items:

<b>Pay Item</b>	<b>Unit of Measurement</b>
(a) Benches .....	Each
(b) Bicycle Racks .....	Each
(c) Interpretive Panel .....	Each
(d) Pedestrian Directional Signs.....	Each
(e) Basalt Column .....	Each
(g) Drinking Fountain .....	Each

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(f)	Traffic Barrier Arm .....	Lump Sum
(h)	Trash Can.....	Each
(i)	Pet Waste Bag Dispenser.....	Each
(j)	Stone Veneer Seatwall with Precast Concrete Cap .....	Linear Foot
(k)	Stone Veneer End Column with Precast Concrete Cap.....	Each
(l)	Skate Deterrent.....	Each

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

### SECTION 01120 - IRRIGATION SYSTEMS

Comply with Section 01120 of the Standard Specifications modified as follows:

**01120.12 Automatic Controllers** - Add the following sentence to the end of this subsection:

See drawings for controller make and model.

**01120.17 Valves** - Add the following sentence to the beginning of this subsection:

See drawings for make and model of valves in this section. Where make and models are not provided, submit product meeting specification below for review prior to installation.

**01120.18 Valve Boxes and Protective Sleeves** – Replace this subsection with text below:

Provide automatic control valves, flow control valves, pressure reducing valves, backflow preventers, filters and other serviceable fixtures with valve boxes that are extendable to obtain the depth required. Furnish boxes constructed of thermoplastic with locking lids. Use brown or black lids in mulch (planting areas) and green lids in seeded areas. Include a protective sleeve and cap with all manual drain valves and manual control valves

**01120.22 Tree Watering Bags** - Add the following product to the end of this subsection:

Provide tree watering bags as shown on plans. Basis of design: Dew Right Tree Watering Bag by DeWitt (<https://www.dewittcompany.com/product/dew-right-tree-watering-bag/>).

### SECTION 01140 - POTABLE WATER PIPE AND FITTINGS

Comply with Section 01140 of the Standard Specifications modified as follows:

**01140.90 Payment** - In the paragraph that begins “No separate or additional payment will be...”, add the following bullet to the bullet list:

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- pipe reconnections

### **SECTION 01150 - POTABLE WATER VALVES**

Comply with Section 01150 of the Standard Specifications modified as follows:

**01150.10 Materials** - Delete “Ball Valves” from the list of materials.

**01150.40 General** – Add the following to the end of the first paragraph:

Public Works Supervisor, Dave Elder, (503) 397-3532 must be notified 48 hours in advance to coordinate any taps and or water valve operation. The Contractor is not allowed to operate any water valves controlling flow to or from the City’s potable water system.

**01150.90 Payment** - Replace the paragraph that begins “No separate or additional...” with the following paragraph:

No separate or additional payment will be made for:

- earthwork not covered under other Pay Items
- jointing
- blocking of valves
- protective coatings
- valve boxes
- valve box extensions
- valve operator extensions
- valve reconnections
- hydrostatic testing

### **SECTION 01160 - HYDRANTS AND APPURTENANCES**

Comply with Section 01160 of the Standard Specifications.

### **SECTION 01170 - POTABLE WATER SERVICE CONNECTIONS, 2 INCH AND SMALLER**

Comply with Section 01170 of the Standard Specifications.

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### SECTION 02001 - CONCRETE

Comply with Section 02001 of the Standard Specifications modified as follows:

#### 02001.02 Abbreviations and Definitions:

Add the following definition:

**Lightweight Concrete** - Structural concrete having a specified density using lightweight Aggregates.

Replace the sentence that begins “**Pozzolans** - Fly ash, silica fume...” with the following sentence:

**Pozzolans** - Fly ash, natural Pozzolans, silica fume, and high-reactivity Pozzolans.

Replace the sentence that begins “**Supplementary Cementitious Materials** - Fly ash, silica fume...” with the following sentence:

**Supplementary Cementitious Materials** - Pozzolans and ground granulated blast furnace slag.

**02001.15(a) Current Mix Designs** - Replace this subsection, except for the subsection number and title, with the following:

Mix designs that meet the requirements for the specified class of concrete and are currently being used or have been used within the past 24 months on any project, public or private, may be submitted for review. Provide individual test results that comprise the average if more than one data point exists. For paving designs the flexural strength testing must be from within the last two years. For HPC designs the length change and permeability tests must be from within the last two years.

**02001.15(b)(1) Trial Batch Plastic Properties** - Replace this subsection, except for the subsection number and title, with the following:

For each trial batch, test according to the following test methods:

Test	Test Method
Sampling Fresh Concrete	WAQTC TM 2
Concrete Temperature	AASHTO T 309
Slump	AASHTO T 119 <sup>1</sup>
Air Content	AASHTO T 152 or T 196 <sup>2</sup>
Density	AASHTO T 121
Yield	AASHTO T 121
Molding Concrete Specimens	AASHTO T 23 or R 39 <sup>3</sup>
Water Cement Ratio	<sup>4</sup>

<sup>1</sup> For drilled shaft concrete test the slump retention by subsequent tests at half-hour intervals for the duration of the estimated drilled shaft placement, including temporary casing extraction. Report in table or graphical format.

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- 2 Use AASHTO T 196 for lightweight concrete.
- 3 Cast cylinders in single use plastic molds.
- 4 Use ODOT's Field Operating Procedure for AASHTO T 121 in the MFTP.

Add the following subsection:

**02001.15(b)(2)(e) Lightweight Equilibrium Density** - For lightweight concrete mix designs, determine the measured oven-dry density and calculate the approximate equilibrium density according to ASTM C567.

**02001.15(c)(12) Documentation of Average Compressive Strength** - Replace this subsection, except for the subsection number and title, with the following:

Provide an analysis, showing applicable data and calculations for documentation of average compressive strength according to ACI 301.

Add the following subsection:

**02001.15(c)(15) Lightweight Equilibrium Density Results** - For lightweight concrete designs, report densities according to 02001.15(b)(2)(e).

**02001.20(a) Strength** - Replace Table 2001-1 with the following Table 2001-1:

**Table 02001-1**

<b>Concrete Strength and Water/Cementitious Material (w/cm) Ratio</b>		
<b>Type of Concrete</b>	<b>Strength <math>f'_c</math> (psi)</b>	<b>Maximum w/cm Ratio</b>
Structural	3300	0.50
	3300 (Seal)	0.45
	4000	0.48
	4000 (Drilled Shaft)	
	HPC4500	0.40
	HPC(IC)4500	
5000 +		
Paving	4000	0.44
<b>PPCM's</b> (with cast-in-place decks and no entrained air)	5000	0.48
	5500	0.44
	6000 +	0.42
Lightweight Concrete	80	0.60

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**02001.20(a)(1) Required Average Compressive Strength ( $f'_{cr}$ )** - Replace this subsection, except for the subsection number and title, with the following:

Except for PPCM designs, provide the required average compressive strength according to ACI 301 for mix design approval.

Add the following subsection:

**02001.20(g) Unit Weight** - Provide high performance lightweight concrete with a maximum cast density of 36 pounds per cubic foot at time of placement.

**02001.30(e)(1) HPC Coarse Aggregate Content** - Delete the paragraph that begins “Two or more Aggregate products or sources...”

### SECTION 02030 – SUPPLEMENTARY CEMENTITIOUS MATERIALS

Comply with Section 02030, of the Standard Specifications modified as follows:

**02030.00 Scope** - Replace this subsection, except for the subsection number and title, with the following:

This Section includes the requirements for fly ash, natural pozzolans, silica fume, ground granulated blast furnace slag and high reactivity pozzolans used in portland cement concrete.

**02030.10 Fly Ash** - Replace this subsection, except for the subsection number and title, with the following:

Furnish Class C and Class F fly ash from the QPL and conforming to AASHTO M 295 (ASTM C618).

Add the following subsection:

**02030.15 Natural Pozzolans** - Furnish Class N natural pozzolans from the QPL and conforming to AASHTO M 295 (ASTM C618).

**02030.50 Metakaolin** - Replace this subsection with the following:

**02030.50 High Reactivity Pozzolans** - Furnish high-reactivity pozzolans from the QPL and conforming to AASHTO M 321.

### SECTION 02050 - CURING MATERIALS

Comply with Section 02050 of the Standard Specifications modified as follows:



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**02050.10 Liquid Compounds** - Replace the paragraph that begins “Furnish liquid membrane-forming curing...” with the following paragraph:

Furnish liquid membrane-forming curing compounds from the QPL and meeting the requirements of ASTM C309. Before use, submit a one quart sample from each lot for testing. Samples will be tested according to ODOT TM 721. Samples are not required for curing compounds used on Commercial Grade Concrete.

### SECTION 02320 – GEOSYNTHETICS

Comply with Section 02320 of the Standard Specifications modified as follows:

**02320.10(a) General Requirements** – Add the following to the end of this subsection:

**(3) Impermeable Liner** – Furnish geomembranes meeting the following requirement:

- Material shall be an impermeable high density polyethylene (HDPE) geomembrane.

**02320.10(c) Manufacturer’s Test Certification** – Add the following to the end of this subsection:

**(3) Impermeable Liner** – For geomembrane liners, include the following:

- Manufacturer’s name, lot number, roll number, production facility address, and full product information (style, brand, name, product code, etc.).
- Test results for factory seams.
- Minimum average roll values for each of the specified properties from the same lot of geomembranes as the delivered material.

**02320.10(d) Manufacturer’s Sampling/Testing** – Add the following to the end of this subsection:

**(4) Impermeable Liner Testing** – Perform the specified tests to determine geomembrane properties for the intended applications.

**02320.20 Geotextile Property Values** – Add the following table to the end of this subsection:

<b>Table 02320-7 High Density Polyethylene (HDPE) Geomembrane Property Values (Smooth or Textured)<sup>1</sup></b>			
<b>Geotextile Property<sup>2</sup></b>	<b>ASTM Test Method</b>	<b>Unit</b>	<b>Geomembrane Property Requirements by Total Nominal Thickness (ASTM D 1599)</b>
Lowest individual thickness reading	-	mils	27
Formulated density	D 1505 / D 792	g/cc	0.940

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Tensile strength at yield	D 638 / D 6693	lb/in	63
Tear resistance	D 1004	lb	21
Puncture resistance	D 4833	lb	54
Yield elongation	D 638 / D 6693	%	12
Carbon black content (range)	D 1603	%	2-3
<sup>1</sup> All geotextile properties are minimum average roll values (MARV). The test results for any sampled roll in a lot shall meet or exceed the values shown in the table. <sup>2</sup> All values are the minimum average unless otherwise specified.			

**SECTION 02415 - PLASTIC PIPE**

Comply with Section 02415 of the Standard Specifications modified as follows:

**02415.40 Polypropylene Pipe** - Replace the sentence that begins "Dual wall polypropylene pipe ..." with the following sentence:

Dual wall polypropylene pipe and fittings ..... ASTM F2764

**SECTION 02440 – JOINT MATERIALS**

Comply with Section 02440 of the Standard Specifications.

**SECTION 02450 – MANHOLE AND INLET MATERIALS**

Comply with Section 02450 of the Standard Specifications.

**SECTION 02470 – POTABLE WATER PIPE MATERIALS**

Comply with Section 02470 of the Standard Specifications.

**SECTION 02475 – POTABLE WATER FITTING MATERIALS**

Comply with Section 02475 of the Standard Specifications.

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### **SECTION 02480 – POTABLE WATER VALVE MATERIALS**

Comply with Section 02480 of the Standard Specifications.

### **SECTION 02485 – HYDRANT AND APURTENANCE MATERIALS**

Comply with Section 02485 of the Standard Specifications.

### **SECTION 02490 – POTABLE WATER SERVICE CONNECTION MATERIALS, 2 INCH AND SMALLER**

Comply with Section 02490 of the Standard Specifications.

### **SECTION 02510 - REINFORCEMENT**

Comply with Section 02510 of the Standard Specifications modified as follows:

**02510.11(c) Coated Reinforcement Ties and Supports** - Replace this subsection, except for the subsection number and title, with the following:

Ties and supports for coated reinforcement, including ties for coated to uncoated reinforcement connections, shall be nonmetallic coated.

### **SECTION 02560 - FASTENERS**

Comply with Section 02560 of the Standard Specifications modified as follows:

**02560.30(b) High Strength Tie Rods, Anchor Bolts and Anchor Rods** - Add the following paragraph to the end of this subsection:

End stamp all ASTM F1554, Grade 105 according to ASTM F1554 Supplementary Requirements S2 and S3. If the end of the bolt is to be embedded in concrete, the projecting end from the concrete shall be the marked end.

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**SECTION 02690 - PCC AGGREGATES**

Comply with Section 02690 of the Standard Specifications modified as follows:

**02690.20(e) Grading and Separation by Sizes for Prestressed Concrete** - Replace this subsection with the following subsection:

**02690.20(e) Grading and Separation by Sizes** - Sampling shall be according to AASHTO R 90. Sieve analysis shall be according to AASHTO T 27 and AASHTO T 11. Provide aggregates meeting the gradation requirements of Table 02690-1 for structural concrete. Provide a CAgT to perform sampling and testing when required.

**Table 02690-1**  
 Gradation of Coarse Aggregates  
 Percent passing (by Weight)

Size Number	Nominal Size Square Openings	Sieve Size											
		(2½ in.)	(2 in.)	(1½ in.)	(1 in.)	(¾ in.)	(½ in.)	(¾ in.)	(No. 4)	(No. 8)	(No. 16)	(No. 50)	(No. 200)
3	(2 to 1 in.)	100	90 to 100	35 to 70	0 to 15	—	0 to 5	—	—	—	—	—	**
357*	(2 in. to No. 4)	100	95 to 100	—	35 to 70	—	10 to 30	—	0 to 5	—	—	—	**
4	(1½ to ¾ in.)	—	100	90 to 100	20 to 55	0 to 15	—	0 to 5	—	—	—	—	**
467*	(1½ to No. 4)	—	100	95 to 100	—	35 to 70	—	10 to 30	0 to 5	—	—	—	**
5	(1 to ½ in.)	—	—	100	90 to 100	20 to 55	0 to 10	0 to 5	—	—	—	—	**
56	(1 to ¾ in.)	—	—	100	90 to 100	40 to 85	10 to 40	0 to 15	0 to 5	—	—	—	**
57	(1 to No. 4)	—	—	100	95 to 100	—	25 to 60	—	0 to 10	0 to 5	—	—	**
6	(¾ to ½ in.)	—	—	—	100	90 to 100	20 to 55	0 to 15	0 to 5	—	—	—	**
67	(¾ to No. 4)	—	—	—	100	90 to 100	—	20 to 55	0 to 10	0 to 5	—	—	**
68	(¾ to No. 8)	—	—	—	100	90 to 100	—	30 to 65	5 to 25	0 to 10	0 to 5	—	**
7	(½ to No. 4)	—	—	—	—	100	90 to 100	40 to 70	0 to 15	0 to 5	—	—	**
78	(½ to No. 8)	—	—	—	—	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	—	**
8	(¾ to No. 8)	—	—	—	—	—	100	85 to 100	10 to 30	0 to 10	0 to 5	—	**
89	(¾ to No. 16)	—	—	—	—	—	100	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5	**

\* Use two or more separated sizes which when combined meet these gradation limits.

\*\* See 02690.20(a). Do Not evaluate material passing the No. 200 sieve according to 00165.40.

**02690.20(f) Grading and Separation by Sizes for Other Concrete** - Delete this subsection.

**02690.30(g) Grading** - In the paragraph that begins “Sampling shall be according to...”, replace the words “AASHTO T 2” with the words “AASHTO R 90”.

**SECTION 02830 - METAL HANDRAIL**

Section 02830, which is not a Standard Specification, is included in this Project by Special Provision.

**Description**

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**02830.00 Scope** - This Section includes the requirements for the steel in handrail for stairways and pedestrian facilities.

### Materials

**02830.10 Shapes, Plates, and Bars** - Shapes, plates, and bars shall conform to ASTM A36.

**02830.20 Steel Pipe** - Steel pipe shall conform to ASTM A500, seamless, Grade B.

**02830.21 Steel Tube** – Furnish steel tube conforming to ASTM A 53/A 53M, Grade B Schedule 40, black finish, with welds from matching pipe or tube, seams continuously welded, joints and seams ground smooth.

**02830.30 Galvanizing** - Hot-dip galvanize all handrail components according to AASHTO M 111 (ASTM A123) after shop fabrication.

**02830.31 Repair of Hot-Dip Galvanizing** - Repair damaged hot-dip galvanizing according to ASTM A780 and ASTM A123. Minimum zinc content for Method A2 is 94 percent on the dry film.

**02830.40 Incidentals** - Plates, caps, and miscellaneous pieces necessary to complete the rail shall be as shown.

**02830.50 Acceptance** - Acceptance of handrail Materials will be according to 00165.35 and this Section.

## SECTION 02910 - SIGN MATERIALS

Comply with Section 02910 of the Standard Specifications modified as follows:

**02910.33(a) General** - Replace this subsection, except for the subsection number and title, with the following:

Permanent legends consist of white retroreflective screened, red retroreflective screened, black screened or cut-out white retroreflective sheeting. The letters and numerals of all permanent legends shall conform to the design of the FHWA Standard Rounded Capital Letter Alphabets.

Add following subsection:

**02910.50 Digitally Printed Signs, Temporary** - Temporary traffic control signs may use digitally printed signs from an integrated engineered match component system on the QPL and applied to furnished substrate according to 00222.10(b).

**SECTION 02926 - HIGHWAY ILLUMINATION MATERIALS**

Comply with Section 02926 of the Standard Specifications modified as follows:

Add following subsection:

**02926.41(f) Electrical Splice Materials** - Furnish electrical splice materials meeting the following requirements:

- **Split bolt** - Made of silicon bronze to securely join the wires both mechanically and electrically.
- **Heat-shrink tubing** - Split-resistant and adhesive-lined tube made of polyolefin complying with UL 224 or UL 486D, temperature range -67° to 230 °F, with 600 V rated inner melting wall or liner to provide void-free encapsulated insulation.
- **Insulating rubber tape** - Electrical grade, nondrying, rubber based, elastic type complying with ASTM D4388.
- **Insulating vinyl plastic tape** - Low temperature (0°F) resistant, vinyl chloride plastic, electrical insulating tape with pressure-sensitive adhesive. Comply with ASTM D3005.

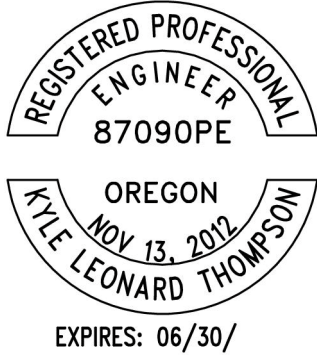

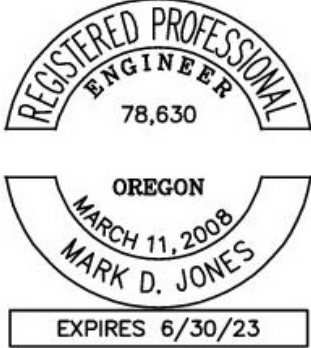
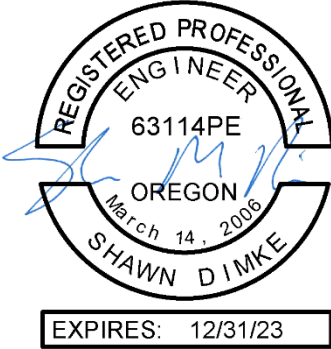
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**SECTION 01 01 07 SEALS PAGE**

<p>PUMP STATION (Division 01, 05, 09, 10, 11, 33,40, 43)</p>  <p>REGISTERED PROFESSIONAL ENGINEER 87090PE OREGON NOV 13, 2012 KYLE LEONARD THOMPSON EXPIRES: 06/30/23</p>	<p>ELECTRICAL (Division 26)</p>  <p>REGISTERED PROFESSIONAL ENGINEER 18533 OREGON JULY 10, 1996 JEFFREY L. HOWARD EXPIRES 6/30/23</p>
<p>MECHANICAL (Division 23)</p>  <p>REGISTERED PROFESSIONAL ENGINEER 78,630 OREGON MARCH 11, 2008 MARK D. JONES EXPIRES 6/30/23</p>	<p>GEOTECHNICAL (Division 31)</p>  <p>REGISTERED PROFESSIONAL ENGINEER 63114PE OREGON March 14, 2006 SHAWN DIMKE EXPIRES: 12/31/23</p>

STRUCTURAL (Division 03, 04, 06)



**END OF SECTION**

## SECTION 01 22 20 UNIT PRICE MEASUREMENT AND PAYMENT

### PART 1 GENERAL

1.01 Measurement and payment will be on a unit price basis in accordance with the prices set forth in the proposal for individual work items. Where work is required but does not appear as a separate item in the proposal, the cost for that work shall be included and absorbed in the unit prices named in the proposal. CONTRACTOR shall make careful assessment when preparing the bid.

- A. **Sanitary Pump Station, Complete (lump sum):** Payment under this item shall cover all particular elements of the project, whether or not specifically or specially identified, as specified herein, in the contract documents and as shown on the plans, except for work included separately under separate bid items. Payment will be made on a lump sum basis for the completion of all work to the new City of St Helens Pump Station #1. The lump sum Contract price for "Sanitary Pump Station, Complete" shall be full payment for all equipment, labor, and materials to construct the pump station, wet well, interior wet well coatings, cable conduits from the wet well to the disconnect panel, valve vaults with interior coatings, toning wire, locate stations, water service, RPBA and enclosure, pump station ductile iron piping with joint restraints and coatings, fittings, and valves, geotextile fabric, backfill, connection to force main, control building structure and foundation, all mechanical and electrical components, chemical feed foundation, chemical delivery system piping, electrical and controls, submersible sewage pumps and accessories including spare pump, site grading and excavation including rock excavation, dewatering, disposal of spoils and debris, structural fill, crushed surfacing, cement concrete pavement, start up and testing of the pump station, equipment and warning signs, warranties, operation and maintenance manual, and any other associated work to provide a complete and operational pump station.

**END OF SECTION**

## **SECTION 01 75 16 TESTING, TRAINING AND SYSTEM START-UP**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. This section specifies equipment and system testing and start-up, services of manufacturer's representatives, training of OWNER's personnel and final testing requirements for the complete sewer pump station facility.

#### **1.02 CONTRACT REQUIREMENTS**

- A. Testing, training and facility start-up acceptance are requisite to the satisfactory completion of the Contract.
- B. Complete all start-up procedures, testing and training, as specified herein, within the Contract Time(s).
- C. Furnish all necessary labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing functional testing, performance testing, and operational testing.
- D. Provide competent, experienced technical representatives of equipment manufacturers for assembly, installation, testing, and operator training.

#### **1.03 SUBMITTALS**

- A. Provide detailed Start-up Progress Schedule with the following activities identified:
  - 1. Manufacturer's services
  - 2. Installation certifications
  - 3. Operator training
  - 4. Submission of operation and maintenance manual
  - 5. Field testing
  - 6. Functional testing
  - 7. Operational testing
- B. Testing and Start-up Plan:
  - 1. Not less than 30 Days prior to performing field testing, the Contractor shall submit for review a detailed Testing Plan. The Plan shall include schedules for equipment certifications, schedules for submitting final Operations and Maintenance Manuals, schedule for training the Owner's personnel, list of Owner furnished supplies or

equipment, electrical testing schedule, and detailed schedule of operations to achieve successful field testing, functional acceptance testing and activities to implement the operational test.

2. The Plan shall include test checklists and data forms for each item of equipment and shall address coordination with the Owner's staff.
  3. The Plan shall note overall project sequencing requirements. The Contractor shall complete the clean-water operational testing period of the sewer pump station facility before decommissioning the existing pump station and connecting to the existing collection system.
  4. Revise and update start-up plan based upon review comments, actual progress, or to accommodate changes in the sequence of activities.
- C. The Contractor shall maintain the following records during installation, field testing, functional acceptance testing and operational readiness testing and submit these said records as requested by Owner's Representative and shall be provided prior to start-up acceptance:
1. Lubrication and service records for each item of mechanical/electrical equipment including logs of time spent by manufacturer's representatives performing services on the job site.
  2. Hours of daily operation for each item of mechanical/electrical equipment.
  3. Daily logs of equipment testing identifying all tests conducted and outcome.
  4. Instrumentation calibration and testing and check lists.
  5. Manufacturer's certification of proper equipment installation.
  6. Testing and validation of all control inputs, outputs, logic functions, status indication, and alarms.
  7. Factory and field equipment settings.
  8. Equipment lubrication records, as may be needed.
  9. Electrical phase, voltage, and amperage measurements.
  10. Insulation resistance measurements.
  11. Data sheets of control loop testing including testing and calibration of instrumentation devices and set points.
  12. Field test reports.

13. Functional acceptance test report.

14. Other records, logs, and check lists as required by the Contract Documents.

D. Provide summary of shutdown requirements for existing systems if required, which are necessary to complete start-up of new equipment and systems.

#### 1.04 EQUIPMENT INSTALLATION

A. Inspect all equipment and systems following installation and prior to testing.

B. Provide written certification that mechanical, electrical and instrumentation systems furnished are installed to manufacturer requirements prior to testing.

#### 1.05 FIELD TESTING PROCEDURES

A. Mechanical Systems:

1. Remove rust preventatives and oils applied to protect equipment during construction.
2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
3. Flush fuel system and provide fuel for testing and start-up.
4. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
5. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
6. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
7. Perform cold alignment and hot alignment to manufacturer's tolerances.
8. Adjust V-belt tension and variable pitch sheaves.
9. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to insure no leakage but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
10. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
11. Install gratings, safety chains, handrails, shaft guards and sidewalks prior to operational testing.

12. Pressure test pump station piping per the specification requirements.

B. Electrical Systems

1. Perform insulation resistance tests on wiring except 120-volt lighting, wiring, and control wiring inside electrical panels.
2. Perform continuity tests on grounding systems.
3. Test and set switchgear and circuit breaker relays for proper operation.
4. Check motors for actual full load amperage draw. Compare to nameplate value.
5. Perform additional testing procedures as required by NEC, other codes, and Division 26 of these specifications.

C. Instrumentation Systems

1. Bench or field calibrate instruments and make required adjustments and control point settings.
2. Energize transmitting and control signal systems, verify proper operation, ranges and settings.
3. Perform additional testing procedures as required by Division 26 and 40 of these Specifications.

D. HVAC SYSTEMS

1. Leak test piping and ducting.
2. Test all electrical and mechanical components for proper operation.
3. Perform additional testing procedures as required by Division 26 and 40 of these Specifications.

1.06 FUNCTIONAL TESTING

- A. Functionally test mechanical and electrical equipment for proper operation after field testing tasks have been completed.
- B. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration. Perform initial checks in the presence of and with the assistance of the manufacturer's representative.
- C. Demonstrate proper operation of each instrument loop function including alarms, local and remote controls, instrumentation and other equipment functions. Generate signals with test equipment to simulate operating conditions in each control mode.

## 1.07 FUNCTIONAL ACCEPTANCE TEST REPORT

- A. At completion of functional testing, the Contractor shall furnish a written report prepared and signed by manufacturer's authorized representative, certifying equipment:
  - 1. Has been properly installed, aligned, adjusted and lubricated.
  - 2. Is free of any stresses imposed by connecting piping or anchor bolts.
  - 3. Is suitable for satisfactory full-time operation under full load conditions.
  - 4. Operates within the allowable limits for vibration.
  - 5. Controls, protective devices, instrumentation, and control panels furnished as part of the equipment package are properly installed, calibrated, and functioning.
  - 6. Control logic for start-up, shutdown, sequencing, interlocks, and emergency shutdown has been tested and is properly functioning.
- B. Furnish written report prepared and signed by the electrical and/or instrumentation subcontractor certifying:
  - 1. Motor control logic that resides in motor control centers, control panels, and circuit boards furnished by the electrical and/or instrumentation subcontractor has been calibrated and tested and is properly operating.
  - 2. Control logic for equipment start-up, shutdown, sequencing, interlocks and emergency shutdown has been tested and is properly operating.
- C. Co-sign the reports along with the manufacturer's representative and subcontractors.

## 1.08 TRAINING OF OWNER'S PERSONNEL

- A. Provide operations and maintenance training for items of mechanical, electrical and instrumentation equipment. Utilize manufacturer's representatives to conduct training sessions.
- B. Instruction shall be specific to the models of equipment provided.
- C. Proposed training material and a detailed outline of each lesson shall be submitted for review. Comments shall be incorporated into the material.
- D. The training materials shall remain with the trainees.
- E. Training shall be scheduled a minimum of three weeks in advance of the first session.
- F. Coordinate training schedule with City staff. Coordinate training sessions to prevent overlapping sessions. Arrange sessions so that individual operators and maintenance technicians do not attend more than two (2) sessions per week.



- G. Provide Operation and Maintenance Manual for specific pieces of equipment or systems two (2) weeks prior to training session for that piece of equipment or system.
- H. Satisfactorily complete functional testing before beginning operator training.
- I. The OWNER may videotape the training for later use with the OWNER’s personnel.

1.09 MINIMUM SERVICE SCHEDULE

Minimum services shall be provided by the manufacturers’ representatives for certain Contractor-provided equipment in accordance with the following schedule:

Specification Section	Equipment	1 Equipment Installation Instruction	2 Equipment Testing Assistance	3 Operator Training
43 21 39	Submersible Liquid Pumps	1 CWD	2 CWD	1 CWD
26 09 00	Instrumentation and Control	1 CWD	1 CWD	1 CWD
26 32 13	Standby Power System	1 CWD	1 CWD	1 CWD
23 05 93	HVAC/ Mechanical		0.5 CWD	0.5 CWD

NOTE: CWD is defined as a consecutive working day consisting of 8 hours each from 8:00 a.m. to 5:00 p.m.

This service schedule establishes the minimum time commitment; additional time may be necessary to fulfill contractual obligations specified elsewhere.

1.10 OPERATIONAL TESTING

- A. Following operator training and functional testing, conduct operational test of the entire facility. Demonstrate satisfactory operation of equipment and systems in actual operation.
- B. The operational readiness test shall not be commenced until all required equipment tests have been completed to the satisfaction of the Engineer
- C. Operational Test
  - 1. The Contractor shall conduct entire facility operational test for continuous 7-day period without malfunctions or deficiencies causing shutdown or partial operation of the facility or results in performance that is less than specified.

2. Operational test shall use clean potable water to test the functionality of the facility for the first 4-days. Contractor shall provide a minimum of 150 gpm of clean water during this period. After successful completion of the first 4-days of the 7-day operational test, raw sewage can be conveyed to the wet well to continue the operational test of the facility.
  3. Temporary bypass pumping system shall remain in operation during the first 4-days of the operational test, and as a standby during the last 3-days of the operational test. Temporary bypass pump system shall not be removed until successful completion of the operational test.
  4. All equipment must properly run continuously 24 hours per day for the test period and within the design criteria range. If any item malfunctions during the test, the item shall be repaired and the test restarted at day zero with no credit given for the operating time before the aforementioned malfunction.
  5. The Contractor shall provide the services of authorized representatives to correct faulty equipment.
  6. Contractor shall facilitate hydraulic pump testing by the Engineer during the operational test.
- D. The Contractor shall provide operating personnel for the duration of the operational test.
- E. Contractor shall provide power, fuel, and other consumables for duration of the operational test.
- F. Immediately correct defects in material, workmanship, or equipment which became evident during operational test.

#### 1.11 PUMP STATION START-UP ACCEPTANCE

- A. Pump station start-up acceptance will be provided to the Contractor by the Engineer when the following activities are approved by the Engineer:
1. Successful completion of the 7-day operational test.
  2. All records specified in section 1.3.C of this Specification are provided to the Engineer.
  3. All manufacturer training of Owner personnel is complete.

**END OF SECTION**

## SECTION 03 30 00 CAST-IN-PLACE CONCRETE

### PART 1: GENERAL

#### 1.12 DESCRIPTION

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes; includes concrete accessories including the following:

1. Forms.
2. Insulation for below-slab applications.
3. Vapor retarders.
4. Waterstops.
5. Topping materials.
6. Liquid treatment for “sealed concrete” interior finish.

B. Related Requirements:

1. Section 05 50 00 – Metal Fabrications

#### 1.13 COORDINATION

- A. Coordinate embed anchors.
- B. Coordinate expansion joint types with penetrations and edge conditions.
- C. Coordinate concrete finishes required by other work.

#### 1.14 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.
- B. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
- C. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.
- D. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

### 1.15 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated and required for installation. Include the following:
  - 1. Admixtures: Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
  - 2. Include substantiating substantial test data to show compliance with ACI 309.
- C. Shop Drawings, Reinforcement: Comply with ACI SP-066.
- D. Shop Drawings, Construction Joints: Indicate proposed construction joints required for construction. Location of construction joints is subject to approval of the Architect.

### 1.16 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Qualification Data:
  - 1. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.
  - 2. Installer: Include copies of applicable ACI certificates.
  - 3. Ready-mix concrete manufacturer.
  - 4. Testing agency: Include copies of applicable ACI certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.

5. Curing compounds.
  6. Bonding agents.
  7. Adhesives.
  8. Semirigid joint filler.
  9. Joint-filler strips.
  10. Repair materials.
- D. Minutes of preinstallation conference.

#### 1.17 QUALITY ASSURANCE

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.
- B. Installer Qualifications:
1. Concrete: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and supervisor who is an ACI-certified Concrete Flatwork Technician.
  2. Installer shall be experienced cast-in-place concrete installer, with not less than five consecutive years' experience, specializing in installing cast-in-place concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- E. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.

2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade 1. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.
- F. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- G. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specification for Structural "Concrete", Sections 1 through 5.
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

#### 1.18 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
1. Include the following information in each test report:
    - i. Admixture dosage rates.
    - ii. Slump.
    - iii. Air content.
    - iv. Seven-day compressive strength.
    - v. 28-day compressive strength.
    - vi. Permeability.

#### 1.19 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Comply with ASTM C94 and ACI 301.
- C. Protect foam-plastic board insulation as follows:
1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
  2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
  3. Quickly complete installation and concealment of foam-plastic board insulation in

each area of construction.

## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
  - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
  - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
  - 3. Design board-formed finishes without tie-holes on exposed surfaces.

### **2.02 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - i. APA High-density overlay (HDO), Class 1, or better.
    - ii. APA Medium-density overlay (MDO), Class 1, or better, mill-release agent treated and edge sealed.
    - iii. APA Structural 1 Plyform, B-B, or better, mill oiled and edge sealed.
    - iv. APA Plyform Class I, B-B or better, mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces without spiral or vertical seams where exposed and not exceeding specified formwork surface class.
  - 1. Provide forms with sufficient wall thickness to resist plastic concrete loads without

detrimental deformation.

- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum unless otherwise indicated.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.03 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/ A706M, deformed.
  - 1. Provide for all reinforcing steel to be welded or bent in field.

## 2.04 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 plain steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice" of greater compressive strength than concrete.

## 2.05 CONCRETE MATERIALS

- A. Source Limitations:
  - 1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
  - 2. Obtain each type or class of cementitious material of the same brand from the



same manufacturer's plant.

3. Obtain aggregate from single source.
  4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: ASTM C150, Type I/II
    - i. Fly Ash: ASTM C618, Class C or F. Refer to General Structural Notes for additional information.
    - ii. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.
- C. Silica Fume: ASTM C1240, amorphous silica.
- D. Normal-Weight Aggregate: ASTM C33, coarse aggregate or better, graded. Provide aggregates from a single source.
1. Maximum Coarse-Aggregate Size: 3/4 inch.
  2. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
  3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- E. Color Pigment: ASTM C979/C979M, synthetic mineral-oxide pigments, color stable, nonfading, and resistant to lime and other alkalis.
- F. Water: ASTM C94/C94M and potable.

## 2.06 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  2. Retarding Admixture: ASTM C494/C494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

## 2.07 CURING MATERIALS

- A. General: Curing materials used shall be guaranteed by manufacturer, prior to application and use, to not affect the bond or performance of applied finishes. Named products may be used where manufacturer's documentation is provided during Submittals.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
  1. Color:
    - i. Ambient Temperature Below 50 deg F: Black.
    - ii. Ambient Temperature between 50 deg F and 85 deg F: Any color.
    - iii. Ambient Temperature Above 85 deg F: White.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

## 2.08 INSULATION, BELOW-SLAB

- A. Molded (Expanded) Polystyrene Board Insulation: ASTM C578, Type IX: 25-psi minimum.
  1. R-Value: As published by manufacturer for type. Provide R-value indicated.

## 2.09 VAPOR RETARDERS

- A. Sheet Vapor Retarders: ASTM E1745, Class A; 10 mil minimum thickness. Include manufacturer's recommended adhesive, pressure-sensitive tape, termination bars and mastic.

## 2.10 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, ASTM D1752 cork or self-expanding cork, with cap strip for sealant; or

closed-cell foam with tear-off strip.

1. At Interior, Round, Curved Penetrations or Joints: Provide closed cell, neoprene filler. compatible with sealants and use indicated.
    - i. WR Meadows Dock-o-Foam.
    - ii. Non Cross Linked Foam by BoMetals, Inc.
    - iii. Or equal.
  2. Joint filler sealants are specified in Section 07 92 00 - Joint Sealants.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy-Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class, suitable for application temperature and grade to suit requirements, and as follows:
1. Types I and II for non-load bearing and types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

## 2.11 REPAIR MATERIALS

- A. Products to be used in locations permanently exposed to the weather shall be approved by the manufacturer for use in exterior environments.
- B. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
  2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  3. Aggregate: Well-graded, washed gravel or coarse sand sized appropriately for thickness required, as recommended by underlayment manufacturer.
  4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
- C. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface

to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel or coarse sand sized appropriately for thickness required, as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

## 2.12 LIQUID FLOOR TREATMENTS, FOR SEALED CONCRETE

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
  1. Basis-of-Design Product: Euco Dimond Hard by Euclid Chemical or approved equal.
  2. Application: At exposed concrete floors scheduled for sealed concrete finish.

## 2.13 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301 and in accordance with the following:
  1. Compressive Strength: As shown.
  2. Maximum Water-Cementitious Materials Ratio: As shown.
  3. Air Content:
    - i. Structures: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having the air content shown.
  4. Slump Limit: As shown.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as shown.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- D. Admixtures, General: Use admixtures according to manufacturer's written

instructions. Do not add multiple admixtures simultaneously.

1. Use water-reducing, high-range water-reducing or plasticizing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. At board-formed concrete, use water-reducing and plasticizing admixtures.
- E. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.
1. Color: Match Precast Concrete Institute no. 528 "Grey" for color, not aggregate.

#### 2.14 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

#### 2.15 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and ASTM C1116, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

### **PART 3 EXECUTION**

#### 3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
1. Surface Finish-3.0: ACI 117 Class A, 1/8 inch for smooth-formed finished

surfaces.

2. Surface Finish-2.0: ACI 117 Class Class B, 1/4 inch for rough-formed finished surfaces and board-formed concrete.
- D. Construct forms tight enough to prevent loss of concrete mortar.
  - E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
    1. Install keyways, reglets, recesses, and the like, for easy removal.
    2. Do not use rust-stained steel form-facing material.
  - F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
  - G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
  - H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
  - I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
  - J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
  - K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- B. Expansion Joint Material: Place expansion joint material where indicated.

1. Refer to "Isolation Joints" below.
2. All plumbing piping, HVAC and sewerage piping penetrating slabs shall have expansion joint material at interface with concrete. No piping shall be embedded in concrete without expansion joint material.

### 3.03 REMOVING AND REUSING FORMS

- A. General: Formwork that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete if concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
  1. Leave formwork that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Architect.

### 3.04 INSULATION INSTALLATION

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.
- E. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- F. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

### 3.05 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
  - 2. Terminate vapor retarder and seal all penetrations.
    - i. At vertical edge of slab terminations, terminate in a manner to prevent water intrusion during and post-construction. Coordinate termination required with other trades.

### 3.06 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### 3.07 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints complying with requirements.
  - 4. Locate horizontal joints where concealed from view.
  - 5. Space vertical joints where shown. Locate joints, near corners, and in concealed locations where possible.



6. Use a bonding agent or roughen interface to 1/4-inch amplitude at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

### 3.08 CONCRETE PLACEMENT

- A. Before placing concrete, verify the following:
1. That installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
  2. That all standing water and pooling water on vapor retarders have been removed.
  3. That all vapor retarder terminations and penetrations are complete.
  4. That all piping penetrations have expansion material placed around items penetrating concrete, and as required by Plumbing code. No piping shall be directly cast-in concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by the Architect.
1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- C. Adjust mix as required to maintain specified air content at the point of discharge.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer

and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
  
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mixture designs.
  
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.09 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view and without other finishes and concealed from view.
  
- B. Smooth-Formed Finish, Exposed: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects unless otherwise shown as to remain. Remove fins and other projections that exceed specified limits on formed-surface irregularities according to ACI 301 Surface Finish-3.0 (SF-3.0) and as follows:
  - 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete.
  - 2. ACI 301 Surface Finish SF-3.0:
    - i. Patch voids larger 1"
    - ii. Remove projections.
    - iii. Patch tie holes.
    - iv. Surface Tolerance: ACI 117 Class A.
  - 3. Grout-Cleaned Rubbed Finish: Where remediation is required and "sack and patch" is specified for surface treatment.
    - i. Clean concrete surfaces after contiguous surfaces are completed and accessible.
    - ii. Do not clean concrete surfaces as Work progresses.
    - iii. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.

- iv. Wet concrete surfaces.
  - v. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
  - vi. Maintain required patterns or variances as shown on drawings or to match approved mockups.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of ¼ inch (6mm) in one direction.
  - 1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
  - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch and 1/16 inch in 2 feet.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish, to surfaces indicated and to

surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with the Architect before application.

### 3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases: Provide 4-inch-thick concrete pads under mechanical equipment as required or thickness indicated. Reinforce as indicated. Dowel to floor structure around perimeter of pad. Refer to Mechanical drawings for locations. Pad size to extend 6-inches beyond edge of equipment on all sides unless otherwise indicated. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

### 3.12 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1 by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days

with the following materials:

- i. Water.
  - ii. Continuous water-fog spray.
  - iii. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- i. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
  - ii. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - iii. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of a floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
- i. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

### 3.13 APPLICATION OF LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than 28 days' old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Do not allow materials to pool.

4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

### 3.14 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  1. Defer joint filling for minimum 28 days from pour. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.15 CONCRETE SURFACE REPAIRS

- A. General: At exposed areas, do not proceed with required repairs without written permission to proceed from the Architect.
  1. Repair mortar color shall be provided in mockup for review at areas scheduled to be concealed.
  2. Installer shall mockup proposed mix used for color matching at exposed areas, in an area sufficient for review and comparison and with similar conditions required for patching.
- B. Defective Concrete: Repair and patch defective areas when approved by the Architect. Remove and replace concrete that cannot be repaired and patched to Architect approval.
- C. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white portland cement

and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by the Architect.
- E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off



dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- F. Perform structural repairs of concrete, subject to the Architect's approval, using epoxy adhesive and patching mortar.
- G. Repair materials and installation not specified above may be used, subject to the Architect's approval.

### 3.16 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a special inspector and qualified testing and inspecting agency, to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified independent testing and inspecting agency to perform tests, and inspections and to submit test reports.
- C. Inspections: As shown.
- D. Concrete Tests: As indicated in the Statement of Special Inspections and the following;
  - 1. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  - 2. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  - 3. Test results shall be reported in writing to the Architect, Engineer, concrete manufacturer, Building Official, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, type of break for both 7- and 28-day tests, and air content.
  - 4. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by the Architect but will not be used as sole basis for approval or rejection of concrete.
  - 5. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Architect.

Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by the Architect.

6. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
7. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness within 24 hours of finishing.

### 3.17 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces and saw cut and exposed joint edges during construction.

**END OF SECTION 03 30 00**

## SECTION 04 22 00 CONCRETE UNIT MASONRY

### PART 1 GENERAL

#### 1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Grout fill.

B. Related Requirements:

1. Section 07 25 00 - Weather Barriers.
2. Section 07 92 00 - Joint Sealants.
3. Section 08 11 13 - Hollow Metal Doors and Frames.

#### 1.02 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### 1.03 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For the following:
1. Proposed expansion joint spacing, where not shown.
- C. Samples for Verification: For each type and color of the following:
1. Nonstandard CMUs.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- A. Material Certificates: For each type and size of the following:

1. Masonry units.
    - i. Include material test reports substantiating compliance with requirements.
  2. Integral water repellent used in CMUs.
  3. Cementitious materials. Include name of manufacturer, brand name, and type.
  4. Mortar admixtures.
  5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  6. Grout mixes. Include description of type and proportions of ingredients.
  7. Reinforcing bars.
  8. Joint reinforcement.
  9. Anchors, ties, and metal accessories.
- B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C 109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C 91M for air content.
  2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
- C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
- D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

#### 1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups for each type of exposed unit masonry construction in sizes

approximately 96 inches long by 24 inches high by full thickness, including accessories.

- i. Include a sealant-filled joint at least 16 inches long in each exterior wall mockup, sanded to match mortar.
  - ii. Include door opening jamb in mockup.
2. Protect accepted mockups from the elements with weather-resistant membrane.
  3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - i. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Contracting Officer specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

#### 1.08 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried for not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## **PART 2      PRODUCTS**

### **2.01    MANUFACTURERS, SOURCING**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
  - 1. Manufacturers:

- i. Mutual Materials.
- ii. Western Block.
- iii. Western Materials.
- iv. White Block Company, Inc.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

## 2.02 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work.

## 2.03 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
  - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
  - 2. Finish end of units to match face where units are finished.
  - 3. Provide square-edged units for outside corners unless otherwise indicated.
- B. CMUs: ASTM C 90.
  - 1. Density Classification: Medium density unless otherwise indicated.
  - 2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
  - 3. Size, General: Manufactured to dimensions 3/8 inch less-than-nominal dimensions indicated.
  - 4. Sizes and Finishes
    - i. Nominal: 8 by 8 by 16 inches, depth, height by length.
      - 1) Actual: 7-5/8 by 7-5/8 by 15-5/8 inches.
      - 2) Texture and color selections: Reference architectural elevations.

## 2.04 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Aggregate for Mortar: ASTM C144.
  - 2. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
- E. Aggregate for Grout: ASTM C404.
- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- G. Water: Potable.
- H. Mortar Color: Match CMU blocks. Reference architectural elevations.

## 2.05 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

## 2.06 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

## 2.07 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents,



accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
  2. Use portland cement- lime mortar.
  3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type S.
  2. For reinforced masonry, use Type S.
  3. For partitions, used Type S.
- C. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C476.
  3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M, unless otherwise indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
  4. Verify that substrates are free of substances that would impair mortar bond.

- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION, GENERAL

- A. Build chases and recesses to accommodate items specified in this and other Sections.
- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

### 3.03 TOLERANCES

- A. General: Comply with ACI 530.1/ASCE 6/TMS 602 and as indicated below.
- B. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus or minus 1/4 inch where abutting other construction. Plus 1/2 and minus 1/4 inch elsewhere.
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- C. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet, or 1/2-inch maximum.
  - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10

feet, 1/4 inch in 20 feet, or 1/2-inch maximum.

5. For lines and surfaces, do not vary from straight by more than 1/8 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch.

D. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/16 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.
4. Maintain a 1/4 inch to 3/8 inch space or dimension shown, between masonry face and hollow metal frames.

### 3.04 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond pattern.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet masonry if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items, except where otherwise specified.
- E. Retain space between hollow metal frames and masonry for installation of sealant.
- F. At all penetrations other than structural penetrations and those shown as solidly filled, at mechanical and plumbing piping and similar, fill space with backer rod and sealant.

- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.05 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
  - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
  - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
  - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
- B. Lay solid CMUs with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated above or on drawings.
- D. Cut joints flush for masonry walls to receive, plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Cut joints flush where indicated to receive adhered weather barriers unless otherwise indicated.

### 3.06 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as indicated on Drawings and using one of the methods where no joints are described on the drawings as acceptable to the Contracting Officer, as follows:
  - 1. Install preformed control-joint gaskets designed to fit standard sash block.
  - 2. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
  - 3. Install temporary foam-plastic filler in head joints, and remove filler when unit

masonry is complete for application of sealant.

### 3.07 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 60 inches or as indicated.

### 3.08 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections shall be in accordance with the provided statement of special inspections.

### 3.09 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain the Contracting Officer's approval of sample cleaning before proceeding with cleaning of masonry.
  3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

### 3.10 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- C. Excess Masonry Waste: Remove excess clean masonry waste and legally dispose of off the Project property.

**END OF SECTION 04 22 00**

## SECTION 05 50 00 METAL FABRICATIONS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. The extent of metal fabrications work is shown on the Drawings and includes items fabricated from iron, steel, stainless steel and aluminum shapes, plates, bars, sheets, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other sections of these specifications.
- B. Section Includes:
  - 1. Bollards
  - 2. Ladders
  - 3. Anchor bolts
  - 4. Vault and wet well access hatches
  - 5. Cable Trench Frame and Cover
  - 6. Fasteners
  - 7. Miscellaneous fabricated items

#### 1.02 RELATED SECTIONS

- A. Section 09 90 00, Painting and Coating.
- B. Section 33 05 17, Precast Concrete Utility Structures

#### 1.03 REFERENCE STANDARDS

- A. Aluminum Association:
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association:
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- C. American National Standards Institute:
1. ANSI A14.3 - American National Standard (ASC) for Ladders - Fixed - Safety Requirements.
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
  2. AWS D1.1 - Structural Welding Code - Steel.
  3. AWS D1.6 - Structural Welding Code - Stainless Steel.
- E. ASTM International:
1. ASTM A6 - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
  2. ASTM A36 - Standard Specification for Carbon Structural Steel.
  3. ASTM A47, grade as selected - Malleable Iron Castings.
  4. ASTM A48, Class 30 - Gray Iron Castings.
  5. ASTM A53- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  6. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  7. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  8. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  9. ASTM A193 - Standard Specification for Alloy-Steel and Stainless-Steel Bolting for High Temperature or High-Pressure Service and Other Special Purpose Applications.
  10. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.



11. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
12. ASTM A283, Grade C - Steel Plates to be Bent or Cold Formed.
13. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
14. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
15. ASTM A312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless-Steel Pipes.
16. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.
17. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
18. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
19. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
20. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing.
21. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
22. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
23. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
24. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
25. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
26. ASTM A992 - Standard Specification for Structural Steel Shapes.
27. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings.
28. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings.

29. ASTM B177 - Standard Guide for Engineering Chromium Electroplating.
  30. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  31. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
  32. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
  33. ASTM B 308, Alloy 6061-T6, Anodic Coating Class I, AA-C22-A41, anodized after fabrication - Structural Aluminum Shapes and Plates.
  34. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  35. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
  36. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.
  37. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
  38. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength.
  39. ASTM F436 - Standard Specification for Hardened Steel Washers.
  40. ASTM F844 - Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
  41. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.
- F. Builders Hardware Manufacturers Association (BHMA):
1. ANSI/BHMA A156.20 - American National Standard for Strap and Tee Hinges and Hasps.
- G. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes.
- H. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
3. SSPC Paint 20 - Zinc-Rich Coating (Type I - Inorganic and Type II - Organic).
4. SSPC SP 1 - Solvent Cleaning.
5. SSPC SP-7 Brush-off Blast Cleaning.
6. SSPC SP 10 - Near-White Blast Cleaning.

#### 1.04 SUBMITTALS

- A. Manufacturer's Data: Submit copies of manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in miscellaneous metal work, including paint products.
- B. Shop Drawings:
  1. General: Submit copies of shop drawings for the fabrication and erection of all assemblies of miscellaneous metal work which are not completely shown by the manufacturer's data sheets.
    - i. Include plans, elevations and details of sections and connections and fabricators proposed shop coat paint or galvanizing specifications.
    - ii. Show anchorage and accessory items.
    - iii. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete construction.
    - iv. Indicate welded connections using standard AWS A2.4 welding symbols.
    - v. Indicate net weld lengths.
  2. Stairs, Handrails and Railings:
    - i. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  3. Gratings:

- i. Indicate details of gratings, plates, component supports, anchorages, openings, perimeter construction details, and tolerances.

C. Samples:

- 1. Submit two sets of representative samples of materials, illustrating factory finishes as may be requested by the Engineer.
- 2. Engineer's review will be for color, texture, style and finish only.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Transporting, handling, storing, and protecting products shall be in accordance with manufacturer's requirements.
- B. Inspection: Accept metal fabrications on-site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather or by ground contact.

1.06 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements prior to preparation of Shop Drawings and fabrication. Indicate field measurements on Shop Drawings.
  - 1. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication.

**PART 2 PRODUCTS**

2.01 GENERAL

A. For the fabrication of miscellaneous metal work items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names, roughness and defects which impair strength, durability and appearance. Remove such blemishes by grinding or by welding and grinding prior to cleaning, treating and application of surface finishes including zinc coatings.

2.02 BOLLARDS

- A. Description:
  - 1. Steel pipe, concrete filled.
  - 2. Crowned cap.

3. Size: 6-inch diameter, length as indicated on Drawings.
  4. Shop Finish: Coat per coating system 101 in Specification 09 90 00 Painting and Coating
- B. Concrete Fill: Minimum Compressive Strength: 3,000 psi.
- C. Anchors: Concealed type as indicated on Drawings.

## 2.03 LADDERS

### A. Vault Ladder:

1. ANSI A14.3.
2. Aluminum welded construction.
3. Siderails:
  - i. Size: 1/2 by 2 inches.
  - ii. Spacing: 20 inches o.c.
4. Rungs:
  - i. Solid knurled bar.
  - ii. Size: 1-inch diameter.
  - iii. Spacing: 12 inches o.c.
5. Mounting:
  - i. Space ladder as shown on Drawings, minimum of 7 inches from wall surface or edge of vault lid.
  - ii. Provide steel mounting brackets and attachments for connections to the wall and floor.
6. Shop Finish:
  - i. Ladder: Mill finish
  - ii. Steel mounting brackets: Coating System 101 per Section 09 90 00.
7. Accessories: Equip with 36" retractable aluminum extension.

## 2.04 ANCHORS

- A. All anchors shall be epoxy anchors or expansion anchors as shown in the Drawings.
- B. All threads on stainless steel fasteners shall be protected with an anti-seize lubricant suitable for submerged application. Anti-Seize Technology Pure White or approved equal.
- C. Where stainless steel bolts are in contact with dissimilar metals, glass epoxy insulating sleeves and washers shall be used to electrically isolate the bolts.
- D. Materials:
  - 1. As shown in the Drawings.
  - 2. For direct bury:
    - i. Malleable iron complying with ASTM A47.
    - ii. Cast steel complying with ASTM A27.
    - iii. Iron and steel galvanized in compliance with ASTM A153.
  - 3. For wetted atmospheric conditions
    - i. Type 316 stainless steel. Provide dielectric isolation
  - 4. Threaded rod, nuts, bolts and washers:
    - i. Material matching anchor insert type.
- E. Types:
  - 1. Threaded-type Concrete Inserts:
    - i. Internally threaded to receive machine bolts.
    - ii. Malleable iron, ASTM A47.
    - iii. Cast steel, ASTM A27.
    - iv. Stainless steel, type 304, ASTM A320.
  - 2. Wedge-type Concrete Inserts:
    - i. Box-type ferrous castings, designed to accept bolts having special wedge-shaped heads.
  - 3. Slotted-type Concrete Inserts:

- i. Box-type welded construction with slot designed to receive square head bolt and with knockout cover.

F. Manufacturers:

1. Hilti, Inc.
2. Simpson Strong-Tie Co., Inc.
3. Proprietary products as named in the Drawings.

2.05 ACCESS HATCHES

- A. Use materials of the size and thickness shown in Drawings or, if not shown in the Drawings, of the size recommended by product manufacturer.
- B. Work to the dimension shown in the Drawings or accepted on final shop drawings, using proven details of fabrication and support.
- C. Manufacturer shall guarantee units against defects in materials and workmanship for a period of no less than 5 years.
- D. Vault Access Hatches:
  1. Access hatches shall be triple leaf diamond plate aluminum with dimensions and features as shown on the Drawings. The minimum design load shall be H-20 loading for exterior hatches.
  2. Hardware shall be Type 316 stainless steel. This includes nuts, bolts, washers, hinges, springs, spring assisted operators, and automatic hold open arm with release lever.
  3. Each leaf shall have a spring-assisted operator to reduce lifting force to 10-30 pounds where shown.
  4. Recessed padlock hasp with hinged cover.
  5. The leaves shall securely latch when closed.
  6. Frames shall be structural aluminum.
  7. Flush grip handle.
  8. Heavy duty automatic lock open arm with red vinyl release grip.
  9. Channel frame with 1-1/4" anchor flange around the perimeter, equipped with a neoprene gasket for weather tight seal and side bottom outlet 1-1/2" aluminum IPS threaded drain coupling outlet integrated into the frame. The drain coupling shall be equipped with a ball valve for isolation.

10. Stainless steel slam-lock.
11. Shop finish of cover and frame: Mill finish.
12. Provide with optional orange safety grate.

E. Wet Well Access Hatch:

1. Access hatches shall be single or double leaf diamond plate aluminum with dimensions and features as shown on the Drawings. The minimum design load shall be H-20 loading.
2. The hatch shall be watertight and capable of holding up to 25 feet head of water. The bottom of the cover shall have a continuous groove to securely hold a 9/16-inch diameter EPDM gasket around its perimeter. The cover shall have 316 stainless steel flood-tight camlock to compress the gasket so that the door will not leak from standing water.
3. Hardware shall be Type 316 stainless steel. This includes nuts, bolts, washers, hinges, springs, spring assisted operators, and automatic hold open arm with release lever.
4. Each leaf shall have a spring-assisted operator to reduce lifting force to 10-30 pounds where shown.
5. Recessed padlock hasp with hinged cover.
6. Provide with optional orange safety grate under each hatch.
7. The leaves shall securely latch when closed.
8. Frames shall be structural aluminum.
9. Flush and flood tight lift handle.
10. Heavy duty automatic lock open arm with red vinyl release grip.
11. Angle type frame with strap anchors.
12. Stainless steel slam-lock.
13. Shop finish of cover and frame: Mill finish.

- F. Access hatches shall be manufactured by U.S.F. Fabrication, LW Hatches, or approved equal.

2.06 CABLE TRENCH FRAME AND COVER



- A. Electrical cable trench frames and covers for power and control cables from the disconnect panel to the wet well shall be pre-engineered, manufactured system that conforms to the design loading requirements of AASHTO H-20 and HS-20. This cable trench frame and cover system shall be set in cast in place concrete.
- B. The system shall include a method of forming a round bottom channel sloped to a minimum of 0.5%. The frame shall be powder coated and have anchors at 45 degrees into surrounding concrete, with intersection kits available for 45 degree and 90 degree angles.
- C. A solid ¼" 5086 aluminum diamond plate cover shall be supplied with a locking device which directly connect the cover to the frame.
- D. Cast in place concrete shall meet the requirements of Standard Specification Section 00446 and shall meet the dimensional requirements as shown on the drawings.
- E. Manufacturer
  - 1. 1. Cable trench frame and cover system shall be Econodrain Series 8 as manufactured by Multidrain System, or approved equal

## 2.07 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting systems. Acceptable manufacturers are Simpson or approved equal.
- B. Manufacture or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere furnish galvanized steel washers.

## 2.08 MISCELLANEOUS FABRICATIONS, FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports required to complete the Work.
- B. Fabricate miscellaneous units to the sizes, shapes and profiles shown in the Drawings or, if not shown, of the required dimensions to receive adjacent grating, plates doors, or other work to be retained by the framing.
- C. Except as otherwise shown, fabricate from structural steel shapes and plate and steel bars, all welded construction using mitered corners, welded brackets and splice plates and a minimum number of joints for field connection.
- D. Cut, drill and tap units to receive hardware and similar items to be anchored to the work.
- E. Equip units with integrally welded anchors for casting into concrete, bolting to structural steel or building into masonry. Furnish inserts if units must be installed after concrete is placed.
- F. Galvanize all miscellaneous fabrications unless otherwise noted.

## 2.09 NON-SHRINK GROUT

- A. Where required for anchoring, patching, or sealing, grouting compounds shall conform to the requirements of Standard Specification Section 02080. Sealers shall conform to the requirements of Standard Specification Section 02060.

## 2.10 MATERIALS

- A. Materials listed below shall be provided unless otherwise noted in the Drawings or other sections of these specification.

- B. Steel:

1. Structural W Shapes: ASTM A992.
2. Structural Shapes: ASTM A36.
3. Channels and Angles: ASTM A36.
4. Steel Plate: ASTM A36.
5. Steel Plate to be Bent or Cold Formed: ASTM A283, Grade C.
6. Hollow Structural Sections: ASTM A500, Grade B.
7. Structural Pipe: ASTM A53, Grade B, Schedule 40 unless shown otherwise in Drawings.
8. Bar: ASTM A36 .
9. Cold-Finished Steel Bar: ASTM A108, grade as selected by fabricator.
10. Sheet Steel: ASTM A653, Grade 33 Structural Quality.
11. Tubing: ASTM A513, Type 5, minimum 50 ksi yield strength.
12. Standard Bolts: ASTM A307; Grade A.
13. Washers: ASTM F844.
14. High Strength Bolts: ASTM A325.
15. Washers: ASTM F436; Type 1.
16. Nuts: ASTM A563; heavy-hex type.
17. Welding Materials: AWS D1.1; type required for materials being welded.

- C. Stainless Steel:

1. Bars and Shapes: ASTM A276; Type 316.
2. Tubing: ASTM A269; Type 316.
3. Pipe: ASTM A312, seamless; Type 316.
4. Plate, Sheet, and Strip: ASTM A666; Type 316.
5. Bolts, Nuts, and Washers: ASTM A354; Type 316.
6. Welding Materials: AWS D1.6; type required for materials being welded.

D. Aluminum:

1. Structural Aluminum Shapes and Plates: ASTM B308, Alloy 6061, Temper T66, Anodic Coating Class I, anodized after fabrication.
2. Aluminum-Alloy-Drawn Seamless Tubes: ASTM B210 Alloy 6063, Temper T6.
3. Aluminum-Alloy Bars: ASTM B211 Alloy 6063, Temper T6.
4. Bolts, Nuts, and Washers: Stainless steel or Steel, galvanized.
5. Welding Materials: AWS D1.1; type required for materials being welded.

E. Bolts, Nuts, and Washers for Equipment and Piping:

1. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.
2. Carbon Steel:
  - i. General: Zinc-coated, ASTM A153.
  - ii. Structural Connections: ASTM A307, Grade 2 (60 ksi), hot-dip galvanized.
  - iii. Anchor Bolts: ASTM A307, Grade 2 (60 ksi), hot-dip galvanized.
    - (i) Where shown on the drawings, stainless steel anchor bolts shall be provided as specified herein.
3. For buried service bolts, nuts and washers for piping see Standard Specifications.
4. Stainless Steel: Type 316 stainless steel, Class 2; ASTM A193 for bolts; ASTM A194 heavy hex head for nuts.

- i. Where stainless steel bolts are in contact with dissimilar metals, glass epoxy insulating sleeves and washers shall be used to electrically isolate the bolts.

## 2.11 FABRICATION

### A. Workmanship:

1. Use materials of the size and thicknesses shown in the Drawings or, if not shown, of the required size and thickness to produce adequate strength and durability in the finished product for the intended use as approved by the Engineer.
2. Work to the dimensions shown in the Drawings or accepted on Shop Drawings, using proven details of fabrication and support.
3. Use the type of materials shown in the Drawings or specified for the various components of work.
4. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
5. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise shown in the Drawings.
6. Form bent-metal corners to the smallest radius possible without causing grain separation or otherwise impairing the Work.

### B. Fit and shop-assemble items in largest practical sections for delivery to Site.

### C. Fabricate items with joints tightly fitted and secured.

### D. Continuously seal joint members by means of continuous welds in accordance with the recommendations of AWS, unless otherwise noted or approved.

### E. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small, uniform radius.

### F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

### G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### H. Loose Bearing and Leveling Plates:

1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area.

2. Drill plates to receive anchor bolts and for grouting as required.
  3. Hot-dip galvanize after fabrication.
- I. Miscellaneous Steel Trim:
1. Provide shapes and sizes for profiles shown in the Drawings.
  2. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges.
  3. Use concealed field splices wherever possible.
  4. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.
- J. Fabrication Tolerances:
1. Squareness: 1/8-inch maximum difference in diagonal measurements.
  2. Maximum Offset between Faces: 1/16 inch.
  3. Maximum Misalignment of Adjacent Members: 1/16 inch.
  4. Maximum Bow: 1/8 inch in 48 inches.
  5. Maximum Deviation from Plane: 1/16 inch in 48 inches.

## 2.12 FINISHES

### A. Steel:

1. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
2. Do not prime surfaces in direct contact with concrete or where field welding is required.
3. Prime-paint items with one coat, except where galvanizing is specified.
4. Coatings as specified per Section 09 90 00, Painting and Coating.
  - i. Primer paint selected must be compatible with the required finish coats of paint.
  - ii. At locations in contact with potable water, use only primer approved for potable water use.
5. Galvanizing for Rolled, Pressed and Forged Steel Shapes, Plates, Bars and Strips: ASTM A123; hot-dip galvanize after fabrication.

6. Galvanizing for Fasteners, Connectors, and Anchors:
    - i. Hot-Dip Galvanizing: ASTM A153.
    - ii. Mechanical Galvanizing: ASTM B695; Class 50 minimum.
  7. Chrome Plating: ASTM B177, nickel-chromium alloy, satin finish.
  8. Sheet Steel: Galvanized.
  9. Bolts: Hot-dip galvanized.
  10. Nuts: Hot-dip galvanized.
  11. Washers: Hot-dip galvanized.
  12. Touchup Primer for Galvanized Surfaces: ASTM A780 (A780M), A1. Repair Using Zinc-Based Alloys (Heat and Stick Method).
- B. Stainless Steel:
1. Satin-Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.
- C. Aluminum:
1. Protection of All Aluminum:
    - i. Aluminum surfaces in contact with cementitious, masonry or dissimilar materials, apply the following coating system:
      - (i) One (1) coat of epoxy primer, 1 to 2 mils dry film (D.F.).
      - (ii) Followed by two (2) coats of Bitumastic, 6 to 8 mils D.F.
      - (iii) Followed by two (2) coats of tarset material, 6 to 8 mils D.F.
- D. Shop Painting
1. Shop paint miscellaneous metal work in accordance with Section 09 90 00, Painting and Coating, with the following exceptions:

- i. Those members or portions of members to be embedded in concrete or masonry.
    - ii. Surfaces and edges to be field welded.
    - iii. Galvanized surfaces.
  2. Remove scale, rust and other deleterious materials before the shop coat of paint is applied.
    - i. Clean off heavy rust and loose mill scale in accordance with SSPC SP-7, Brush-off Blast Cleaning.
    - ii. Remove oil, grease and similar contaminants in accordance with SSPC SP-1, Solvent Cleaning.
  3. Immediately following surface preparation, brush or spray on metal primer paint, applied in accordance with the manufacturer's instructions or as specified below.
  4. Apply one (1) shop coat of metal primer paint to fabricated metal items, except apply two (2) coats of paint to surfaces which will be inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
- E. Touch-up Painting, Pre-painted Items:
  1. Immediately after erection, clean field welds, bolted connections, and abraded areas of the shop paint, and paint all exposed areas with the same material as used for shop painting.
  2. Apply touch-up coatings by brush or spray to provide a minimum dry film thickness of the original coating thickness.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive Work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal and aluminum where Site welding is required.
- B. Furnish setting drawings, diagrams, templates, instructions and directions for the installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections. Coordinate

delivery of such items to the project Site.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, and free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment until permanent bracing and attachments are installed.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- D. Fit exposed connections accurately together to form tight hairline joints.
- E. Grind joints smooth and touch-up shop paint coat.
- F. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- G. Field-weld components indicated on Drawings and Shop Drawings.
- H. Perform field welding according to AWS D1.1 with regards to procedures of manual shielded metal-arc welding, the appearance and quality of welds made and the methods used in correcting welding work.
- I. Obtain approval of Engineer prior to site cutting or making unscheduled adjustments.

### 3.04 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story or for every 12 feet in height, whichever is greater, non-cumulative.
- B. Maximum Variation from Level: 1/16 inch in 3 feet and 1/4 inch in 10 feet.
- C. Maximum Offset from Alignment: 1/4 inch.
- D. Maximum Out-of-Position: 1/4 inch.

### 3.05 FIELD QUALITY CONTROL

- A. Welding: Inspect welds according to AWS D1.1.
- B. Replace damaged or improperly functioning hardware.
- C. After erection, touch up welds, abrasions, and damaged finishes with prime paint or galvanizing repair paint to match shop finishes.
- D. Touch up factory-applied finishes according to manufacturer-recommended procedures.



3.06 ADJUSTING

- A. Adjust operating hardware and lubricate as necessary for smooth operation.

**END OF SECTION**

## SECTION 06 17 53 SHOP-FABRICATED WOOD TRUSSES

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:
  - 1. Wood roof trusses.

#### 1.03 DEFINITIONS

- A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

#### 1.04 ACTION SUBMITTALS

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
  - 2. Indicate sizes, stress grades, and species of lumber.
  - 3. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 4. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
  - 5. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For metal connector-plate manufacturer and fabricator.

- B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.
- C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- D. Evaluation Reports: For the following, from ICC-ES:
  - 1. Metal-plate connectors.
  - 2. Metal truss accessories.

#### 1.06 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction and is certified for chain of custody by an FSC-accredited certification body.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."
  - 1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
  - 2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
  - 3. Provide for air circulation around stacks and under coverings.
- B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

## **PART 2 PRODUCTS**

### **2.01 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.
- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.
  - 1. Design Loads: As indicated.
  - 2. Maximum Deflection under Design Loads:
    - i. Roof Trusses: Vertical deflection of 1/180 (total load) 1/240 (live/snow) of span.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

### **2.02 DIMENSION LUMBER**

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Provide dressed lumber, S4S.
  - 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing.
- B. Minimum Chord Size for Roof Trusses: per drawings.
- C. Minimum Specific Gravity for Top Chords: 0.5.
- D. Permanent Bracing: Provide wood bracing as required.

### **2.03 METAL CONNECTOR PLATES**

- A. Basis of design is Simpson Light Gauge connectors. Contractor may submit for approval an alternative connector with design values that meet or exceed the values

of the specified connector per the Simpson catalog.

- B. General: Fabricate connector plates to comply with TPI 1.
- C. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 (Z180) coating designation; and not less than 0.036 inch (0.9 mm) thick.
  - 1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
  - 1. Use for wood-preservative-treated lumber and where indicated.

#### 2.04 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
  - 2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.

#### 2.05 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Allowable design loads, as published by manufacturer, shall comply with or exceed those of basis-of-design product. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- B. Basis of design is Simpson Light Gauge connectors. Contractor may submit for approval an alternative connector with design values that meet or exceed the values of the specified connector per the Simpson catalog.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
- D. Use for interior locations unless otherwise indicated.
- E. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS),

high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

## 2.06 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

## 2.07 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## 2.08 SOURCE QUALITY CONTROL

- A. Special Inspections: Contractor will engage a qualified special inspector to perform special inspections.
  1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
  2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.
- B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

# **PART 3 EXECUTION**

## 3.01 INSTALLATION

- A. Install wood trusses only after supporting construction is in place and is braced and

secured.

- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- F. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
  - 1. Anchor trusses to girder trusses as indicated.
- I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  - 1. Install bracing as required.
- J. Install wood trusses within installation tolerances in TPI 1.
- K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- L. Replace wood trusses that are damaged or do not comply with requirements.
  - 1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

### 3.02 REPAIRS AND PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

- C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A 780/A 780M and manufacturer's written instructions.

3.03 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

**END OF SECTION**



## SECTION 09 90 00 PAINTING AND COATING

### PART 1 GENERAL

#### 1.01 THE REQUIREMENT

- A. Work under this Section shall include the protective coating of all specified surfaces including all surface preparation, pretreatment, coating application, touch-up of factory coated surfaces, protection of surfaces not to be coated, cleanup, and appurtenant work, all in accordance with the requirements of the Contract Documents.
- B. This specification is applicable to coated pipe, steel, concrete and other surfaces listed in the coating schedule at the end of this section.
- C. The Coating System Schedules summarize the surfaces to be coated, the required surface preparation and the coating systems to be applied. Coating notes on the drawings are used to show exceptions to the schedules, to show or extend the limits of coating systems, or to clarify or show details for application of the coating systems.
- D. Related Work Specified in Other Sections -- Shop coatings and/or factory finishes on fabricated or manufactured equipment may be specified in other divisions. Some items with factory finishes, or corrosion resistant finishes may be scheduled or directed to be painted by the ENGINEER to unify a wall finish or color scheme, at the ENGINEER's discretion.
- E. Exclusions -- Do not coat the following surfaces unless specified or directed elsewhere: Stainless steel, aluminum, copper, brass, bronze and other corrosion-resistant material (except for valve bodies and piping); Electrical switch-gear and motor control centers having factory finish; Fencing; Multiple coated factory finished baked enamel or porcelain products; Concealed areas such as ducts, piping, conduits and items specified elsewhere for special linings and coatings.
- F. Damaged Factory Finish -- If directed by the ENGINEER, refinish the entire exposed surfaces of equipment chipped, scratched or otherwise damaged in shipment or installation.
- G. All coating coming in contact with potable water shall be NSF approved.

#### 1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Comply with the provisions of the following codes, specifications and standards, except as otherwise shown or specified.
  - 1. "Architectural Specification Manual" by the Painting and Decorating Contractors of America (PDCA), 333 Taylor Avenue North, Seattle, Washington 98109.
  - 2. "Systems and Specifications" - Volume 2 of Steel Structures Painting Council (SSPC).
  - 3. National Sanitation Foundation (NSF) Standard No. 61.

B. References herein to "NACE" shall mean the published standards of the National Association of Corrosion Engineers, P.O. Box 986, Katy, TX 77450.

C. Pipe Coating Commercial Standards

ANSI/AWWA C105	Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids.
ANSI/AWWA C203	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied.
ANSI/AWWA C205	Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4-inch and Larger - Shop Applied
ANSI/AWWA C209	Cold Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Pipelines.
ANSI/AWWA C210	Liquid Epoxy Coating for Exterior and Interior of Steel Pipe.
ANSI/AWWA C223	Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
ANSI/AWWA C214	Tape Coating systems for the Exterior of Steel Water Pipelines.

D. Federal Specifications

DOD-P-23236A(SH)	Military Specification, Paint Coating Systems, Steel Ship Tank, Fuel and Saltwater Ballast.
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1.03 CONTRACTOR SUBMITTALS

- A. Coating Materials List -- The CONTRACTOR shall provide a coating materials list which indicates the manufacturer and the coating number, keyed to the coating systems herein.
- B. Coating Manufacturer's and Applicator Information -- For each coating system to be used the CONTRACTOR shall submit, the following listed data:
1. Manufacturer's data sheet for each product used, including statements on the suitability of the material for the intended use.
  2. Manufacturer's instructions and recommendations on surface preparation and application.
  3. Colors available for each product and each coat.
  4. Compatibility of shop and field applied coatings (where applicable).

5. Material safety data sheet (MSDS) for each product used.
6. The manufacturer's recommended products and procedures for field coating repairs and field preparation of field cut pipe ends.
7. The name of the proposed coating applicator shop along with certification that the applicator shop is qualified and equipped to apply the coatings systems as specified.
8. Certificate -- Submit manufacturer's certificate of compliance with the specifications and standards signed by a representative in the manufacturer's employ.
9. Samples -- Provide painted surface areas at the job for approval of main color selections, or submit sample on 12-inch sample of substrate using required finish system at ENGINEER's discretion.

#### 1.04 QUALITY ASSURANCE

- A. Painter Qualifications -- The Painting/Coating CONTRACTOR must be capable of performing the various items of work as specified. The Painting/Coating CONTRACTOR shall furnish a statement covering experience on similar work, a list of machinery, plant and other equipment available for the proposed work, and a financial statement, including a complete statement of the Painter/Coating CONTRACTOR's financial ability and experience in performing similar painting and coating work. The Painting/Coating CONTRACTOR shall have a minimum of five (5) years practical experience and a successful history in the application of the specified products to concrete/steel surfaces. Upon request, the Painting/Coating CONTRACTOR shall substantiate this requirement by furnishing a list of references, which shall include jobs of similar nature. The CONTRACTOR shall give the ENGINEER a minimum of 3 days advance notice of the start of any field surface preparation work of coating application work, and a minimum of 7 days advance notice of the start of any shop surface preparation work.
- B. All such work shall be performed only in the presence of the ENGINEER, unless the ENGINEER has granted prior approval to perform such work in its absence.
- C. Inspection by the ENGINEER, or the waiver of inspection of any particular portion of the work, shall not relieve the CONTRACTOR of its responsibility to perform the work in accordance with these Specifications.
- D. Surface Preparation -- Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the standard samples available from the NACE, using NACE standard TM-01-70.
- E. Scaffolding shall be erected and moved to locations where requested by the ENGINEER to facilitate inspection. Additional illumination shall be provided by the CONTRACTOR to cover all areas to be inspected.

- F. Paint Products -- No request for substitution shall be approved which decreases the film thickness designated or the number of coats to be applied, or which offers a change from the generic type of coating specified. Painting shall be done at such times as the CONTRACTOR and ENGINEER may agree upon in order that dust-free and neat work be obtained. All painting shall be in strict accordance with the manufacturer's instructions and shall be performed in a manner satisfactory to the ENGINEER.
- G. Manufacturer's Representative -- Require coating manufacturer's representative to be at job site when the first day's coating application is in progress and periodically during progress of the work.
- H. Labels -- Deliver to the job site in the original sealed containers with manufacturer's name, product name, type of product, manufacturer's specification or catalog number or federal specification number, and instructions for reducing where applicable.
- I. Colors -- Colors will be selected from manufacturer's standard colors as reviewed by ENGINEER and approved by the OWNER. Colors for special coatings that are limited in their availability and color selection will be chosen on the basis of manufacturer's standard colors, provided that the manufacturer's product line represents a color range comparable to similar products of other manufacturers.
- J. Flame Spread -- Provide paint materials which will result in a Class II finish for all coated surfaces in exit corridors, and a Class III finish for all other interior rooms or areas.
- K. Film Thickness Testing -- On ferrous metals, the dry film coating thickness shall be measured in accordance with the SSPC "Paint Application Specification No. 2" using a magnetic-type dry film thickness gage such as Mikrotest model FM, Elcometer model 111/1EZ, or approved equal. Each coat shall be tested for the correct thickness. No measurements shall be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses shall be measured at the time of application using wet film gage readings and destructive film thickness tests.

#### 1.05 DELIVERY, HANDLING AND STORAGE

- A. Deliver in labeled containers as specified above and store in a locked room accessible for inspection. Comply with fire and health regulations.
- B. Provide adequate heat and forced mechanical ventilation for health, safety and drying requirements. Use explosion proof equipment. Provide face masks.
- C. Protect adjacent surfaces with suitable masking and drop cloths as required. Remove cloths or waste from the project daily.
- D. Apply to surfaces under recommended environmental conditions and within the limitations established by the material manufacturer. Do not apply coating in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces, unless otherwise permitted by the coating manufacturer's printed instructions. Coating application may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

## 1.06 PROTECTION

- A. Follow all safety recommendations of manufacturer regarding ventilation and danger from explosion or breathing paint fumes or skin exposure, and all applicable O.S.H.A. and other regulations.
- B. Protect surface adjacent to work being coated from overspray, drips or other damage.

## 1.07 EXTRA STOCK

- A. Provide one gallon of each type and color, fully labeled, at completion of job.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. Definitions -- The terms "paint," "coatings" or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, tape and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.
- B. General -- Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use.
- C. The CONTRACTOR shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.
- D. Compatibility -- In any coating system only compatible materials from a single manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the approval of the ENGINEER, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.
- E. Colors -- All colors and shades of colors of all coatings shall be as selected or specified by the ENGINEER. Each coat shall be of a slightly different shade, to facilitate inspection of surface coverage of each coat. Finish colors shall be as selected from the manufacturer's standard color samples by the ENGINEER. Color pigments shall be lead free.
- F. Protective Coating Materials -- Products shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, the CONTRACTOR shall provide the ENGINEER with the names of not less than 10 successful applications of the proposed manufacturer's products demonstrating compliance with this specification requirement.
- G. Substitute or "Or-Equal" Submittals -- Unless otherwise specified, materials are from

the catalogs of the companies listed herein. Materials by other manufacturers are acceptable provided that they are established as being compatible with and of equal quality to the coatings of the companies listed. The CONTRACTOR shall provide satisfactory documentation from the firm manufacturing the proposed substitute or "or equal" material that said material meets the specified requirements and is equivalent or better than the listed materials.

- H. The cost of all testing and analyzing of the proposed substitute materials that may be required by the ENGINEER shall be paid by the CONTRACTOR. If the proposed substitution requires changes in the contract work, the CONTRACTOR shall bear all such costs involved and the costs of allied trades affected by the substitution.

## 2.02 INDUSTRIAL COATING SYSTEMS

### A. General

Provide and apply the industrial coatings systems which follow as listed in the coating schedule, as required by these specifications and as directed by the ENGINEER. Coat all existing and new exposed interior or exterior surfaces and submerged and intermittently submerged surfaces as indicated, except as specifically excluded in Part 1 of this section or on the drawings or finish schedules. Coating System Numbers listed below shall be used as the Coating System code letter, and shall be used on any coating submittals or correspondence.

### B. Industrial coating systems shall be as follows

#### 1. Coating System 100

- i. Location -- Exposed, unprimed, non-galvanized, non-submerged metal surfaces, both interior and exterior including piping and structural steel.
- ii. Surface Preparation -- As specified herein.
- iii. Coating System -- Apply prime coat and topcoat, 4.0-6.0 mils each coat of Tnemec Series 66 Hi-Build Epoxoline, or approved equal. Color as selected by Owner.

#### 2. Coating System 101

- i. Location -- Exposed metal surfaces, shop primed, both interior and exterior including piping, railings, ladders, steel doors, and any other metal items not otherwise specified.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- Apply shop prime coat 3.0 mils DFT Tnemec Series 90-97 Tneme-Zinc, one coat 4.0 - 6.0 mils DFT Tnemec Series 66 Hi-Build Epoxoline, and 3.0 - 4.0 mils DFT of Tnemec Series 73 Endura Shield, or approved equal. Color as selected by Owner.
3. Coating System 102
- i. Location -- Unprimed or non-galvanized, continuously or intermittently submerged metal items, both interior and exterior including piping, structural steel and all other metal items not otherwise specified.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- Prime, intermediate and topcoat, 4.0-6.0 mils each coat of Tnemec Series 20 Pota-Pox, or approved equal. Color as selected by Owner.
4. Coating System 103
- i. Location -- Vertical concrete walls, exterior, below finish grade, not exposed to view.
  - ii. Surface Preparation -- Per manufacturer's requirements, surface shall be clean and free of all oil, grease, dirt, laitance, and loose or foreign materials. Surface shall be dampened with water and kept damp until application of the coating.
  - iii. Paint System -- Apply two coats of BASF MasterSeal or approved equal, in accordance with manufacturer's recommendations. Allow first coat MasterSeal 610 to dry tacky before applying second coat of MasterSeal 614. Ensure a continuous, pinhole-free coating from the top and outside edge of the footing to the finished grade.
  - iv. Backfilling--Follow manufacturer recommendations for backfilling. Provide protection board or geotextile fabric to protect the coating from damage while backfilling. Geotextile fabric shall be Mirafi 140N, or approved equal.
5. Coating System 104

- i. Location - Nonsubmerged, exposed to view, PVC piping.
- ii. Surface Preparation -- As specified herein.
- iii. Coating System -- Apply one coat, 4.0-6.0 mils Tnemec Series 66 Hi-Build Epoxoline, or approved equal. Color as selected by Owner.

## 2.03 SPECIAL PIPE AND SEVERE SERVICE COATING SYSTEMS

### A. General

The following coatings are for buried pipe and surfaces used in severe service conditions. The manufacturers' products listed in this paragraph are materials which satisfy the material descriptions of this paragraph and have a documented successful record for long term submerged or severe service conditions. Proposed substitute products will be considered as indicated within the paragraph entitled " 'Or-Equal' Clause" in Section 01100, Special Provisions.

### B. Special pipe and severe service coating systems shall be as follows

#### 1. Coating System 200 -- Cement Mortar Coating

- i. Location -- Exterior surfaces of buried steel pipe and fittings, non-galvanized.
- ii. Surface Preparation - As specified herein.
- iii. Coating System -- A 1-1/2-inch minimum thickness mortar coating reinforced with 3/4-inch galvanized welded wire fabric shall be provided. The cement mortar shall contain no less than one part Type V cement to 3 parts sand. The cement mortar shall be cured by a curing compound meeting the requirements of "Liquid Membrane-Forming Compounds for Curing Concrete" ASTM C 309-81, Type II, white pigmented, or by enclosure in an 8-mil thick polyethylene sheet with all joints and edges lapped by at least 6 inches. At the ENGINEER's discretion, the hot applied coal tar epoxy coating may be used as the curing membrane for the mortar coating.

#### 2. Coating System 201 -- Hot Applied Coal Tar Epoxy Coating



- i. Location -- Exterior surface of concrete pipe and cement-mortar coated pipe and fittings.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- The hot applied coal tar epoxy shall be a solvent free 100 percent solids coal tar epoxy chemically compatible with hydrating cement and suitable for application on moist surfaces of freshly placed cement mortar or concrete and properly prepared cured surfaces. The coal tar epoxy coating material shall be Amercoat 1972B or approved equal. The finish coal tar epoxy coating shall have a minimum DFT of 26 mils.
3. Coating System 202 -- Coal-Tar Epoxy Coating System
- i. Location -- Exterior surface of buried steel pipe, fittings and other ferrous surfaces.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- High build, 2-component amine or polyamide cured coal-tar epoxy shall have a solids content of at least 68 percent by volume, suitable as a long term coating of buried surfaces, and conforming to AWWA C210. Prime coats are for use as a shop primer only. Prime coat shall be omitted when both surface preparation and coating are to be performed in the field. The coal-tar epoxy coating system shall include:
    - (i) Prime coat (DFT = 1.5 mils), Amercoat 83HS, Tnemec P66, or equal.
    - (ii) Finish coats (2 or more, DFT = 18 mils), Amercoat 78 HB, Tnemec 46 H-413, or equal.
    - (iii) Total system DFT = 19.5 mils.
4. Coating System 203 -- Fusion Bonded Epoxy

- i. Location -- Ferrous surfaces of sleeve couplings, steel pipe and fittings.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- The coating material shall be a 100 percent powder epoxy applied in accordance with the ANSI/AWWA C213 "AWWA Standard for Fusion- Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines". The coating shall be applied using the fluidized bed process.
    - (i) Liquid Epoxy -- For field repairs, the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a DFT 16 mils. The liquid epoxy shall be a 100 percent solids epoxy recommended by the powder epoxy manufacturer.
    - (ii) Coating (DFT = 16 mils), Scotchkote 203, or equal.
    - (iii) Total system DFT = 16 mils.
5. Coating System 204 -- Hot, Coal-Tar Enamel
- i. Location -- Exterior surfaces of buried steel pipe and fittings, non-galvanized.
  - ii. Surface Preparation - As specified herein
  - iii. Coating System -- Coal-Tar Enamel materials and procedures shall be in accordance with ANSI/AWWA C203. This system shall consist of a primer layer, coal-tar enamel layer, coal-tar saturated nonasbestos felt outerwrap and a finish coat. Total system DFT = 188 mils.
6. Coating System 205 -- Hot Applied Tape
- i. Location -- Exterior surfaces of buried steel pipe and fittings, non-galvanized.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- Tape coating materials and procedures shall be in accordance with ANSI/AWWA C203. This system shall consist of a cold-applied liquid primer and heated coal-tar base tape. Total system DFT = 50 mils.
7. Coating System 206 -- Cold Applied Tape

- i. Location -- Exterior surfaces of buried steel pipe and fittings, non-galvanized.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- Tape coating materials and procedures shall be in accordance with ANSI/AWWA C209. Prefabricated tape shall be Type II. The system shall consist of a primer layer, inner layer tape of 35 mils, and an outer layer tape of 35 mils. Total system DFT = 70 mils.
8. Coating System 207 -- PVC Tape
- i. Location -- Small galvanized steel pipe and fittings.
  - ii. Surface Preparation -- As specified herein.
  - iii. Coating System -- Prior to wrapping pipe with PVC tape, the pipe and fittings shall be primed using a primer recommended by the PVC tape manufacturer. After being primed, the pipe shall be wrapped with a 20-mil adhesive PVC tape, half lapped for a total thickness of 40 mils.
9. Coating System 208 -- Mastic
- i. Location -- Pipe and fitting joints, and general buried surface coating repair and touch up.
  - ii. Surface Preparation - As specified herein.
  - iii. Coating System -- Mastic shall be a one-part solvent drying heavy bodied thixotropic synthetic elastomeric coating with chemically inert resins and fillers and an average viscosity of 650,000 CPS at 77 degrees Fahrenheit, thereby requiring generous applications by hand or trowel. Total coat thickness shall be 30 mils, minimum. Mastic shall be Protecto Wrap 160 H or approved equal and be fully compatible with pipeline coating systems.
10. Coating System 209 -- Polyethylene Encasement
- i. Location -- Ductile iron, steel and concrete cylinder pipe and fittings
  - ii. Surface Preparation -- None required.
  - iii. Coating System -- Except as otherwise specified, application of polyethylene encasement shall be in accordance with ANSI/AWWA C105 using Method C.
11. Coating System 210

- i. Location – Wet well and valve vault interior concrete surfaces.
- ii. Surface Preparation – Per manufacturer’s requirements, pressure wash concrete interior and apply non-shrink grout to all voids prior to coating application. Surface shall be clean and free of all foreign materials.
- iii. Coating System – Prime surface with two coats of Raven 155 epoxy primer/sealer with a total DFT of 10 – 14 mils. Apply two coats of Raven 405 blue or gray epoxy coating over the primed surface. Total dry film thickness of the topcoat shall be between 180 – 220 mils.

## 12. Coating System 211

- i. Location – Wet well exterior piping.
- ii. Surface Preparation – Per manufacturer’s requirements. Surface shall be clean and free of all foreign materials.
- iii. Coating System –Apply two coats of Raven 405 blue or gray epoxy coating. DFT of each coat shall be 30 – 40 mils each, for a total system DFT of 60 – 80 mils.

## 2.04 ARCHITECTURAL COATING SYSTEMS

### A. General

- 1. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or topcoat.
- 2. Fungus Control: Submit evidence for all paints attesting the passing of Federal Test Method Standard No. 141, Method 6271.1 showing no fungus growth or other approved test results.
- 3. Apply to surfaces under recommended environmental conditions and within the limitations established by the material manufacturer. Acrylics require 60 degrees Fahrenheit (°F) and above temperature and below 50 percent relative humidity. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50°F and 90°F unless otherwise permitted by the paint manufacturer's printed instructions.

### B. Architectural coating systems shall be as follows

- 1. Coating System 307

- i. Location – Exterior stainless-steel surfaces.
- ii. Surface Preparation – Surface shall be prepared according to SSPC-SP 16 Surface Preparation of Non-Metallic Substrates with a minimum 1 mil profile. Surface must be clean, dry, and free of oil, grease, and other contaminants.
- iii. Coating System – First apply a flat finish primer coat of polyamide epoxy at 4-6 mils dft. Primer shall be Tnemec Typoxy Series 27. A stripe coat of the primer shall also be applied, either before or after the main coat of primer. The stripe coat shall be 3-5 mils dft and shall be applied in a different color from the main primer coat for QA/QC purposes. The stripe coat shall be applied to outside corners, flanges, nuts, bolts, and any other irregularly shaped items. After the primer has been applied and been allowed to set according to the manufacturer's instructions, apply an aliphatic acrylic polyurethane coating. Coating shall be black and shall be applied at 2-3 mils dft. Coating shall be Tnemec Endurashield Series 1095.

### **PART 3 EXECUTION**

#### **3.01 STORAGE, MIXING AND THINNING OF MATERIALS**

- A. Manufacturer's Recommendations -- Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly observed.
- B. All protective coating materials shall be used within the manufacturer's recommended shelf life.
- C. Storage and Mixing -- Coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

#### **3.02 SURFACE PREPARATION STANDARDS**

- A. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this specification.
  - 1. Solvent Cleaning (SSPC-SP1) -- Removal of oil, grease, soil, salts and other soluble contaminants by cleaning with solvent, vapor, alkali, emulsion or steam.
  - 2. Hand Tool Cleaning (SSPC-SP2) -- Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by hand chipping, scraping, sanding, and wire brushing.
  - 3. Power Tool Cleaning (SSPC-SP3) -- Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by power tool chipping,

descaling, sanding, wire brushing and grinding.

4. White Metal Blast Cleaning (SSPC-SP5) -- Removal of all visible rust, oil, grease, soil, dust, mill scale, paint, oxides, corrosion products and foreign matter by blast cleaning.
5. Commercial Blast Cleaning (SSPC-SP6) -- Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 33 percent of each square inch of surface area.
6. Brush-Off Blast Cleaning (SSPC-SP7) -- Removal of all visible oil, grease, soil, dust, loose mill scale, loose rust and loose paint.
7. Near-White Blast Cleaning (SSPC-SP10) -- Removal of all visible oil, grease, soil, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except that staining shall be limited to no more than 5 percent of each square inch of surface area.
8. High- and Ultra High- Pressure Water Jetting (SSPC-SP12): Water jetting at high- or ultra high-pressure to prepare a surface for recoating using pressure above 10,000 psi.
9. Surface Preparation of Concrete (SSPC-SP-13) - Surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
10. Industrial Blast Cleaning (SSPC-SP14): Blast cleaning to remove all visible oil, grease, dust and dirt, when viewed without magnification

### 3.03 CORRECTIONS AND CLEANUP

- A. At completion any damaged, de-laminated or defaced coated surfaces shall be touched up, restored and left in first class condition. Any coated or finished surfaces damaged in fitting or erection shall be restored. If necessary, an entire wall shall be refinished rather than spot finished. Upon completion and prior to final acceptance, all equipment and unused materials accumulated in the coating process shall be removed from the site and any spillage, spatter spots or other misplaced coating material shall be removed in a manner which will not damage surfaces. Perform required patching, repair and cleaning to the satisfaction of the ENGINEER. Cooperate and coordinate work with the work of other trades in the removal and replacement of hardware, fixtures, covers, switch plates, etc., as required for coating.

### 3.04 SURFACE PREPARATION

#### A. General

1. Prepare all surfaces scheduled to receive new coating systems, as required to

provide for adequate bonding of the specified coating system to the substrate material. Request review of prepared surfaces by the ENGINEER prior to proceeding. For existing coated surfaces, hand wash with cleaner or product recommended by coating manufacturer to properly prepare existing surface and provide for bonding of coating specified to follow. Remove any loose, peeling or flaking coating, or mildewed areas. Surface preparation minimums shall be as follows:

- i. Exposed metal items, nonsubmerged, unprimed, non-galvanized both interior and exterior, including: piping, structural steel and all other metal items not otherwise specified, shall undergo surface preparation in accordance with SSPC-SP6, "Commercial Blast Cleaning".
- ii. Exposed metal items, shop primed, both interior and exterior including: piping, steel doors, steel ladders to be painted, and railings, and all other metal items not otherwise specified, shall undergo surface preparation in accordance with SSPC- SP1, "Solvent Cleaning"; SSPC-SP2, "Hand Tool Cleaning"; and SSPC-SP3, "Power Tool Cleaning" as may be required to remove grease, loose or peeling or chipped paint.
- iii. Metal items, unprimed or non-galvanized, continuously or intermittently submerged, both interior and exterior including: piping, structural steel and all other metal items not otherwise specified, shall undergo surface preparation in conformance with SSPC-SP10, "Near-White Blast Cleaning".
- iv. Stainless Steel - Nonsubmerged and submerged, exposed piping and fittings, both interior and exterior shall undergo surface preparation in accordance with SSPC- SP1, "Solvent Cleaning".
- v. Polyvinyl Chloride (PVC) - Nonsubmerged, both interior and exterior, process piping and plumbing, shall be lightly sanded prior to application of the specified coating system to follow.
- vi. Nonsubmerged Concrete - Clean all concrete surfaces of dust, form oil, curing compounds or other incompatible matter. Etch and prime if required by manufacturer for specified coating products to follow. Allow minimum 28-day cure of concrete prior to application of coating systems.
- vii. Wet Well Concrete –
  - (i) All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed. All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface or replaced.
  - (ii) Infiltration shall be stopped by using a material which is compatible with the repair materials and is suitable for topcoating with the epoxy coating.
  - (iii) Cementitious repair materials shall be trowelled to provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the epoxy coating. No bugholes or honeycomb surfaces should remain. The repair materials shall be permitted to cure according to manufacturer recommendations.



(iv) Curing compounds should not be used unless approved for compatibility with the specified epoxy coating.

viii. Preparation of All Existing Coated Surfaces -- Removed rough and defective coating film from material surfaces to be painted. Touch up with approved primer. Clean all greasy or oily surfaces, to be painted, with benzine or mineral spirits or Rodda's Gresof before coating, or as recommended by manufacturer. For walls, patch existing nicks and gouges, sand to match wall finish.

### 3.05 PRIME COATING

- A. Exposed Steel -- Prime coat all exposed steel in accordance with SSPC PS 13.01 for epoxy-polyamide coating systems. Prime coats shall be applied following completion of surface preparation requirements as specified in paragraph 3.4.A.1 above.
- B. Galvanized Metal -- After surface preparation specified above, prime galvanized metal items receiving paints as specified with Tnemec Series 66 Hi-Build Epoxaline or equal, verifying with manufacturer before application the compatibility with coatings specified to follow.
- C. Shop Primed Metal -- Where indicated on the plans or coating schedule and following the surface preparation procedures specified in paragraph 3.4.A.2 above, the CONTRACTOR shall apply intermediate and topcoats of the specified paint system to shop primed metal. The CONTRACTOR shall verify with the manufacturer(s) representative of the item(s) to be painted, before application, the compatibility of shop primers with the specified intermediate and topcoat coating systems.
- D. Non-Shop Primed Metal and Piping -- Prime coat all exposed metal and piping, except stainless steel, received at job site following completion of surface preparation requirements as specified in paragraph 3.4.A.1 above. Prime paint in accordance with SSPC PS No. 13.01 for epoxy-polyamide primers. Epoxy-polyamide primers shall conform to the standards set forth in SSPC Paint Specification No. 22.

### 3.06 FIELD PRIME

- A. Wherever shop priming has been damaged in transit or during construction, the damaged area shall be cleaned and touched up with field primer specified herein or returned to the shop for resurfacing and repriming, at the ENGINEER's discretion. Metal items delivered to the job site unprimed shall be cleaned and primed as specified herein.

### 3.07 APPLICATION

- A. Thickness -- Apply coatings in strict conformance with the manufacturer's application instructions. Apply each coat at the rate specified by the manufacturer to achieve the dry mil thickness specified. If material must be diluted for application by spray gun, build up more coating to achieve the same thickness as undiluted material. Correct apparent deficiency of film thickness by the application of an additional coat.
- B. Porous Surfaces -- Apply paint to porous surfaces as required by increasing the number

of coats or decreasing the coverage as may be necessary to achieve a durable protective and decorative finish.

- C. Blast cleaned ferrous metal surfaces shall be painted before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.
- D. Coatings shall be applied in accordance with the manufacturer's instructions and recommendations, and this Section, whichever has the most stringent requirements.
- E. Special attention shall be given to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thicknesses are likely to be present. Use stripe coating for these areas.
- F. Special attention shall be given to materials which will be joined so closely that proper surface preparation and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.
- G. Ventilation -- Adequately ventilate enclosed rooms and spaces during painting and drying periods.
- H. Drying Time -- Do not apply next coat of coat until each coat is dry. Test non-metallic surfaces with moisture meter. The manufacturer's recommended drying time shall mean an interval under normal condition to be increased to allow for adverse weather or drying conditions. Coating manufacturer's representative shall verify by cure testing, complete cure of coatings systems used for immersion service.

3.08 COATING SCHEDULE

A. Provide protective coatings in accordance with the following Coating Schedule:

Item	Location	Material	Coating System
Piping <sup>1</sup>	Buried and in vaults	Ductile Iron	Coating System 101
Piping <sup>1</sup>	In Wet Well (exterior)	Ductile Iron	Coating System 211
Piping <sup>1</sup>	In Wet Well (interior)	Ductile Iron	Coating System 101
Item	Location	Material	Coating System
Concrete Wet Well and Valve Vault	Interior (walls, floor and ceiling)	Concrete	Coating System 210
Miscellaneous Metals	Exposed Surfaces,	Steel, Galvanized	Coating System 101

	Exterior and Interior	Steel, Aluminum	
Disconnect Panel	Exposed Surfaces, Exterior	Steel	Coating System 307
Remote Fuel Fill Box	Exposed Surfaces, Exterior	Stainless-Steel	Coating System 307
Submersible Sewage Pumps	As Specified in 43 21 39 - Submersible Sewage Pumps	As Specified in 43 29 39 - Submersible Sewage Pumps	As Specified in 43 21 39, Submersible Sewage Pumps

Notes:

- <sup>1</sup> Pipe linings shall be as specified elsewhere in these contract documents.
- <sup>2</sup> Coating of exposed valves and couplings to be shop-applied fusion-bonded epoxy. Finish coat shall be same coating system as adjacent piping to match in color, unless otherwise directed by the ENGINEER.

**END OF SECTION**

## **SECTION 10 14 10 IDENTIFYING DEVICES**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. This Section covers the work necessary to furnish and install, complete, identifying devices for the Project.
- B. Section includes:
  - 1. Process pipe color coding and labeling.
  - 2. Process equipment nameplates.
  - 3. Door and warning signs.

#### **1.02 RELATED SECTIONS:**

- 1. Section 40 05 13 - Common Work Results for Process Piping.
- 2. Section 40 05 23 – Common Work Results for Process Valves.

#### **1.03 STANDARDS, SPECIFICATIONS AND CODES**

- A. All safety related signs, markers, labeling and symbols shall conform to the applicable provisions or codes of the Occupational Safety and Health Administration (OSHA), unless specifically modified hereinafter.
- B. All signage providing emergency information or general circulation directions, or identifies rooms for the physically handicapped, shall comply with the requirements of the latest edition of American National Standards Institute (ANSI A117.1).

#### **1.04 SUBMITTALS**

- A. Manufacturer's Data - Specifications and installation instructions for each type of sign required.
- B. Samples - Submit three (3) full size samples of each color and finish of pipe labeling, process equipment nameplates and warning signs with sample letters.
  - 1. ENGINEER's review of samples will be for color and texture only. Compliance with all other requirements is the exclusive responsibility of the CONTRACTOR.
  - 2. Submit samples of any other special identifying or signing provided for elsewhere in this specification.

**PART 2 PRODUCTS**

**2.01 PIPE LABELING AND COLORS**

A. Unless noted otherwise on the Drawings or specified differently hereinafter, pipe labeling and colors shall conform to the following schedule:

<u>Service</u>	<u>Symbol (label)</u>	<u>Symbol Color (label)</u>	<u>Pipe Color (if coated)</u>
Potable Water	PW	White	Blue
Non-Potable Water	NPW	Green	Gray
Drains	D	White	Gray
Vents	V	Black	Green
Force Main Piping	RS	Green	Tan

- B. Pipe identification labels and flow direction arrows shall consist of lettering and symbols applied over the pipe base color.
- C. Coating systems and surface preparation requirements used in color coding piping and lettering and flow arrows shall be as specified in Section 09 90 00, Painting and Coating.

**2.02 PROCESS EQUIPMENT NAMEPLATES**

- A. Nameplates shall be used to identify all process equipment including but not limited to pumps, chlorinators, control panels, and any other equipment requiring identification as directed by the Engineer.
- B. Fabricated from 1/16-inch thick satin-surfaced Setonply, all edges beveled neatly.
- C. Furnish with drilled holes for mounting to the appropriate equipment or nearest adjacent surface. As an alternative, acceptable adhesive attachment methods may be used if approved by the Engineer.
- D. Nameplate background color, lettering color and wording shall be as directed by the Engineer and approved by the Owner.
- E. Minimum Size: 4-inch x 1 1/2-inch.
- F. Manufacturer: Seton Nameplate Company, New Haven, CT, Style M4565 (for minimum size) or approved equal.
- G. Where conflict occurs, nameplate requirements in individual equipment specifications

shall supersede these provisions.

2.03 VALVE NAMEPLATES

- A. Nameplates shall be used to identify all valves located within buildings, vaults, or otherwise unburied conditions.
- B. Fabricated from 1/16-inch thick satin-surfaced Setonply, all edges beveled neatly.
- C. Furnish with a drilled hole for mounting to the valve with a brass beaded chain.
- D. Nameplate background color, lettering color and wording shall be as directed by the Engineer and approved by the Owner.
- E. Minimum Size: 2-inch diameter.
- F. Manufacturer: Seton Nameplate Company, New Haven, CT, nameplate Style M4553 (for minimum size), brass chain Style 16179 or approved equal.

2.04 CONFINED SPACE WARNING SIGNS

- A. Shall be provided for all vaults.
- B. Painted aluminum with a yellow background and black lettering.
- C. Each sign shall contain the following wording:

“DANGER

PERMIT-REQUIRED CONFINED  
SPACE DO NOT ENTER”

**PART 3 EXECUTION**

3.01 PIPE LABELS AND FLOW DIRECTION ARROWS

- A. Location: At all connections to equipment, valves, branching fittings, at wall boundaries and at intervals along the piping not greater than 5 feet on center with at least one label applied to each exposed horizontal and vertical run of pipe. Exposed piping not normally in view, such as behind ceilings and in closets and cabinets, shall also be labeled.
- B. Labels shall not be applied to the pipe until all pipe painting is complete or as approved by the ENGINEER.
- C. Application: By stencil over pipe base color. Base coat shall be cured, clean and dry, prior to application of lettering.
- D. Lettering sizes for pipe labels shall be in accordance with ANSI A13.1, Table 3, and based upon the outside diameter of the pipe to which they are applied.

- E. Stripes on solution pipe shall be applied at intervals along the piping not greater than 5 feet on center with at least one stripe applied to each exposed horizontal and vertical run of pipe.

### 3.02 PROCESS EQUIPMENT NAMEPLATES

- A. Location: As directed by the ENGINEER.
- B. Mounting of process equipment nameplates shall be in accordance with the manufacturer's instructions, and as directed by the ENGINEER.
- C. See additional requirements in Specification 11 05 00 Common Work Result for Equipment.

### 3.03 PAINTED SIGNS

- A. Prepare and mask base material as required to provide clean surface for application of letters by stencil.
- B. Unless otherwise noted, color of letters shall be black.
- C. Paint Type: Semi-gloss alkyd enamel.

### 3.04 CONFINED SPACE WARNING SIGNS

- A. Securely fasten signs to the underside of all hatches entering vaults such that the sign can be read when the hatch is opened.

**END OF SECTION**

## SECTION 11 05 00 COMMON WORK RESULTS FOR EQUIPMENT

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Provide all tools, supplies, materials, equipment and all labor necessary for the furnishing, construction, installation, testing and operation of equipment and appurtenant work, complete and operable, in accordance with the requirements of the Contract Documents.
- B. The provisions of this Section shall apply to all equipment specified and where referred to, except where otherwise specified or shown.

#### 1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. All equipment, products and their installation shall be in accordance with the following standards, as applicable and as specified in each section of these specifications:
  - 1. American Society for Testing and Materials (ASTM)
  - 2. American Public Health Association (APHA)
  - 3. American National Standards Institute (ANSI)
  - 4. American Society of Mechanical Engineers (ASME)
  - 5. American Water Works Association (AWWA)
  - 6. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
  - 7. American Welding Society (AWS)
  - 8. National Fire Protection Association (NFPA)
  - 9. Federal Specifications (FS)
  - 10. National Electrical Manufacturers Association (NEMA)
  - 11. Manufacturer's published recommendations and specifications
  - 12. Oregon Occupational Safety and Health Division (OR-OSHA)
- B. The following standards have been referred to in this Section of the specifications.
  - 1. ASTM International:



- i. ASTM A48 - Specification for Gray Iron Castings.
  - ii. ASTM A108 - Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.
2. American National Standards Institute (ANSI):
- i. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800.
  - ii. ANSI B16.5 - Pipe Flanges and Flanged Fittings, Steel, Nickel Alloy and Other Special Alloys.
  - iii. ANSI B46.1 - Surface Texture.
  - iv. ANSI S12.6 - Method for the Measurement of the Real-Ear Attenuation of Hearing Protectors.
3. American Society Mechanical Engineers (ASME):
- i. ANSI/ASME B1.20.1 - General Purpose Pipe Threads (Inch).
  - ii. ANSI/ASME B31.1 - Power Piping.
4. American Water Works Association (AWWA):
- i. AWWA C206 - Field Welding of Steel Water Pipe.

### 1.03 SUBMITTALS

#### A. Shop Drawings:

- 1. Furnish complete shop drawings for all equipment specified in the various sections, together with all piping, valves and controls for review by the ENGINEER.
- 2. Include calculations showing equipment anchorage forces and the capacities of the anchorage elements.

#### B. Special Tools:

- 1. Supply one complete set of special tools where necessary for the assembly, adjustment and dismantling of the equipment.
- 2. Tools shall be suitable for professional work and manufactured by a recognized supplier of professional tools such as Snap On, Crescent, Stanley, or equal.

#### C. Spare Parts:

1. Obtain and submit from the manufacturer a list of suggested spare parts for each piece of equipment.
2. Furnish the name, address and telephone number of the nearest distributor for each piece of equipment.
3. Spare parts shall be supplied when indicated in the appropriate equipment specification sections.

D. Torsional and Lateral Vibration Analysis:

1. Where required by the individual equipment sections, provide a torsional and lateral vibration analysis of the equipment.
2. Equipment shall be designed and constructed such that the natural frequency of the drive train is avoided by a minimum of 25 percent throughout the entire operating range.
3. Analysis shall be performed by a specialist experienced in this type of work and approved by the Engineer.
  - i. The specialist, or their assigned representative who shall similarly be experienced in this type of work and who shall be approved by the Engineer, shall visit the Site during start-up and testing of the equipment to analyze and measure the amount of equipment vibration, certify that the operating frequency avoids the natural frequency by 25 percent, and make a written recommendation for keeping the vibration at a safe limit.

#### 1.04 QUALITY ASSURANCE

- A. Demonstrate all equipment meets the specified performance requirements. Provide the services of an experienced, competent and authorized service representative of the manufacturer of each item of major equipment, who shall visit the Site to perform the following tasks:
1. Assist the Contractor in the installation of the equipment.
  2. Inspect, check, adjust if necessary and approve the equipment installation.
  3. Start-up and field-test the equipment for proper operation, efficiency and capacity.
  4. Perform necessary field adjustments during the test period until the equipment installation and operation are satisfactory to the ENGINEER.
  5. Instruct the OWNER's personnel in the operation and maintenance of the equipment. Instruction shall include step-by-step trouble shooting procedures with all necessary test equipment.

- B. The costs of all inspection, start-up, testing, adjustment and instruction work performed by said factory-trained representatives shall be borne by the Contractor.
- C. Tolerances and clearances shall be as shown on the shop drawings and shall be closely adhered to. Machine work shall in all cases be of high-grade workmanship and finish, with due consideration to the special nature or function of the parts.
- D. The surface texture shall be the most suitable for the application and shall be in accordance with ANSI B46.1.
- E. Unless otherwise noted, all equipment furnished shall have a record from the same manufacturer of at least 3 years successful, trouble-free operation in similar applications.

#### 1.05 DELIVERY, HANDLING AND STORAGE

- A. All equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling and storage.
- B. Each item of equipment shipped shall have a legible identifying mark corresponding to the equipment number shown or specified for the particular item.
- C. All equipment shall be protected from exposure to corrosion and shall be kept thoroughly dry at all times.

## **PART 2 PRODUCTS**

### 2.01 GENERAL REQUIREMENTS

#### A. Hearing Protection:

1. At each high noise level location, where equipment produces noise exceeding 85 dBA at 3 feet or exceeding OSHA noise level requirements for operator safety, supply two pairs of high attenuation hearing protectors.
2. Ear protectors shall meet the requirements of ANSI S12.6 and shall produce a noise level reduction of 25 dBA at a frequency of 500 Hz.
3. Hearing protectors shall have fluid filled ear cushions and an adjustable, padded headband.
4. Protectors shall be stored in a weatherproof, labeled, steel cabinet, furnished by the CONTRACTOR and mounted in an approved location near the noise producing equipment.

#### B. Welding:

1. Unless otherwise specified or shown, all welding shall be by the metal arc method or gas-shielded arc method as described in the American Welding Society's

“Welding Handbook” as supplemented by other pertinent standards of the AWS.

2. Qualification of welders shall be in accordance with the AWS Standards governing same.

C. Protective Coatings:

1. All equipment shall be painted or coated in accordance with Section 09 90 00, Painting and Coating, unless otherwise indicated.
2. Non-ferrous metal and corrosion-resisting steel surfaces shall be coated with grease or lubricating oil.
3. Coated surfaces shall be protected from abrasion or other damage during handling, testing, storing, assembly and shipping.

D. All equipment subject to vibration shall be provided with restrained spring type vibration isolators or pads per manufacturer’s written recommendations.

E. Shop fabrication shall be performed in accordance with the Specifications and the Engineer-approved shop drawings.

## 2.02 EQUIPMENT SUPPORTS AND FOUNDATIONS

A. Design Loads:

1. All equipment supports, anchors and restraint shall be adequately designed for static, dynamic, wind and seismic loads.
2. The design horizontal seismic force shall be the greater of that noted in the general structural notes, if listed, or as required by the governing building code (10 percent of gravity minimum).
3. Non-structural Architectural, HVAC, Plumbing and Electrical equipment, components and systems that require seismic anchorage design shall be designed by a Registered Professional Engineer in Oregon. All elements shall meet the requirements of Chapter 13 of ASCE 7-10 as amended by the 2019 OSSC. These non-structural equipment, components and systems that require seismic anchorage design include:

- i. Distributed systems weighing more than 5 lbs/ft.
- ii. Components weighing more than 400 pounds
- iii. Components weighing more than 20 pound but less than or equal to 400 pounds that have a center of mass located 4-feet or more above the floor or roof level that supports the component.
- iv. Exceptions:
  - (i) Furniture
  - (ii) Temporary or movable equipment

- B. Equipment foundations shall be as per manufacturer's written recommendations.
- C. All equipment shall be mounted as shown on the manufacturer's standard details, unless otherwise shown or specified.

#### 2.03 PIPE HANGERS, SUPPORTS AND GUIDES

- A. All pipe connections to equipment shall be supported, anchored and guided to avoid stresses and loads on equipment flanges and equipment.

#### 2.04 FLANGES AND PIPE THREADS

- A. All flanges on equipment and appurtenances provided under this Section shall conform to ANSI B16.1, Class 125 or B16.5, Class 150, unless otherwise shown.
- B. All pipe threads shall be in accordance with ANSI/ASME B1.20.1 and with requirements of Section 40 05 13, Common Work Results for Process Piping.

#### 2.05 COUPLINGS

- A. Flexible couplings shall be provided between the driver and the driven equipment to accommodate slight angular misalignment, parallel misalignment, end float and to cushion shock loads. Where required for vertical shafts, three-piece spacer couplings or universal type couplings for extended shafts shall be installed.
- B. The Contractor shall have the equipment manufacturer select or recommend the size and type of coupling required to suit each specific application.
- C. Taper-lock bushings may be used to provide for easy installation and removal on shafts of various diameters.
- D. Where universal type couplings are shown, they shall be equipped with grease fittings.

#### 2.06 BEARINGS

- A. Bearings shall conform to the standards of the Anti-Friction Bearing Manufacturers Association (AFBMA).

- B. All field-lubricated type bearings shall be equipped with a hydraulic grease fitting in an accessible location and shall have sufficient grease capacity in the bearing chamber.
- C. All lubricated-for-life bearings shall be factory-lubricated with the manufacturer's recommended grease to insure maximum bearing life and best performance.
- D. Except where otherwise specified or shown, all bearings shall have a minimum B-10 life expectancy of 5 years or 20,000 hours, whichever occurs first.
- E. Bearing housings shall be of cast iron or steel and bearing mounting arrangement shall be as specified or shown, or as recommended in the published standards of the manufacturer. Split type housings may be used to facilitate installation, inspection and disassembly.
- F. Sleeve type bearings shall have a Babbitt or bronze liner.

## 2.07 V-BELT DRIVES

- A. V-belts and sheaves shall be of the best commercial grade and shall conform to ANSI, MPTA and RMA standards.
- B. Unless otherwise specified, sheaves shall be machined from the finest quality gray cast iron.
- C. All sheaves shall be statically balanced. In applications where vibration is a problem, sheaves shall be dynamically balanced. Sheaves operating at belt speeds exceeding 6,500 fpm may be required to be of special materials and construction.
- D. To facilitate installation and disassembly, sheaves shall be furnished complete with taper-lock or QD bushings as required.
- E. Finish bored sheaves shall be furnished complete with keyseat and set screws.
- F. Sliding motor bases shall be provided to adjust the tension of V-belts.

## 2.08 DRIVE GUARDS

- A. All power transmission, prime movers, machines, shaft extensions and moving machine parts shall be guarded to conform with the OSHA Safety and Health Standards (29CFR1910) requirements.
- B. Guards shall be constructed of minimum 10-gauge expanded, flattened steel with smooth edges and corners, galvanized after fabrication and securely fastened.
- C. Where required for lubrication or maintenance, guards shall have hinged and latched access doors.

## 2.09 FLEXIBLE CONNECTORS

- A. Flexible connectors shall be installed in all piping connections to engines, blowers, compressors and other vibrating equipment.

## 2.10 GASKETS AND PACKINGS

- A. Gaskets shall be in accordance with the requirements of Section 40 05 13, Common Work Results for Process Piping.
- B. Packing around valve stems and reciprocating shafts shall be of compressible material, compatible with the fluid being used. Chevron type "V" packing shall be Garlock No. 432, John Crane "Everseal" or equal.
- C. Packing around rotating shafts (other than valve stems) shall be "O" rings, stuffing boxes or mechanical seals, as recommended by the manufacturer and approved by the ENGINEER.

## **PART 3 EXECUTION**

### 3.01 WELDING

- A. In assembly and during welding, the component parts shall be adequately clamped, supported and restrained to minimize distortion and for control of dimensions.
- B. Weld reinforcement shall be as specified by the AWS code. Upon completion of welding, all weld splatter, flux, slag and burrs left by attachments shall be removed.
- C. Welds shall be repaired to produce a workmanlike appearance with uniform weld contours and dimensions.
- D. All sharp corners of material to be painted or coated shall be ground to a minimum of 1/32-inch on the flat.

### 3.02 COUPLINGS

- A. The Contractor shall have the equipment manufacturer select or recommend the size and type of coupling required to suit each specific application.
- B. Installation shall be per equipment manufacturer's printed recommendations.

### 3.03 PACKAGED EQUIPMENT

- A. When any system is furnished as pre-packaged equipment, the Contractor shall coordinate all necessary space and structural requirements, clearances, utility connections, signals and outputs with his subcontractors.
- B. If the packaged system has any additional features other than specified, the Contractor shall coordinate such features and furnish all material and labor necessary for a complete installation, as required by the manufacturer, at no additional cost to the Owner.

**END OF SECTION**

## **SECTION 23 05 13 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

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

#### **1.02 SUMMARY**

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on alternating-current power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

#### **1.03 COORDINATION**

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  - 1. Motor controllers.
  - 2. Torque, speed, and horsepower requirements of the load.
  - 3. Ratings and characteristics of supply circuit and required control sequence.
  - 4. Ambient and environmental conditions of installation location.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL MOTOR REQUIREMENTS**

- A. Comply with NEMA MG 1 unless otherwise indicated.

#### **2.02 MOTOR CHARACTERISTICS**

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

#### **2.03 SINGLE-PHASE MOTORS**



- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
  - 1. Permanent-split capacitor.
  - 2. Split phase.
  - 3. Capacitor start, inductor run.
  - 4. Capacitor start, capacitor run.
- B. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- C. Motors 1/20 HP and Smaller: Shaded-pole type.
- D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **SECTION 23 05 18 ESCUTCHEONS FOR HVAC PIPING**

### **PART 2 - GENERAL**

#### 3.01 RELATED DOCUMENTS

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

#### 3.02 SUMMARY

- B. Section Includes:
  - 1. Escutcheons.

### **PART 4 PRODUCTS**

#### 4.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. BrassCraft Manufacturing Co.; a Masco company.
  - 2. Dearborn Brass.
  - 3. Jones Stephens Corp.
  - 4. Keeney Manufacturing Company (The).
  - 5. Mid-America Fittings, Inc.
  - 6. ProFlo; a Ferguson Enterprises, Inc. brand.

#### 4.02 ESCUTCHEONS

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.

### **PART 5 EXECUTION**

#### 5.01 INSTALLATION

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:

- i. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.

#### 5.02 FIELD QUALITY CONTROL

- A. Using new materials, replace broken and damaged escutcheons.

**END OF SECTION**

## SECTION 23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

##### A. Section Includes:

1. Metal pipe hangers and supports.
2. Thermal-hanger shield inserts.

##### B. Related Requirements:

1. Section 23 05 48 "Vibration and Seismic Controls for HVAC" for vibration isolation devices.
2. Section 23 31 13 "Metal Ducts" for duct hangers and supports.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

#### 1.05 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code, Section IX.

### PART 2 PRODUCTS

#### 2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall

withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
2. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

## 2.02 METAL PIPE HANGERS AND SUPPORTS

### A. Carbon-Steel Pipe Hangers and Supports:

- i. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
- ii. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
- iii. Nonmetallic Coatings: Plastic coated, or epoxy powder-coated.
- iv. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
- v. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

## 2.03 THERMAL-HANGER SHIELD INSERTS

### A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Buckaroos, Inc.
2. CADDY; a brand of nVent.
3. Carpenter & Paterson, Inc.
4. KB Enterprise.
5. National Pipe Hanger Corporation.
6. Pipe Shields Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

### B. Insulation-Insert Material for Hot Piping: Water-repellent-treated, ASTM C533, Type I

calcium silicate with 100-psi ASTM C552, Type II cellular glass with 100-psi or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psi minimum compressive strength.

- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

## 2.04 MATERIALS

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M, carbon-steel plates, shapes, and bars; galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Threaded Rods: Continuously threaded. Zinc-plated or galvanized steel for indoor applications and stainless steel for outdoor applications. Mating nuts and washers of similar materials as rods.
- F. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

## PART 3 EXECUTION

### 3.01 APPLICATION

- A. Comply with requirements in the Contract Documents for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

### 3.02 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Trapeze pipe hanger in first paragraph below requires calculating and detailing at each use.

- C. Framing system in first paragraph below requires calculating and detailing at each use.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Pipe stand in first paragraph below requires calculating and detailing at each use.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment support in first paragraph below requires calculating and detailing at each use.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - i. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - ii. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
  - 3. Shield Dimensions for Pipe: Not less than the following:
    - i. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
  - 4. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.03 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.04 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 09 90 00 "Painting and Coating" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780/A780M.

### 3.05 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use thermal-hanger shield inserts for insulated piping and tubing.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
  - 3. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
  - 4. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 5. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of



noninsulated, stationary pipes NPS 3/4 to NPS 8.

6. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  7. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  8. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  9. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
  10. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
  11. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  12. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  13. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
  14. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
  15. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.

2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
  2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  4. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  5. C-Clamps (MSS Type 23): For structural shapes.
  6. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  7. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  8. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  9. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  10. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  11. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  12. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  13. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
  6. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    - i. Horizontal (MSS Type 54): Mounted horizontally.
    - ii. Vertical (MSS Type 55): Mounted vertically.
    - iii. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

**END OF SECTION**

## SECTION 23 05 48 VIBRATION AND SEISMIC CONTROLS FOR HVAC

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:

1. Spring hangers.
2. Restraints - rigid type.
3. Restraints - cable type.
4. Restraint accessories.
5. Post-installed concrete anchors.

#### 1.03 DEFINITIONS

- A. IBC: International Building Code.

#### 1.04 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic -force-restraint component.
3. Annotate to indicate application of each product submitted and compliance with requirements.

- B. Delegated-Design Submittal:

1. For each seismic-restraint device, including seismic-restrained mounting, pipe-riser resilient support, snubber, seismic restraint, seismic-restraint accessory, concrete anchor and insert, and restrained isolation roof-curb rail that is required by this Section or is indicated on Drawings, submit the following:

- i. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification by professional engineer that riser system was examined for excessive stress and that none exists.
  - ii. Concrete Anchors and Inserts: Include calculations showing anticipated seismic and wind loads. Include certification that device is approved by an NRTL for seismic reinforcement use.
  - iii. Seismic Design Calculations: Submit all input data and loading calculations prepared under "Seismic Design Calculations" Paragraph in "Performance Requirements" Article.
  - iv. Qualified Professional Engineer: All designated-design submittals for seismic- and wind-restraint calculations are to be signed and sealed by qualified professional engineer responsible for their preparation.
2. Seismic- Restraint Detail Drawing:
- i. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
  - ii. Details: Indicate fabrication and arrangement. Detail attachments of restraints to restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
  - iii. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply also with requirements in other Sections for equipment mounted outdoors.
3. All delegated-design submittals for seismic-restraint detail Drawings are to be signed and sealed by qualified professional engineer responsible for their preparation.
4. Product Listing, Preapproval, and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and basis for approval (tests or calculations).
5. Design Calculations for Vibration Isolation Devices: Calculate static and dynamic loading due to equipment weight and operating forces required to select proper vibration isolators, and to design vibration isolation bases.
6. Riser Supports: Include riser diagrams and calculations showing anticipated

expansion and contraction at each support point, initial and final loads on building structure, and spring deflection changes. Include certification that riser system was examined for excessive stress and that none exists.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.

#### 1.06 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Seismic-Restraint Device Load Ratings: Devices to be tested and rated in accordance with applicable code requirements and authorities having jurisdiction. Devices to be listed by a nationally recognized third party that requires periodic follow-up inspections and has a listing directory available to the public. Provide third-party listing by one or more of the following: an agency acceptable to authorities having jurisdiction.

## **PART 2 PRODUCTS**

#### 2.01 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design seismic load control system.
  - 1. Seismic Performance: Equipment shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7-16.
- B. Seismic Design Calculations:
  - 1. Perform calculations to obtain force information necessary to properly select seismic-restraint devices, fasteners, and anchorage. Perform calculations using methods acceptable to applicable code authorities and as presented in ASCE/SEI 7-16. Where "ASCE/SEI 7" is used throughout this Section, it is to be understood that the edition referred to in this subparagraph is the edition intended as reference throughout the Section Text.

- i. Data indicated below to be determined by Delegated-Design Contractor must be obtained by Contractor and must be included in individual component submittal packages.
  - ii. Building Risk Category: IV.
  - iii. Building Site Classification: D.
2. Calculation Factors, ASCE/SEI 7-16, Ch. 13 - Seismic Design Requirements for Nonstructural Components: All section, paragraph, equation, and table numbers refer to ASCE/SEI 7-16 unless otherwise noted.

- i. Horizontal Seismic Design Force  $F_p$ : Value is to be calculated by Delegated-Design Contractor using Equation 13.3-1. Factors below must be obtained for this calculation:

$S_{DS}$  = Spectral Acceleration: 0.664. Value applies to all components on Project.

- ii. Vertical Seismic Design Force: Calculated by Delegated-Design Contractor using method explained in ASCE/SEI 7-16, Paragraph 13.3.1.2.
- iii. Seismic Relative Displacement  $D_{pi}$ : Calculate by Delegated-Design Contractor using methods explained in ASCE/SEI 7-10, Paragraph 13.3.2. Factors below must be obtained for this calculation:

$D_p$  = Relative Seismic Displacement that Each Component Must Be Designed to Accommodate: Calculate by Delegated-Design Contractor in accordance with ASCE/SEI 7-10, Paragraph 13.3.2.

- iv. Component Fundamental Period  $T_p$ : Calculated by Delegated-Design Contractor using methods explained in ASCE/SEI 7-16, Paragraph 13.3.3. Factors below must be obtained for this calculation:

$W_p$  = Component Operating Weight: Determined by Contractor from Project Drawings and manufacturer's data.

$g$  = Gravitational Acceleration: 32.17 fps<sup>2</sup>.

$K_p$  = Combined Stiffness of Component, Supports, and Attachments: Determined by delegated-design seismic engineer.

- C. Consequential Damage: Provide additional seismic restraints for suspended HVAC components or anchorage of floor-, roof-, or wall-mounted HVAC components as indicated in ASCE/SEI 7-16 so that failure of a non-essential or essential HVAC component will not cause failure of any other essential architectural, mechanical, or electrical building component.

- D. Fire/Smoke Resistance: Seismic-restraint devices that are not constructed of ferrous metals must have a maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested by an NRTL in accordance with ASTM E84 or UL 723 and be so labeled.
- E. Component Supports:
  - 1. Load ratings, features, and applications of all reinforcement components must be based on testing standards of a nationally recognized testing agency.
  - 2. All component support attachments must comply with force and displacement resistance requirements of ASCE/SEI 7-16 Section 13.6.

## 2.02 SPRING HANGERS

- A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - i. Ace Mountings Co., Inc.
    - ii. CADDY; a brand of nVent.
    - iii. California Dynamics Corporation.
    - iv. Kinetics Noise Control, Inc.
    - v. Mason Industries, Inc.
    - vi. Novia; A Division of C&P.
    - vii. Vibration Eliminator Co., Inc.
    - viii. Vibration Isolation.
    - ix. Vibration Management Corp.
    - x. Vibration Mountings & Controls, Inc.
  - 2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  - 3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  - 4. Minimum Additional Travel: 50 percent of the required deflection at rated load.



5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

### 2.03 RESTRAINTS - RIGID TYPE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. B-line, an Eaton business.
  2. CADDY; a brand of nVent.
  3. California Dynamics Corporation.
  4. Hilti, Inc.
  5. Isolation Technology, Inc.
  6. TOLCO.
  7. Unistrut; Part of Atkore International.
  8. Vibration Mountings & Controls, Inc.
- B. Description: Shop- or field-fabricated bracing assembly made of AISI S110-07-S1 slotted steel channels, ANSI/ASTM A53/A53M steel pipe as per NFPA 13, or other rigid steel brace member. Includes accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

### 2.04 RESTRAINTS - CABLE TYPE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. B-line, an Eaton business.
  2. CADDY; a brand of nVent.

3. Loos & Co.
  4. Vibration Mountings & Controls, Inc.
- B. Seismic-Restraint Cables: ASTM A1023/A1023M galvanized or ASTM A603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for seismic-restraining cable service; with fittings attached by means of poured socket, swaged socket or mechanical (Flemish eye) loop.
- C. Restraint cable assembly with cable fittings must comply with ASCE/SEI 19. All cable fittings and complete cable assembly must maintain the minimum cable breaking force. U-shaped cable clips and wedge-type end fittings do not comply and are unacceptable.

## 2.05 RESTRAINT ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. B-line, an Eaton business.
  2. CADDY; a brand of nVent.
  3. Hilti, Inc.
  4. Loos & Co.
  5. Mason Industries, Inc.
  6. TOLCO.
  7. Unistrut; Part of Atkore International.
- B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod. Non-metallic stiffeners are unacceptable.
- C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.
- D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings and matched to type and size of anchor bolts and studs.
- E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings and matched to type and size of attachment devices used.
- F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

## 2.06 POST-INSTALLED CONCRETE ANCHORS

### A. Mechanical Anchor Bolts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - i. B-line, an Eaton business.
  - ii. Hilti, Inc.
  - iii. Mason Industries, Inc.
  - iv. Powers Fasteners.
  - v. Simpson Strong-Tie Co., Inc.
  - vi. Unistrut; Part of Atkore International.
2. Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength for anchor and as tested according to ASTM E488/E488M.

### B. Adhesive Anchor Bolts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - i. B-line, an Eaton business.
  - ii. Hilti, Inc.
  - iii. Mason Industries, Inc.
  - iv. Powers Fasteners.
  - v. Simpson Strong-Tie Co., Inc.
  - vi. Unistrut; Part of Atkore International.
2. Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E488/E488M.

- C. Provide post-installed concrete anchors that have been prequalified for use in wind-load applications. Post-installed concrete anchors must comply with all requirements

of ASCE/SEI 7-16, Ch. 13.

1. Prequalify post-installed anchors in concrete in accordance with ACI 355.2 or other approved qualification testing procedures.
  2. Prequalify post-installed anchors in masonry in accordance with approved qualification procedures.
- D. Expansion-type anchor bolts are not permitted for equipment in excess of 10 hp (7.46 kW) that is not vibration isolated.
1. Undercut expansion anchors are permitted.

## 2.07 CONCRETE INSERTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. B-line, an Eaton business.
  2. Hilti, Inc.
  3. Mason Industries, Inc.
  4. Powers Fasteners.
  5. Simpson Strong-Tie Co., Inc.
  6. Unistrut; Part of Atkore International.
- B. Provide preset concrete inserts that are seismically prequalified in accordance with ICC-ES AC466 testing.
- C. Comply with ANSI/MSS SP-58.

## **PART 3 EXECUTION**

### 3.01 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 APPLICATIONS

- A. Hanger-Rod Stiffeners: Install where required to prevent buckling of hanger rods due to seismic forces.

- B. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

### 3.03 INSTALLATION OF VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICES

- A. Provide vibration-control devices for systems and equipment where Specifications indicate they are to be installed on specific equipment and systems.
- B. Provide seismic-restraint devices for systems and equipment where Specifications indicate they are to be installed on specific equipment and systems, and where required by applicable codes.
- C. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- D. Equipment Restraints:
  1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
  2. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- E. Piping Restraints:
  1. Comply with requirements in MSS SP-127.
  2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
  3. Brace a change of direction longer than 12 feet.
- F. Install seismic-restraint cables so they do not bend across edges of adjacent equipment or building structure.
- G. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- H. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- I. Mechanical Anchor Bolts:
  1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.

2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge-Type Anchor Bolts: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Adhesive-Type Anchor Bolts: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
5. Set anchors to manufacturer's recommended torque, using a torque wrench.
6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

#### 3.04 ADJUSTING

- A. Adjust isolators after system is at operating weight.
- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

#### 3.05 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  1. Perform tests and inspections.
  2. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  3. Test to 90 percent of rated proof load of device.
  4. Measure isolator restraint clearance.
  5. Measure isolator deflection.
- B. Remove and replace malfunctioning units and retest as specified above.
- C. Units will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

**END OF SECTION**

## **SECTION 23 05 53 IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

### **PART 1 GENERAL**

#### 1.01 SUMMARY

##### A. Section Includes:

1. Equipment labels.
2. Pipe labels.
3. Duct labels.

#### 1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve-numbering scheme.
- E. Valve Schedules: Provide for each piping system. Include in operation and maintenance manuals.

### **PART 2 PRODUCTS**

#### 2.01 EQUIPMENT LABELS

##### A. Plastic Labels for Equipment:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- i. Brady Corporation.
  - ii. Brimar Industries, Inc.
  - iii. Carlton Industries, LP.
  - iv. Champion America.
  - v. Craftmark Pipe Markers.
  - vi. emedco.
  - vii. Kolbi Pipe Marker Co.
  - viii. LEM Products Inc.
  - ix. Marking Services, Inc.
  - x. Seton Identification Products; a Brady Corporation company.
2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, with predrilled holes for attachment hardware.
  3. Letter and Background Color: As indicated for specific application under Part 3.
  4. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless steel rivets or self-tapping screws.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

## 2.02 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of



the following:

1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
  2. Brady Corporation.
  3. Brimar Industries, Inc.
  4. Carlton Industries, LP.
  5. Champion America.
  6. Craftmark Pipe Markers.
  7. emedco.
  8. Kolbi Pipe Marker Co.
  9. LEM Products Inc.
  10. Marking Services Inc.
  11. Seton Identification Products; a Brady Corporation company.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:
1. Pipe size.
  2. Flow-Direction Arrows: Include flow-direction arrows on distribution piping. Arrows may be either integral with label or applied separately.
  3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

## 2.03 DUCT LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Brady Corporation.
  2. Brimar Industries, Inc.
  3. Carlton Industries, LP.
  4. Champion America.
  5. Craftmark Pipe Markers.
  6. emedco.
  7. Kolbi Pipe Marker Co.
  8. LEM Products Inc.
  9. Marking Services Inc.
  10. Seton Identification Products; a Brady Corporation company.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings. Also include the following:
1. Duct size.
  2. Flow-Direction Arrows: Include flow-direction arrows on main distribution ducts. Arrows may be either integral with label or may be applied separately.
  3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

### **3.02 INSTALLATION, GENERAL REQUIREMENTS**

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

### **3.03 INSTALLATION OF EQUIPMENT LABELS AND LABELS**

- A. Permanently fasten labels on each item of mechanical equipment.
- B. Sign and Label Colors:
  1. White letters on an ANSI Z535.1 safety-blue background.
- C. Locate equipment labels where accessible and visible.

### **3.04 INSTALLATION OF PIPE LABELS**

- A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  1. Within 3 ft. of each valve and control device.
  2. At access doors, manholes, and similar access points that permit view of concealed piping.
  3. Within 3 ft. of equipment items and other points of origination and termination.
  4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping, ductwork, and equipment.
- C. Flow-Direction Arrows: Use arrows to indicate direction of flow in pipes, including pipes

where flow is allowed in both directions.

D. Pipe-Label Color Schedule:

1. Combustible Fluids: White letters on an ANSI Z535.1 safety-brown background.

E. Install self-adhesive duct labels showing service and flow direction with permanent adhesive on air ducts.

1. Provide labels in the following color codes:

i. For exhaust-, outside-, relief-, return-, and mixed-air ducts: White letters on blue background.

F. Locate label near each point where ducts enter into and exit from concealed spaces and at maximum intervals of 20 ft. where exposed or are concealed by removable ceiling system.

G. Stenciled Access Panels and Door Labels, Equipment Labels, and Similar Operational Instructions:

1. Black letters on White background.

**END OF SECTION**

## **SECTION 23 05 93 TESTING, ADJUSTING, AND BALANCING FOR HVAC**

### **PART 1 GENERAL**

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:

1. Testing, Adjusting, and Balancing of Air Systems:
  - i. Constant-volume air systems.
2. Testing, adjusting, and balancing of fuel oil systems for HVAC.
3. Testing, adjusting, and balancing of equipment.
4. Duct leakage tests verification.
5. Pipe leakage tests verification.

#### 1.03 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.
- G. UFAD: Underfloor air distribution.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report, as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures, as specified in "Preparation" Article.
- D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists, as specified in "Preparation" Article.
- E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.
- F. Certified TAB reports.
- G. Sample report forms.
- H. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

#### 1.05 QUALITY ASSURANCE

- A. TAB Specialists Qualifications, Certified by AABC:
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
  - 2. TAB Technician: Employee of the TAB specialist and certified by AABC.
- B. TAB Specialists Qualifications, Certified by NEBB or TABB:
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
  - 2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB.
- C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

- E. Code and AHJ Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

## **PART 2 PRODUCTS (NOT APPLICABLE)**

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine equipment performance data, including fan curves.
  - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
  - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- E. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- F. Examine test reports specified in individual system and equipment Sections.
- G. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- H. Examine temporary and permanent strainers. Verify that temporary strainer screens used during system cleaning and flushing have been removed and permanent strainer baskets are installed and clean.
- I. Examine control valves for proper installation for their intended function of isolating, throttling, diverting, or mixing fluid flows.

- J. Examine operating safety interlocks and controls on HVAC equipment.
- K. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.
- L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.02 PREPARATION

- A. Prepare a TAB plan that includes the following:
  - 1. Equipment and systems to be tested.
  - 2. Strategies and step-by-step procedures for balancing the systems.
  - 3. Instrumentation to be used.
  - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
  - 1. Airside:
    - i. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
    - ii. Duct systems are complete with terminals installed.
    - iii. Fans are operating, free of vibration, and rotating in correct direction.
    - iv. Automatic temperature-control systems are operational.
    - v. Ceilings are installed.
    - vi. Windows and doors are installed.
    - vii. Suitable access to balancing devices and equipment is provided.

### 3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system in accordance with the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.



1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  2. Where holes for probes are required in piping or hydronic equipment, install pressure and temperature test plugs to seal systems.
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.04 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT

- A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:
1. Fans and ventilators.

### 3.05 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' Record drawings duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.

### 3.06 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
1. Measure total airflow.

- i. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
    - ii. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
  - 2. Measure fan static pressures as follows:
    - i. Measure static pressure directly at the fan outlet or through the flexible connection.
    - ii. Measure static pressure directly at the fan inlet or through the flexible connection.
  - 3. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs.
- B. Adjust air inlets and outlets for each space to indicated airflows.
- 1. Measure inlets and outlets airflow.
  - 2. Adjust each inlet and outlet for specified airflow.
  - 3. Re-measure each inlet and outlet after they have been adjusted.
- C. Verify final system conditions.
- 1. Re-measure and confirm that total airflow is within design.
  - 2. Re-measure all final fan operating data, speed, volts, amps, and static profile.
  - 3. Mark all final settings.
  - 4. Measure and record all operating data.
  - 5. Record final fan-performance data.

### 3.07 DUCT LEAKAGE TESTS

- A. Witness the duct leakage testing performed by Installer.
- B. Verify that proper test methods are used and that leakage rates are within specified limits.
- C. Report deficiencies observed.

### 3.08 PIPE LEAKAGE TESTS

- A. Witness the pipe pressure testing performed by Installer.
- B. Verify that proper test methods are used and that leakage rates are within specified limits.
- C. Report deficiencies observed.

### 3.09 TOLERANCES

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
  - 1. Exhaust Fans: Plus 10 percent or minus 5 percent. If design value is less than 100 cfm, within 10 cfm.
  - 2. Air Outlets and Inlets: Plus 10 percent or minus 5 percent. If design value is less than 100 cfm, within 10 cfm.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

### 3.10 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
  - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  - 2. Include a list of instruments used for procedures, along with proof of calibration.
  - 3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
  - 1. Fan curves.
  - 2. Manufacturers' test data.
  - 3. Field test reports prepared by system and equipment installers.
  - 4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
  - 1. Title page.
  - 2. Name and address of the TAB specialist.
  - 3. Project name.

4. Project location.
  5. Engineer's name and address.
  6. Contractor's name and address.
  7. Report date.
  8. Signature of TAB supervisor who certifies the report.
  9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  10. Summary of contents, including the following:
    - i. Indicated versus final performance.
    - ii. Notable characteristics of systems.
    - iii. Description of system operation sequence if it varies from the Contract Documents.
  11. Nomenclature sheets for each item of equipment.
  12. Notes to explain why certain final data in the body of reports vary from indicated values.
  13. Test conditions for fans performance forms, including the following:
    - i. Fan drive settings, including settings and percentage of maximum pitch diameter.
    - ii. Other system operating conditions that affect performance.
- D. Fan Test Reports: For exhaust fans, include the following:
1. Fan Data:

- i. System identification.
- ii. Location.
- iii. Make and type.
- iv. Model number and size.
- v. Manufacturer's serial number.
- vi. Arrangement and class.
- vii. Sheave make, size in inches, and bore.
- viii. Center-to-center dimensions of sheave and amount of adjustments in inches.

2. Motor Data:

- i. Motor make, and frame type and size.
- ii. Horsepower and speed.
- iii. Volts, phase, and hertz.
- iv. Full-load amperage and service factor.
- v. Sheave make, size in inches, and bore.
- vi. Center-to-center dimensions of sheave and amount of adjustments in inches.
- vii. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

- i. Total airflow rate in cfm.
- ii. Total system static pressure in inches wg.
- iii. Fan speed.
- iv. Discharge static pressure in inches wg.
- v. Suction static pressure in inches wg.

E. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

- i. System fan and air-handling-unit number.
- ii. Location and zone.
- iii. Traverse air temperature in deg F.
- iv. Duct static pressure in inches wg.
- v. Duct size in inches.
- vi. Duct area in sq. ft..
- vii. Indicated airflow rate in cfm.
- viii. Indicated velocity in fpm.
- ix. Actual airflow rate in cfm.
- x. Actual average velocity in fpm.
- xi. Barometric pressure in psig.

F. Instrument Calibration Reports:

1. Report Data:

- i. Instrument type and make.
- ii. Serial number.
- iii. Application.
- iv. Dates of use.
- v. Dates of calibration.

### 3.11 VERIFICATION OF TAB REPORT

- A. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to the lesser of either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- B. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- C. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the TAB shall be considered

- incomplete and shall be rejected.
- D. If recheck measurements find the number of failed measurements noncompliant with requirements indicated, proceed as follows:
1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection. All changes shall be tracked to show changes made to previous report.
  2. If the second final inspection also fails, Owner may pursue others Contract options to complete TAB work.
- E. Prepare test and inspection reports.

**END OF SECTION**

## SECTION 23 11 13 FACILITY FUEL-OIL PIPING

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

##### A. Section Includes:

1. Fuel-oil pipes, tubes, and fittings.
2. Piping specialties.
3. Joining materials.
4. Specialty valves.
5. Labels and identification.

#### 1.03 DEFINITIONS

- A. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- B. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- C. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

#### 1.04 ACTION SUBMITTALS

##### A. Product Data: For each type of product.

1. Include construction details, material descriptions, and dimensions of individual components and profiles.
2. Include, where applicable, rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
3. For valves, include pressure rating, capacity, settings, and electrical connection data of selected models.



- B. Shop Drawings: For fuel-oil piping.
  1. Include plans, elevations sections, hangers, and supports for multiple pipes.
  2. Include details of location of anchors, alignment guides, and expansion joints and loops.
  3. Scale: 1/4 inch per foot.
- C. Delegated-Design Submittal: For fuel-oil piping indicated to comply with performance requirements and design criteria.
  1. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  2. Detail fabrication and assembly of anchors and seismic restraints.
  3. Design Calculations: Calculate requirements for selecting seismic restraints.
  4. Detail fabrication and assembly of pipe anchors, hangers, supports for multiple pipes, and attachments of the same to building structure.

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings:
  1. Plans and details, drawn to scale, on which fuel-oil piping is shown and coordinated with other installations, using input from installers of the items involved.
  2. Site Survey: Plans, drawn to scale, on which fuel-oil piping and tanks are shown and coordinated with other services and utilities.
- B. Brazing certificates.
- C. Retain "Welding certificates" Paragraph below if retaining procedures for welder certification in "Quality Assurance" Article.
- D. Welding certificates.
- E. Retain "Field quality-control reports" Paragraph below if Contractor is responsible for field quality-control testing and inspecting.
- F. Field quality-control reports.
- G. Sample Warranty: For special warranty.

#### 1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuel-oil equipment and accessories to include

in emergency, operation, and maintenance manuals.

#### 1.07 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

#### 1.08 QUALITY ASSURANCE

- A. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding Qualifications: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Lift and support fuel-oil storage tanks only at designated lifting or supporting points, as shown on Shop Drawings. Do not move or lift tanks unless empty.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store pipes and tubes with protective PE coating to avoid damaging the coating and to protect from direct sunlight.

#### 1.10 FIELD CONDITIONS

- A. Interruption of Existing Fuel-Oil Service: Do not interrupt fuel-oil service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary fuel-oil supply according to requirements indicated:
  1. Notify Architect no fewer than two days in advance of proposed interruption of fuel-oil service.
  2. Do not proceed with interruption of fuel-oil service without Architect's written permission.

#### 1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of flexible, double-containment piping and related equipment that fail in materials or workmanship within specified warranty period.
  1. Failures due to defective materials or workmanship for materials including piping, dispenser sumps, water-tight sump entry boots, terminations, and other end

fittings.

2. Warranty Period: 10 years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 SYSTEM DESCRIPTION**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with ASME B31.9, "Building Services Piping," for fuel-oil piping materials, installation, testing, and inspecting.
- C. Fuel-Oil Valves: Comply with UL 842 and have service mark initials "WOG" permanently marked on valve body.
- D. Comply with requirements of the EPA and of state and local authorities having jurisdiction. Include recording of fuel-oil piping.

### **2.02 PERFORMANCE REQUIREMENTS**

- C. Maximum Operating-Pressure Ratings: 3-psig fuel-oil supply pressure at oil-fired appliances.
- D. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design restraints and anchors and multiple pipe supports and hangers for fuel-oil piping.

### **2.03 FUEL-OIL PIPES, TUBES, AND FITTINGS**

- A. See "Outdoor Piping Installation" and "Indoor Piping Installation" articles for where pipes, tubes, fittings, and joining materials are applied in various services.
- B. Steel Pipe: ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.
  1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  2. Wrought-Steel Welding Fittings: ASTM A234/A234M, for butt and socket welding.
  3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
  4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

- i. Material Group: 1.1.
- ii. End Connections: Threaded or butt welding to match pipe.
- iii. Lapped Face: Not permitted underground.
- iv. Gasket Materials: Asbestos free, ASME B16.20 metallic, or ASME B16.21 nonmetallic, gaskets compatible with fuel oil.
- v. Bolts and Nuts: ASME B18.2.1, cadmium-plated steel.

C. Drawn-Temper Copper Tube: Comply with ASTM B88, Type L.

- 1. Copper Fittings: ASME B16.22, wrought copper, streamlined pattern.
- 2. Bronze Flanges and Flanged Fittings: ASME B16.24, Class 150.
  - i. Gasket Material: Asbestos free, ASME B16.20 metallic or ASME B16.21 nonmetallic, gaskets compatible with fuel oil.
  - ii. Bolts and Nuts: ASME B18.2.1, cadmium-plated steel.

D. Annealed-Temper Copper Tube: Comply with ASTM B88, Type L.

- i. Copper Fittings: ASME B16.22, wrought copper, streamlined pattern.

## 2.04 PIPING SPECIALTIES

A. Metallic Flexible Connectors:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- i. American Flexible Hose Co., Inc.
  - ii. Flexicraft Industries.
  - iii. FLEX-ING, Inc.
  - iv. Hose Master, Inc.
  - v. Metraflex Company (The).
  - vi. Proco Products, Inc.
  - vii. Tru-Flex Metal Hose Corp.
  - viii. Unaflex.
2. Listed and labeled for aboveground and underground applications by an NRTL acceptable to authorities having jurisdiction.
  3. Stainless-steel bellows with woven, flexible, bronze or stainless-steel, wire-reinforcing protective jacket.
  4. Minimum Operating Pressure: 150 psig.
  5. End Connections: Socket, flanged, or threaded end to match connected piping.
  6. Maximum Length: 30 inches
  7. Swivel end, 50-psig maximum operating pressure.
  8. Factory-furnished anode for connection to cathodic protection.
- B. Nonmetallic Flexible Connectors:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - i. American Flexible Hose Co., Inc.
    - ii. Flexicraft Industries.
    - iii. FLEX-ING, Inc.
    - iv. Tru-Flex Metal Hose Corp.
  2. Listed and labeled for underground applications by an NRTL acceptable to authorities having jurisdiction.

3. PTFE bellows with woven, flexible, bronze or stainless-steel, wire-reinforcing protective jacket.
4. Minimum Operating Pressure: 150 psig.
5. End Connections: Socket, flanged, or threaded end to match connected piping.
6. Maximum Length: 30 inches
7. Swivel end, 50-psig maximum operating pressure.
8. Factory-furnished anode.

C. Manual Air Vents:

1. Body: Bronze.
2. Internal Parts: Nonferrous.
3. Operator: Screwdriver or thumbscrew.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/8.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 225 deg F.

## 2.05 JOINING MATERIALS

- A. Joint Compound and Tape for Threaded Joints: Suitable for fuel oil.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.
- D. Bonding Adhesive for RTRP and RTRF: As recommended by piping and fitting manufacturer.

## 2.06 SPECIALTY VALVES

A. Emergency Shutoff Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- i. EMCO Wheaton.
  - ii. Franklin Fueling Systems.
  - iii. OPW Engineered Systems; OPW Fluid Transfer Group; a Dover company.
2. Listed and labeled for fuel-oil service by an NRTL acceptable to authorities having jurisdiction.
  3. Poppet valve.
  4. Body: ASTM A126, cast iron.
  5. Disk: FPM.
  6. Poppet Spring: Stainless steel.
  7. Stem: Plated brass.
  8. O-Ring: FPM.
  9. Packing Nut: PTFE-coated brass.
  10. Fusible link to close valve at 165 deg F.
  11. Thermal relief to vent line pressure buildup due to fire.
  12. Air test port.
  13. Maximum Operating Pressure: 0.5 psig.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of fuel-oil piping.
- B. Examine installation of fuel-burning equipment and fuel-handling and storage equipment to verify actual locations of piping connections before installing fuel-oil piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Comply with NFPA 30 and NFPA 31 requirements for prevention of accidental ignition.

### 3.03 INSTALLATION OF INDOOR PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping free of sags and bends.
- E. Install fittings for changes in direction and branch connections.
- F. Comply with requirements for equipment specifications for roughing-in requirements.
- G. Prohibited Locations:
  - 1. Do not install fuel-oil piping in or through HVAC ducts and plenums, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
  - 2. Do not install fuel-oil piping in solid walls or partitions.
- H. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- I. Connect branch piping from top or side of horizontal piping.
- J. Install unions in pipes NPS 2 and smaller at final connection to each piece of equipment and elsewhere as indicated. Unions are not required on flanged devices.
- K. Do not use fuel-oil piping as grounding electrode.
- L. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

### 3.04 INSTALLATION OF VALVES

- A. Install manual fuel-oil shutoff valves on branch connections to fuel-oil appliance.
- B. Install valves in accessible locations.
- C. Install oil safety valves at inlet of each oil-fired appliance.
- D. Install pressure relief valves in distribution piping between the supply and return lines.



- E. Install one-piece, bronze ball valve with hose end connection at low points in fuel-oil piping. Comply with requirements in Section 230523.12 "Ball Valves for HVAC Piping."
- F. Install manual air vents at high points in fuel-oil piping.
- G. Install emergency shutoff valves at dispensers.

### 3.05 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to "Quality Assurance" Article.
  - 1. Bevel plain ends of steel pipe.
  - 2. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tubing" Chapter.
- F. Flanged Joints: Install gasket material, size, type, and thickness for service application. Install gasket concentrically positioned.
- G. Flared Joints: Comply with SAE J513. Tighten finger tight then use wrench according to fitting manufacturer's written instructions. Do not overtighten.
- H. Fiberglass-Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### 3.06 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for seismic-restraint devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
- B. Comply with requirements for hangers, supports, and anchor devices specified in Section 23 05 29 "Hangers and Supports for HVAC Piping and Equipment."

- C. Install hangers for steel piping and copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting and coupling.
- E. Support vertical runs of copper tube and steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

### 3.07 CONNECTIONS

- A. Where installing piping adjacent to equipment, allow space for service and maintenance.
- B. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment having threaded pipe connection.
- C. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
- D. Connect piping to equipment with shutoff valve and union. Install union between valve and equipment.
- E. Install flexible piping connectors at final connection to burners or oil-fired appliances.

### 3.08 LABELING AND IDENTIFYING

- A. Nameplates, pipe identification, valve tags, and signs are specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."
- B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on or near each service regulator, service meter, and earthquake valve.
  - 1. Text: In addition to identifying unit, distinguish between multiple units; inform operator of operational requirements; indicate safety and emergency precautions; and warn of hazards and improper operations.

### 3.09 FIELD QUALITY CONTROL

- A. Pressure Test Piping: Minimum hydrostatic or pneumatic test-pressures measured at highest point in system:
  - 1. Fuel-Oil Distribution Piping: Minimum 5 psig for minimum 30 minutes.
- B. Inspect and test fuel-oil piping according to NFPA 31, "Tests of Piping" Paragraph; and according to requirements of authorities having jurisdiction.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- D. Bleed air from fuel-oil piping using manual air vents.
- E. Fuel-oil piping and equipment will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

### 3.10 INDOOR PIPING SCHEDULE

- A. Aboveground fuel-oil piping shall be one of the following:
  1. NPS 1/2 and Smaller: Annealed-temper copper pipe, wrought copper fittings, and brazed or flared joints.
  2. NPS 5/8 to NPS 2: Steel pipe, steel or malleable-iron threaded fittings, and threaded joints.
  3. NPS 2-1/2 and Larger: Steel pipe, steel fittings, and welded or flanged joints .

### 3.11 SHUTOFF VALVE SCHEDULE

- A. Valves for aboveground distribution piping NPS 2 and smaller shall be one of the following:
  1. Two-piece, full-port, bronze ball valves with bronze trim.
- B. Distribution piping valves for pipe NPS 2-1/2 and larger shall be one of the following:
  1. Two-piece, full-port, bronze ball valves with bronze trim.
  2. Bronze, nonlubricated plug valve.
- C. Valves in branch piping for single appliance shall be the following:
  1. Two-piece, full-port, bronze ball valves with bronze trim.

**END OF SECTION**

## SECTION 23 31 13 METAL DUCTS

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

##### A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Sheet metal materials.
3. Duct liner.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

##### B. Related Sections:

1. Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Section 23 33 00 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

#### 1.03 ACTION SUBMITTALS

##### A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.

##### B. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.

2. Factory- and shop-fabricated ducts and fittings.
  3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
  4. Elevation of top and bottom of ducts.
  5. Dimensions of all duct runs from building grid lines.
  6. Fittings.
  7. Reinforcement and spacing.
  8. Seam and joint construction.
  9. Penetrations through fire-rated and other partitions.
  10. Equipment installation based on equipment being used on Project.
  11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
  12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.
- C. Delegated-Design Submittal:
1. Sheet metal thicknesses.
  2. Joint and seam construction and sealing.
  3. Reinforcement details and spacing.
  4. Materials, fabrication, assembly, and spacing of hangers and supports.
  5. Design Calculations: Calculations, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation for selecting hangers and supports and seismic restraints.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: A single set of plans or BIM model, drawn to scale, showing the items described in this Section, and coordinated with all building trades.
- B. Welding certificates.
- C. Field quality-control reports.

## **PART 2      PRODUCTS**

### **2.01    PERFORMANCE REQUIREMENTS**

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and with performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7. Seismically brace duct hangers and supports in accordance with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
  - 1. Seismic Hazard Level (SHL): A.
- C. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

### **2.02    SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
  - 1. Construct ducts of galvanized sheet steel unless otherwise indicated.
- B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  - 1. For ducts with longest side less than 36 inches, select joint types in accordance with Figure 2-1.
  - 2. For ducts with longest side 36 inches or greater, use flange joint connector Type T-22, T-24, T-24A, T-25a, or T-25b. Factory-fabricated flanged duct connection system may be used if submitted and approved by engineer of record.
- C. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.03 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
  - 1. Galvanized Coating Designation: G60.
  - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Tie Rods: Galvanized steel, 1/4-inch-minimum diameter for lengths 36 inches or less; 3/8-inch-minimum diameter for lengths longer than 36 inches.

## 2.04 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - i. CertainTeed Corporation.
    - ii. CertainTeed Insulation.
    - iii. Johns Manville; a Berkshire Hathaway company.
    - iv. Knauf Insulation.
    - v. Owens Corning.
  - 2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
  - 3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C916.
- B. Insulation Pins and Washers:
  - 1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.

2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel; with beveled edge sized as required to hold insulation securely in place, but not less than 1-1/2 inches in diameter.
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
  2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
  3. Butt transverse joints without gaps, and coat joint with adhesive.
  4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
  5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
  6. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
  7. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
    - i. Fan discharges.
    - ii. Intervals of lined duct preceding unlined duct.

## 2.05 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
  1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.



2. Tape Width: 3 inches.
  3. Sealant: Modified styrene acrylic.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. Maximum Static-Pressure Class: 10 inch wg, positive and negative.
  7. Service: Indoor and outdoor.
  8. Service Temperature: Minus 40 to plus 200 deg F.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
- C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
  2. Solids Content: Minimum 65 percent.
  3. Shore A Hardness: Minimum 20.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. VOC: Maximum 75 g/L (less water).
  7. Maximum Static-Pressure Class: 10 inch wg, positive and negative.
  8. Service: Indoor or outdoor.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Flanged Joint Sealant: Comply with ASTM C920.
1. General: Single-component, acid-curing, silicone, elastomeric.
  2. Type: S.
  3. Grade: NS.
  4. Class: 25.

5. Use: O.

E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

## 2.06 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.

D. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

F. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

## 2.07 SEISMIC-RESTRAINT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. B-line, an Eaton business.

2. CADDY; a brand of nVent.

3. Ductmate Industries, Inc.

4. Elgen Manufacturing.

5. Hilti, Inc.

6. Kinetics Noise Control, Inc.

7. Mason Industries, Inc.

8. Unistrut; Part of Atkore International.

B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
- D. Restraint Cables: ASTM A603, galvanized-steel cables with end connections made of galvanized-steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested in accordance with ASTM E488/E488M.

## **PART 3 EXECUTION**

### **3.01 DUCT INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.
- B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install ducts in maximum practical lengths with fewest possible joints.
- D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on

four sides by at least 1-1/2 inches.

- I. Install dampers, and all other duct-mounted accessories in air ducts where indicated on Drawings.
- J. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

### 3.02 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### 3.03 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

### 3.04 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  1. Where practical, install concrete inserts before placing concrete.
  2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.05 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with ASCE/SEI 7.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
  1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

### 3.06 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### 3.07 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer.

### 3.08 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Duct System Cleanliness Tests:
  1. Visually inspect duct system to ensure that no visible contaminants are present.
- C. Duct system will be considered defective if it does not pass tests and inspections.

### 3.09 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.
- B. Clean the following components by removing surface contaminants and deposits:
  1. Air outlets and inlets (registers, grilles, and diffusers).
  2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
  3. Dedicated exhaust and ventilation components and makeup air systems.
- C. Mechanical Cleaning Methodology:
  1. Clean metal duct systems using mechanical cleaning methods that extract

contaminants from within duct systems and remove contaminants from building.

2. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
3. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents in accordance with manufacturer's written instructions after removal of surface deposits and debris.

### 3.10 STARTUP

- A. Air Balance: Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

### 3.11 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:

1. Fabricate all ducts to achieve SMACNA pressure class, seal class, and leakage class as indicated below.

- B. Exhaust Ducts:

1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
  - i. Pressure Class: Negative 1-inch wg.
  - ii. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
  - iii. SMACNA Leakage Class for Rectangular: 2.
  - iv. SMACNA Leakage Class for Round and Flat Oval: 2.
2. Ducts Connected to Equipment Not Listed above:
  - i. Pressure Class: Positive or negative 2-inch wg.
  - ii. Minimum SMACNA Seal Class: A if negative pressure; A if positive pressure.
  - iii. SMACNA Leakage Class for Rectangular: 2.
  - iv. SMACNA Leakage Class for Round: 2.

- C. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:

1. Ducts Connected to Equipment Not Listed Above:

- i. Pressure Class: Positive or negative 2-inch wg.
- ii. Minimum SMACNA Seal Class: A.
- iii. SMACNA Leakage Class for Rectangular: 2.
- iv. SMACNA Leakage Class for Round: 2.

D. Intermediate Reinforcement:

- 1. Galvanized-Steel Ducts: Galvanized steel.

E. Elbow Configuration:

- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
  - i. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - ii. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - iii. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

**END OF SECTION**



## SECTION 23 33 00 AIR DUCT ACCESSORIES

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

##### A. Section Includes:

1. Backdraft dampers.
2. Control dampers.
3. Duct-mounted access doors.
4. Flexible connectors.
5. Duct accessory hardware.

##### B. Related Requirements:

1. Section 23 33 46 "Flexible Ducts" for insulated and non-insulated flexible ducts.

#### 1.03 ACTION SUBMITTALS

- A. Shop Drawings: For duct accessories. Include plans, elevations, sections, details, and attachments to other work.

1. Detail duct accessories' fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
  - i. Control-damper installations.
  - ii. Include diagrams for power, signal, and control wiring.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, or BIM model, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from installers of the items involved.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

## **PART 2      PRODUCTS**

### **2.01    PERFORMANCE REQUIREMENTS**

- A. Comply with NFPA 90A and NFPA 90B.
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

### **2.02    BACKDRAFT DAMPERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. American Warming and Ventilating; a Mestek Architectural Group company.
  2. Cesco Products; a division of MESTEK, Inc.
  3. Greenheck Fan Corporation.
  4. Lloyd Industries, Inc.
  5. Nailor Industries Inc.
  6. NCA Manufacturing, Inc.
  7. Pottorff.
  8. Ruskin Company.
  9. Safe Air - Dowco Products.
  10. United Enertech.
  11. Vent Products Co., Inc.
- B. Description: Gravity balanced.
- C. Performance:
  1. Maximum Air Velocity: 2000 fpm.
  2. Maximum System Pressure: 2 inches wg.

3. AMCA Certification: Test and rate in accordance with AMCA 511.
  4. Leakage:
    - i. Class III: Leakage shall not exceed 40 cfm/sq. ft. against 1-inch wg differential static pressure.
- D. Construction:
1. Frame:
    - i. Hat shaped.
    - ii. 16-gauge-thick, galvanized sheet steel, with welded or mechanically attached corners and mounting flange.
  2. Blades:
    - i. Multiple single-piece blades.
    - ii. Center pivoted, maximum 6-inch width, 16-gauge-thick, galvanized sheet steel with sealed edges.
  3. Blade Action: Parallel.
- E. Blade Seals: Felt.
- F. Blade Axles:
1. Material: Nonferrous metal.
  2. Diameter: 0.20 inch.
- G. Tie Bars and Brackets: Galvanized steel.
- H. Return Spring: Adjustable tension.
- I. Bearings: Steel ball or synthetic pivot bushings.
- J. Accessories:
1. Counterweights and spring-assist kits for vertical airflow installations.
  2. Screen Material: Galvanized steel.
  3. Screen Type: Bird.
  4. 90-degree stops.

## 2.03 CONTROL DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Warming and Ventilating; a Mestek Architectural Group company.
2. Arrow United Industries.
3. Carnes Company.
4. Cesco Products; a division of MESTEK, Inc.
5. Greenheck Fan Corporation.
6. Lloyd Industries, Inc.
7. McGill AirFlow LLC.
8. Metal Form Manufacturing, Inc.
9. Nailor Industries Inc.
10. NCA Manufacturing, Inc.
11. Pottorff.
12. Ruskin Company.
13. Safe Air - Dowco Products.
14. United Enertech.
15. Vent Products Co., Inc.
16. Young Regulator Company.

B. General Requirements:

1. Unless otherwise indicated, use parallel-blade configuration for two-position control, equipment isolation service, and when mixing two airstreams. For other applications, use opposed-blade configuration.
2. Factory or field assemble multiple damper sections to provide a single damper assembly of size required by the application.

C. Performance:

1. AMCA Certification: Test and rate in accordance with AMCA 511.

2. Leakage:
    - i. Class I: Leakage shall not exceed 4 cfm/sq. ft. against 1-inch wg differential static pressure.
  3. Pressure Drop: 0.05 inch wg at 1500 fpm across a 24-by-24-inch damper when tested in accordance with AMCA 500-D, Figure 5.3.
  4. Velocity: Up to 3000 fpm.
  5. Temperature: Minus 25 to plus 180 deg F.
  6. Pressure Rating: Damper close-off pressure equal to fan shutoff pressure with a maximum blade deflection of 1/200 of blade length.
- D. Construction:
1. Linkage out of airstream.
  2. Suitable for horizontal or vertical airflow applications.
  3. Frames:
    - i. Hat, U, or angle shaped.
    - ii. 16-gauge-thick, galvanized sheet steel.
    - iii. Mitered and welded corners.
    - iv. Flanges for attaching to walls and flangeless frames for installing in ducts.
  4. Blades:
    - i. Multiple blade with maximum blade width of 8 inches.
    - ii. Parallel-blade design.
    - iii. Galvanized steel.
    - iv. 16-gauge-thick single skin or 14-gauge-thick air foil dual skin.
  5. Blade Edging Seals:
    - i. Inflatable seal blade edging, or replaceable rubber seals.
  6. Blade Jamb Seal: Flexible stainless steel, compression type.
  7. Blade Axles: 1/2-inch diameter; galvanized steel.

8. Blade-Linkage Hardware: Zinc-plated steel and brass; ends sealed against blade bearings. Linkage mounted out of air stream.
  9. Bearings:
    - i. Oil-impregnated bronze.
    - ii. Dampers mounted with vertical blades to have thrust bearings at each end of every blade.
- E. Damper Actuator - Electric:
1. Electric - 120 V ac.
  2. UL 873, plenum rated.
  3. Two position with fail-safe spring return.
    - i. Sufficient motor torque and spring torque to drive damper fully open and fully closed with adequate force to achieve required damper seal.
    - ii. Minimum 90-degree drive rotation.
  4. Clockwise or counterclockwise drive rotation as required for application.
  5. Environmental Operating Range:
    - i. Temperature: Minus 40 to plus 130 deg F.
    - ii. Humidity: 5 to 95 percent relative humidity noncondensing.
  6. Environmental enclosure: NEMA 2.
  7. Actuator to be factory mounted and provided with a single-point wiring connection.

#### 2.04 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Aire Technologies.
  2. Arrow United Industries.
  3. Cesco Products; a division of MESTEK, Inc.
  4. CL WARD & Family Inc.
  5. Ductmate Industries, Inc.

6. Duro Dyne Inc.
  7. Elgen Manufacturing.
  8. Flexmaster U.S.A., Inc.
  9. McGill AirFlow LLC.
  10. Ruskin Company.
  11. United Enertech.
  12. Ventfabrics, Inc.
  13. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figure 7-2 (7-2M), "Duct Access Doors and Panels," and Figure 7-3, "Access Doors - Round Duct."
1. Door:
    - i. Double wall, rectangular.
    - ii. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - iii. 24-gauge-thick galvanized steel or 0.032-inch-thick aluminum or 24-gauge-thick stainless steel door panel.
    - iv. Vision panel.
    - v. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    - vi. Fabricate doors airtight and suitable for duct pressure class.
  2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
    - i. 24-gauge-thick galvanized steel or 0.032-inch-thick aluminum frame.
  3. Number of Hinges and Locks:

- i. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
- ii. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
- iii. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches with outside and inside handles.
- iv. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

## 2.05 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CL WARD & Family Inc.
  - 2. Ductmate Industries, Inc.
  - 3. Duro Dyne Inc.
  - 4. DynAir; a Carlisle Company.
  - 5. Elgen Manufacturing.
  - 6. Ventfabrics, Inc.
  - 7. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Fire-Performance Characteristics: Adhesives, sealants, fabric materials, and accessory materials shall have flame-spread index not exceeding 25 and smoke-developed index not exceeding 50 when tested in accordance with ASTM E84.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
- D. Materials: Flame-retardant or noncombustible fabrics.
- E. Coatings and Adhesives: Comply with UL 181, Class 1.
- F. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd..
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 200 deg F.

## 2.06 DUCT ACCESSORY HARDWARE



- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CL WARD & Family Inc.
  - 2. Ductmate Industries, Inc.
  - 3. Duro Dyne Inc.
  - 4. DynAir; a Carlisle Company.
  - 5. Elgen Manufacturing.
  - 6. Hardcast; a Carlisle Company.
  - 7. United Eneritech.
  - 8. Ventfabrics, Inc.
  - 9. Ward Industries; a brand of Hart & Cooley, Inc.
- B. 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.
- C. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## 2.07 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A653/A653M.
  - 1. Galvanized Coating Designation: G60.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Stainless Steel Sheets: Comply with ASTM A480/A480M, Type 304, and having a No. 2D finish for concealed ducts and No. 4 finish for exposed ducts.
- C. Aluminum Sheets: Comply with ASTM B209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, one-side bright finish for exposed ducts.
- D. Extruded Aluminum: Comply with ASTM B221, Alloy 6063, Temper T6.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless steel ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install duct accessories in accordance with applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116 for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless steel accessories in stainless steel ducts, and aluminum accessories in aluminum ducts.
- C. Compliance with ASHRAE/IES 90.1 restricts the use of nonmotorized backdraft dampers and requires motorized control dampers for specific types of applications.
- D. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- E. Where multiple damper sections are necessary to achieve required dimensions, provide reinforcement to fully support damper assembly when fully closed at full system design static pressure.
- F. To minimize duct noise generated by volume dampers, SMACNA recommends locating dampers at least two duct diameters from fittings and as far away as possible from outlets.
- G. Coordinate subparagraphs below with Section 23 31 13 "Metal Ducts."
- H. Install test holes at fan inlets and outlets and elsewhere as indicated and as needed for testing and balancing.
- I. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. At outdoor-air intakes and mixed-air plenums.
  - 2. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  - 3. Retain first three subparagraphs below to provide access for duct cleaning.
  - 4. Control devices requiring inspection.
  - 5. Elsewhere as indicated.
- J. Install access doors with swing against duct static pressure.
- K. Sizes in "Access Door Sizes" Paragraph below are from one manufacturer's literature. SMACNA lists only three sizes, 12 by 12 inches (300 by 300 mm), 16 by 20 inches (400 by 500 mm), and 24 by 24 inches (600 by 600 mm) but makes no recommendations for applications. Indicate location and type of each access door on

Drawings.

L. Access Door Sizes:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.

M. Coordinate first paragraph below with Section 23 05 53 "Identification for HVAC Piping and Equipment."

N. Label access doors according to Section 23 05 53 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.

O. Install flexible connectors to connect ducts to equipment.

P. Install duct test holes where required for testing and balancing purposes.

Q. Retain paragraph below for thrust limits on flexible connections for fans.

R. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

### 3.02 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that size and location of access doors are adequate to perform required operation.

**END OF SECTION**

## **SECTION 23 33 46 FLEXIBLE DUCTS**

### **PART 1 GENERAL**

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:
  - 1. Flexible ducts.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For flexible ducts.
  - 1. Include plans showing locations and mounting and attachment details.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from installers of the items involved.

### **PART 2 PRODUCTS**

#### 2.01 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."
- D. Comply with ASTM E96/E96M, "Test Methods for Water Vapor Transmission of Materials."

#### 2.02 FLEXIBLE DUCT CONNECTORS

- A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
- B. Non-Clamp Connectors: Adhesive Liquid adhesive plus tape.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.
- C. Connect diffusers or light troffer boots to ducts directly or with maximum 24-inch lengths of flexible duct clamped or strapped in place.
- D. Connect flexible ducts to metal ducts with draw bands.
- E. Install duct test holes where required for testing and balancing purposes.
- F. Installation:
  - 1. Install ducts fully extended.
  - 2. Do not bend ducts across sharp corners.
  - 3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
  - 4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
  - 5. Install flexible ducts in a direct line, without sags, twists, or turns.
- G. Supporting Flexible Ducts:
  - 1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
  - 2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
  - 3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.

4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches o.c.

**END OF SECTION**

## SECTION 23 34 23 HVAC POWER VENTILATORS

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:

- 1. Ceiling-mounted ventilators.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
- 2. Rated capacities, operating characteristics, and furnished specialties and accessories.
- 3. Certified fan performance curves with system operating conditions indicated.
- 4. Certified fan sound-power ratings.
- 5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
- 6. Material thickness and finishes, including color charts.
- 7. Dampers, including housings, linkages, and operators.
- 8. Prefabricated roof curbs.
- 9. Fan speed controllers.

- B. Shop Drawings:

- 1. Include plans, elevations, sections, and attachment details.
- 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Include diagrams for power, signal, and control wiring.
  4. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints.
- C. Delegated Design Submittal: For unit hangars and supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans, reflected ceiling plans, and other details, or BIM model, drawn to scale, showing the items described in this Section and coordinated with all building trades.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For HVAC power ventilators to include in normal and emergency operation, and maintenance manuals.

## **PART 2 PRODUCTS**

#### 2.01 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.
- C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- E. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design vibration isolation, supports, and seismic restraints, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- F. Seismic Performance: HVAC power ventilators shall withstand the effects of earthquake motions determined according to ASCE/SEI 7. See Section 230548 "Vibration and Seismic Controls for HVAC."
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."



2. Component Importance Factor: 1.0.

## 2.02 CEILING-MOUNTED VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Acme Engineering & Manufacturing Corp.
  2. American Coolair Corporation.
  3. Broan-NuTone LLC.
  4. Carnes Company.
  5. FloAire National.
  6. Greenheck Fan Corporation.
  7. JencoFan.
  8. Loren Cook Company.
  9. PennBarry.
  10. S & P USA Ventilation Systems, LLC.
- B. Housing: Steel, lined with acoustical insulation.
- C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.
- D. Back-draft damper: Integral.
- E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- F. Accessories:
  1. Variable-Frequency Motor Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  2. Isolation: Rubber-in-shear vibration isolators.
  3. Manufacturer's standard transition fittings.

## 2.03 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 23 05 13 "Common Motor Requirements

for HVAC Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

#### 2.04 SOURCE QUALITY CONTROL

- A. AMCA Certification for Fan Sound Performance Rating: Test, rate, and label in accordance with AMCA 311.
- B. AMCA Certification for Fan Aerodynamic Performance Ratings: Test, rate, and label in accordance with AMCA 211.
- C. AMCA Certification for Fan Energy Index (FEI): Test, rate, and label in accordance with AMCA 211.
- D. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

### **PART 3 EXECUTION**

#### 3.01 INSTALLATION, GENERAL

- A. Install power ventilators level and plumb.
- B. Equipment Mounting:
  1. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
  2. Comply with requirements for vibration isolation and seismic-control devices specified in Section 23 05 48 "Vibration and Seismic Controls for HVAC."
- C. Install units with clearances for service and maintenance.
- D. Label units according to requirements specified in Section 23 05 53 "Identification for HVAC Piping and Equipment."

#### 3.02 DUCTWORK CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 33 00 "Air Duct Accessories."

#### 3.03 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.

1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

### 3.04 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Division 26.

### 3.05 STARTUP SERVICE:

- A. Perform startup service.
  1. Complete installation and startup checks in accordance with manufacturer's written instructions.
  2. Verify that shipping, blocking, and bracing are removed.
  3. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  4. Verify that cleaning and adjusting are complete.
  5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.
  6. Adjust damper linkages for proper damper operation.
  7. Verify lubrication for bearings and other moving parts.
  8. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  9. Shut unit down and reconnect automatic temperature-control operators.
  10. Remove and replace malfunctioning units and retest as specified above.

### 3.06 ADJUSTING

- A. Lubricate bearings.
- B. Comply with requirements in Section 23 05 93 "Testing, Adjusting, and Balancing for HVAC."

### 3.07 CLEANING

- A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust.

### 3.08 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
  - 1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 2. Test and adjust controls and safeties.
  - 3. Fans and components will be considered defective if they do not pass tests and inspections.
  - 4. Prepare test and inspection reports.

### 3.09 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

**END OF SECTION**

## SECTION 23 37 13.23 REGISTERS AND GRILLES

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section Includes:
  - 1. Fixed face registers and grilles.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
  - 2. Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Ceiling suspension assembly members.
  - 2. Method of attaching hangers to building structure.
  - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  - 4. Duct access panels.
- B. Source quality-control reports.

### PART 2 PRODUCTS

#### 2.01 REGISTERS

A. Fixed Face Register:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - i. A-J Manufacturing Co., Inc.
  - ii. Anemostat Products; a Mestek company.
  - iii. Carnes Company.
  - iv. Dayus Register & Grille Inc.
  - v. Hart & Cooley Inc.
  - vi. Kees, Inc.
  - vii. Krueger.
  - viii. Nailor Industries Inc.
  - ix. Price Industries.
  - x. Shoemaker Mfg. Co.
  - xi. Titus.
  - xii. Tuttle & Bailey.
2. Material: Steel.
3. Finish: Baked enamel, white.
4. Face Blade Arrangement: spaced 3/4 inch apart.
5. Core Construction: Integral.
6. Frame: 1-1/4 inches wide.
7. Mounting: Countersunk screw.
8. Damper Type: Multishutter.
9. Accessory: Filter.

2.02 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate registers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas where registers and grilles are installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install registers and grilles level and plumb.
- B. Outlets and Inlets Locations: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install registers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

### **3.03 ADJUSTING**

- A. After installation, adjust registers and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION**

## **SECTION 23 82 39.19 WALL AND CEILING UNIT HEATERS**

### **PART 1 GENERAL**

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 SUMMARY

- A. Section includes wall heaters with propeller fans and electric-resistance heating coils.

#### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include rated capacities, operating characteristics, furnished specialties, and accessories.

- B. Shop Drawings:

- 1. Include plans, elevations, sections, and details.
- 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- 3. Include details of anchorages and attachments to structure and to supported equipment.
- 4. Include equipment schedules to indicate rated capacities, operating characteristics, furnished specialties, and accessories.
- 5. Wiring Diagrams: Power, signal, and control wiring.

- C. Samples: For each exposed product and for each color and texture specified.

#### 1.04 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For wall unit heaters to include in emergency, operation, and maintenance manuals.

### **PART 2 PRODUCTS**

#### 2.01 MANUFACTURERS



A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Berko; Marley Engineered Products.
2. Chromalox, Inc.
3. INDEECO.
4. Markel Products; TPI Corporation.
5. Marley Engineered Products.
6. Ouellet Canada Inc.
7. QMark; Marley Engineered Products.
8. Trane.

## 2.02 DESCRIPTION

- A. Assembly including chassis, electric heating coil, fan, motor, and controls. Comply with UL 2021.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 2.03 CABINET

- A. Front Panel: Extruded-aluminum bar grille, with removable panels fastened with tamperproof fasteners.
- B. Finish: Baked enamel over baked-on primer with manufacturer's standard color selected by Architect, applied to factory-assembled and -tested wall and ceiling heaters before shipping.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

## 2.04 COIL

- A. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and 60-Hz hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel, machine-staked terminals secured with stainless-steel hardware, and limit controls for high-temperature protection. Provide integral circuit breaker for overcurrent protection.

## 2.05 FAN AND MOTOR

- A. Fan: Aluminum propeller directly connected to motor.

- B. Motor: Permanently lubricated, multispeed. Comply with requirements in Section 23 05 13 "Common Motor Requirements for HVAC Equipment."

## 2.06 CONTROLS

- A. Controls: Unit-mounted thermostat.
- B. Electrical Connection: Factory wire motors and controls for a single field connection with disconnect switch.

## **PART 3 EXECUTION**

### 3.01 EXAMINATION

- A. Examine areas to receive wall unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for electrical connections to verify actual locations before unit-heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Install wall unit heaters to comply with NFPA 90A.
- B. Install wall unit heaters level and plumb.
- C. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

**END OF SECTION**

## SECTION 26 05 00 GENERAL ELECTRICAL REQUIREMENTS

### PART 1 GENERAL

#### 3.03 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. Furnish all labor, equipment, appliances, materials, transportation, facilities, services, and skilled supervision necessary for the construction, erection, installation, connection, testing, and adjustment of all circuits and electrical equipment specified herein, shown, or noted on the drawings; specified or required in other portions of this specification; and its delivery to the City complete in all respects and ready for use.

#### 3.04 Intent of Drawings

- A. Electrical drawings show only general locations of equipment, devices, and raceway, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceway, subject to the approval of the Engineer.
- B. Riser and other diagrams are schematic only and shall not be used for obtaining quantities.
- C. The electrical drawings do not show complete details of the site conditions. The Contractor shall check actual conditions.

#### 3.05 Departures from Contract Documents

- A. Submit to the Engineer, in writing, details of any proposed departures from these Contract Documents, and the reasons the departures are necessary. Submit such requests as soon as practicable and within 30 days after award of the Contract. Make no such departures without written approval of the Engineer.

#### 3.06 Coordination of Work

- A. The Contractor shall plan his work in coordination with the power utility authorities, and City Operations, as required.
- B. The Contractor shall field verify all dimensions of equipment to be installed or provided by others or by this contract so that correct clearances and connections may be made between the work installed by the Contractor and equipment installed or provided by others.
- C. The Contractor shall arrange all conduit runs so that they do not interfere with duct work, structural members, etc.
- D. All working measurements shall be taken from the sites, checked with those shown on the drawings, and if they conflict, reported to the Engineer at once, and before

proceeding with the work. Should the Contractor fail to comply with this procedure, he shall alter his work at his own expense as directed by the Engineer.

- E. No extra payments will be allowed where obstructions in the work of other trades, or work under this contract requires offsets to conduit runs.
- F. The Contractor is responsible for all alterations in the work to accommodate equipment differing in dimensions or other characteristics from that shown or specified.

### 3.07 Supervision

- A. The Contractor shall maintain adequate supervision of the work and shall have a responsible person in charge at the site during all times that work under this contract is in progress, or when necessary for coordination with other work.

### 3.08 Codes and Standards

- A. All work and materials shall conform to the applicable current standards (standard rules, regulations, and specifications) of the National Electrical Code (NEC), National Electrical Safety Code (NESC), Institute of Electrical and Electronic Engineers (IEEE), National Electrical Manufacturers' Association (NEMA), American National Standards Institute (ANSI), Insulated Cable Engineers Association (ICEA), Occupational Safety and Health Administration Standards (OSHA), State and local electrical codes, and other specifically cited standards, as applicable. All materials unless otherwise approved by local government authorities shall bear the label of, or be listed by, a Nationally Recognized Testing Laboratory (NRTL); the Underwriters' Laboratory, Inc. (UL) is one such NRTL. Where conflicts exist between any of the above standards, the standard which is most stringent shall take precedence. Where the contract documents exceed minimum requirements, the contract documents take precedence.
- B. Observe where applicable the prevailing rules and requirements of the National Fire Protection Association (NFPA), the State and local fire marshals' regulations, and standards pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous conditions.
- C. Resolve at the Contractor's expense all conflicts with applicable standards and provide a complete installation of Electrical Work, approved in all respects. Certain methods and materials for the project may require special approval and it is the Contractor's responsibility to prepare and submit to all approving authorities additional clarifying details, test data, methods and materials as needed to secure the required approval and resolve conflicts.

### 3.09 Workmanship

- A. All work shall be performed by personnel skilled in the particular trade. Workmanship shall conform to the standards of the NEC and the installation standards of NECA.
- B. The Engineer shall be the sole judge as to whether or not the finished work is satisfactory; and if in his judgment any material or equipment has not been properly installed or finished, the Contractor shall replace the material or equipment whenever required, and reinstall it in a manner entirely satisfactory to the Engineer without any

increase in cost to the Owner.

### 3.10 Permits, Fees, and Service Charges

A. The Contractor shall obtain all permits and pay all fees.

### 3.11 Substitution of Materials and Equipment

A. In accordance with provisions elsewhere in these Contract Documents, manufacturers' names and catalog numbers stated herein are intended to indicate the type and quality of equipment or materials desired.

B. Make requests for approval of alternates in writing to the Engineer. Provide sufficient material or data to allow evaluation of the proposed alternatives and determination of compliance with these Contract Documents. List any proposed deviations from these Contract Documents. Alternates will be handled during the submittal process; no "pre-bid approvals" will be given.

### 3.12 Submittals After Award of Contract

A. General: All electronic (PDF) submittals (including O&M Manual submittals) shall use standard 8.5" x 11" page sizes for all non-drawing pages. Drawings and/or schematics may use 8.5" x 11", 11" x 17", or 22" x 34" sized pages, as applicable. All drawings/schematic must be legible on whatever page size is used. Any manufacturer supplied information that comes on sizes other than these shall be re-sized to meet these requirements. Contractor may use any means necessary to have the information re-sized, but all re-sized materials must be legible. Submittals which do not meet these requirements are subject to wholesale rejection.

B. The Contractor shall provide complete manufacturer's descriptive information and shop drawings for all equipment, material, and devices furnished under this Division, including certified outline drawings, arrangement drawings, elementary (schematic) diagrams, interconnection diagrams, and connection diagrams, in accordance with provisions in ODOT Part 00100 of these Contract Documents. Provide the number of copies specified therein for the Engineer, Contractor, and Operation and Maintenance Manuals.

C. Manufacturer's standardized elementary diagrams shall not be acceptable unless applicable portions of the diagram have been clearly identified and non-applicable portions deleted or crossed out.

D. Contractor shall check submittals for proper number of copies, adequate identification, correctness and compliance with Drawings and Specifications, and initial all copies indicating this has been done. Revise, change, and/or resubmit all submittal information until acceptable to the Engineer. Obtain Engineer's acceptance before commencing fabrication or installation of any materials or equipment.

1. When a resubmittal is requested, resubmit only the indicated deficient portions of the submittal in question or where changes have been made to previously acceptable items. Resubmitting previously acceptable items slows the review process as all resubmitted material is (re)reviewed.

- E. Review of submittal information by the Engineer shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless he has requested and received written approval from the Engineer for specific deviations at time of submission. Review of submittal information shall not relieve the Contractor from responsibility for errors and omissions in shop drawings or literature.
- F. Submittals shall be made in accordance with the schedule listed hereinafter. Provide certified shop drawings, literature, and requested samples showing items proposed for use, size, dimensions, capacity, special features required, schematic (elementary) control diagrams, equipment schedules, rough in, etc., as required by the Engineer for complete review and for installation. Use NEMA device designations and symbols for all electric circuit diagrams submitted. Make content of schematic (elementary) connection of interconnection diagrams in accordance with the latest edition of NEMA ICS.
- G. Submittals shall be made on, but not limited to, the following items:
  - 1. Circuit breakers and enclosures
  - 2. Transformers
  - 3. Panelboards and circuit breakers
  - 4. Motor Controls
  - 5. Special control panels - outline and schematic drawings, descriptive information, component schedules
  - 6. Wiring Devices, including Receptacles (120v duplex outlets; generator receptacles), switches, boxes, etc.
  - 7. Special pull boxes and junction boxes
  - 8. All conduit types used in project
  - 9. All conductor/wire types used in project
  - 10. Lighting
- H. Submit a listing of all nameplate data from actual motors provided after delivery to site.
- I. Provide one copy of each final, fully-accepted submittal furnished complete in the appropriate sections of the Operation & Maintenance (O&M) Manuals. The final submittals included in the O&M Manuals shall be compiled, as may be required, from all submittals and resubmittals, with any and all corrections included. Do not include all iterations of the submittals in the O&M Manuals; provide only the final, complete, fully-corrected, and fully-accepted submittal.

## **PART 4 PRODUCTS**

### 4.01 Materials and Equipment, Common Requirements

- A. Unless otherwise indicated, provide all first-quality, new materials and equipment, free from any defects, in first-class condition, and suitable for the space provided. Provide materials and equipment listed by UL wherever standards have been established by that agency.
- B. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.
- C. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturers' latest standard design that conforms to these Specifications.

### 4.02 Equipment Finishes

- A. Provide materials and equipment with manufacturers' standard finish system. Provide manufacturers' standard finish color, except where specific color is indicated.

### 4.03 Portable or Detachable Parts

- A. The Contractor shall retain in his possession and shall be responsible for all portable and detachable parts or portions of installations such as fuses, key locks, adapters, blocking chips, and inserts until completion of his work.
- B. These parts shall be delivered to the Engineer and an itemized receipt obtained. This receipt, together with 2 copies of the final inspection certificate, shall be attached to the Contractor's request for final payment.
- C. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations.

## **PART 5 EXECUTION**

### 5.01 Installation, Common Requirements

- A. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work which has a neat and finished appearance.
- B. Coordinate electrical work with work of other trades to avoid conflicts, errors, delays, and unnecessary interference with City operations during construction.
- C. Provide any necessary backing required to properly support all fixtures and equipment installed under this contract.

## 5.02 Protection During Construction

- A. Throughout this Contract, provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Protect everything from the effects of weather.
- B. Prior to installation, store items in clean, dry, indoor locations. Store in clean, dry, indoor, heated locations items subject to corrosion under damp conditions, and items containing electrical insulation, such as transformers, conductors, motors, and controls. Energize all space heaters furnished with equipment.
- C. Following installation protect materials and equipment from corrosion, physical damage, and the effects of moisture on insulation. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during construction. Energize all space heaters furnished with equipment.

## 5.03 Load Balance

- A. The Drawings and Specifications indicate connection of electrical loads and distribution equipment; however, after installation, if necessary, certain electrical loads may require re-connection to achieve a more equal current balance.

## 5.04 Motor Rotation

- A. After final service connections are made, check and correct if necessary, the rotation of all motors. Coordinate rotation with the Engineer and the Contractor responsible for the driven equipment. Submit a written report to the Engineer for each motor, verifying that rotation has been checked and corrected.

## 5.05 Cleaning and Touchup Painting

- A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

## 5.06 Cutting, Patching, and Framing

- A. The Contractor shall determine in advance the locations and sizes of all sleeves, chases, and openings necessary for the proper installation of his work.
- B. Whenever practical, inserts or sleeves shall be installed prior to covering work. Cutting and patching shall be held to a minimum. All required holes in concrete construction shall be made with a core drill and patched with non-shrink grout.
- C. Cutting, fitting, repairing, and finishing of carpentry work, metal work, or concrete work, and the like, which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors; and holes required to be cut in floors must be



drilled without breaking out around the holes.

#### 5.07 Inspection

- A. All materials, equipment, and workmanship shall be subject to inspection at any time by the Engineer, or his representatives. Correct work, materials, or equipment not in accordance with these Contract Documents or found to be deficient or defective in a manner satisfactory to the Engineer.

#### 5.08 Operations and Maintenance Manuals

- A. Provide operations and maintenance manuals in accordance with provisions of Division 1, in these Contract Documents.

#### 5.09 Record Drawings

- A. The Contractor shall maintain a neatly marked set of record drawings. Contract Drawings shall be marked with red indelible pencil to show all departures from original Drawings, underground cable, conduit, or duct runs dimensioned from established building lines, and all electrical work revisions. In addition, the locations of panels, field mounted instruments and panels, terminal boxes, junction boxes and any other materials included in this contract shall be shown. As built drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Engineer at any time.

#### 5.10 Tests

- A. Carry out tests specified hereinafter and as indicated under individual items of materials and equipment specified in other sections.

#### 5.11 Operations

- A. After the electrical system installation is completed and at such time as the Engineer may indicate, conduct an operating test for approval. Demonstrate that the equipment operates in accordance with the requirements of these Specifications and Drawings.
- B. Perform the test in the presence of the Engineer or his authorized representative. Furnish all instruments and personnel required for the tests. The Owner will furnish the necessary electric power. System performance shall conform to the following criteria. Deviations, if any, shall be noted on the test reports with indication of corrective action taken or proposed.
  1. Plus, or minus 2 percent maximum variation between nominal system voltage and average system voltage.
  2. Plus, or minus 5 percent maximum variation from nominal system voltage for all load conditions.
  3. Actual motor current on each ungrounded conductor at prevailing conditions shall be equal to or less than nameplate rated full load motor current at a service factor of 1.0.

4. One percent maximum voltage unbalance at full load defined as 100 times the maximum deviation from average voltage divided by the average voltage. (Balance system loads and cooperate with the serving utility company to achieve a balanced condition which is within the indicated limits.)
5. Plus, or minus 10 percent maximum variation between average phase current and individual phase current. Balance system loads to achieve a balanced condition which is within the indicated limits.
6. Insulation resistance shall be tested under normal climatic conditions and shall conform to the following:
  - i. Circuits of 600 volts or less shall have conductor insulation resistance as installed of not less than 10,000,000 ohms to ground.

#### 5.12 Test Reports

- A. Submit dated "Electrical System Test Reports" indicating all tests performed and demonstrating conformance with the required system performance criteria. This test report shall include all voltage, current and resistance test data of the electrical service, main feeders, panelboards, power transformers and ground systems as applicable.

#### 5.13 Final Correction

- A. Promptly correct any failures or defects revealed by these tests as determined by the engineer. Re-conduct tests on these corrected items as directed by the engineer.

#### 5.14 Guarantee

- A. Materials, equipment, and workmanship shall be guaranteed in accordance with provisions of Division 1, in these Contract Documents.

**END OF SECTION**

## SECTION 26 05 19 LOW VOLTAGE ELECTRICAL CONDUCTORS

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. This section covers the work necessary to furnish and install complete conductor systems as specified herein.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00 GENERAL ELECTRICAL REQUIREMENTS.

### PART 2 PRODUCTS

#### 2.01 General

- A. The use of a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered in accordance with the General Conditions.
- B. This specification covers all conductors not specified in other sections. All conductors and cables shall be copper and shall conform to UL or other Nationally Recognized Testing Laboratory (NRTL), Federal Specification A-A-59544, or ICEA as applicable. Provide new cable manufactured within one year of installation.
- C. Minimum conductor size: Provide 12 AWG minimum branch circuit wire size. Provide 14 AWG control circuits unless otherwise specified or required by over-current protection. Provide smaller conductor sizes for specific application where shown on the drawings.

#### 2.02 Conductors

- A. Conductors 600 Volts and Below: In raceways, ducts, and cables, provide stranded copper conductors with the type of insulation specified; solid conductors are unacceptable. Provide conductors, including insulation, cabling, jacket, filler,

shielding, covering, and testing, that meet all applicable requirements of Federal Specification A-A-59544, ICEA S-19-81 and S-61-402, the NEC, and UL (or other NRTL). Unless noted otherwise, conductor sizes indicated are based on copper conductors. Do not provide conductors smaller than those indicated.

- B. 600 Volt power, lighting, and control cable: Provide stranded copper, 90°C rated conductors (unless otherwise specified), conforming to Federal Specification A-A-59544.
  - 1. For types THHN-2/THWN-2, provide insulation conforming to ICEA S-73-532.
  - 2. For type XHHW-2, provide insulation conforming to ICEA S-66-524.
  - 3. Provide control cable with 600 Volt TW type insulation for all multi-conductor, Class 1 remote control and signal wiring unless otherwise specified. Provide overall jacket complying with ICEA S-61-402. Color code control cable in accordance with ICEA S-61-402, Table 5-1.

### 2.03 Cable

- A. General: Where required, provide 600 Volt cable that is UL listed and conforms to the requirements of UL-1277 and NEC Article 340, or UL listed Power Limited Circuit Cable that conforms to the requirements of NEC Article 725. The 600-volt cables shall be permanently and legibly marked with the manufacturer's name, maximum working voltage for which the cable was tested, type of cable, and labeled UL (or evidence of UL listing shall be submitted).
- B. Class 2 remote control and signal conductors: Where required, provide cables UL approved for such use. Voltage rating shall be not less than 600 Volts. Utilize multi-conductor cables with like or related functions generally grouped together. Unless otherwise specified or shown on the drawings, utilize 14 AWG conductors.
- C. Instrumentation cables: Where used, multi-conductor cables shall have the quantity and size of conductors shown on the plans. Individual conductors shall be bare soft annealed copper Class B, 7-strand concentric per ASTM B-8. Individual conductor insulation shall be flame-retardant per UL 13, 15 mils nominal thickness, with a 105°C temperature rating. Conductor pairs shall be uniquely identified according to manufacturer's standard method. Overall cable assembly shall have 2.35 mils (minimum) aluminum-polyester tape shield overlapped for 100% coverage and provided with a 7-strand tinned copper drain wire the same size as an individual conductor. The jacket shall be flame-retardant per UL 13, with a 105°C temperature rating and a rip cord laid longitudinally under the jacket to facilitate removal. Conductors shall be twisted pairs and the cable shall be rated for operation to 600 Volts.
- D. Twisted shielded pairs (TSP) shall be 7 or 19-strand, 16 AWG, tinned-copper conductors, 600 Volts, individually insulated with color-coded cross-linked polyethylene, insulated conductors twisted into a pair, pair-shielded with a spirally applied aluminum/mylar tape shield and a 7-strand drain wire. Cable to have an overall 45 mil jacket.

- E. Manufacturers: The Okonite Company; Alpha Wire Corporation, Dekorán Division; Samuel Moore and Company; or approved.

#### 2.04 Conductor and Cable Tags

- A. Tags for conductors 12 AWG and below shall be legible permanent sleeve of yellow or white PVC with machine printed black marking. Provide heat shrink type applied with manufacturer's recommended heat source. Tags relying on adhesives or taped-on markers are not acceptable.
- B. All conductors and cables shall be labeled at each end with heat shrinkable sleeves indicating wire or cable designation.
- C. Contractor shall develop cable labeling system and record all tag names on record drawings.

### **PART 3 EXECUTION**

#### 3.01 General

- A. Conduit shall be thoroughly cleaned of all foreign material just prior to pulling the wire or cable. Lubricants shall be compounds specifically prepared for cable pulling and shall not contain petroleum or other products which will affect cable insulation or conduit integrity. Lubrications shall be UL approved. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii.
- B. Terminal strips in panels shall be identified throughout the equipment utilizing unique numbering system at all equipment enclosures and control panels.
- C. Wires terminating on terminal strips shall be tagged with the designation of the terminal strip and the number of the terminal to which they are connected. Wires shall be numbered with Brady nylon wire markers at all accessible locations. Wire markers shall be permanent type. Submit shop drawings of the type to be used for approval.
- D. Wiring diagrams shall show the terminal strips, terminals, and their identifying designations.
- E. Color code
  - 1. All secondary service, feeder, and branch circuit conductors shall be color coded as follows:

240/120 Volt or 208/120 Volt	Phase	480/277 Volt
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray

2. All conductors 14 AWG through 6 AWG shall have solid color compound or solid color coating. All neutral sizes shall have solid color compound or solid color coating.
  3. Conductors 4 AWG and larger phase conductors shall have either:
    - i. Solid color compound or solid color coating.
    - ii. Stripes, bands, or hashmarks of colors specified above.
    - iii. Colored pressure-sensitive plastic tape. Tape shall be applied in half overlapping turns for a minimum of 3-inches for all terminal points, and in all junction boxes, pull boxes, troughs, manholes, and handholes. Tape shall be 3/4 inch wide with colors as specified above. The last two laps of tape shall be applied with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable stating size and insulation type.
- F. Keep all conductors within the allowable tension limits during installation. Lubricants for wire pulling, if used, shall be approved for the insulation and raceway material. Observe cable manufacturer and industry standard cable bending radius recommendations. For type THHN-2/THWN-2 conductors, avoid abrasion and damage to outer jacket. Wiring showing damage after installation shall be replaced by the Contractor at his own expense.
- G. 600 Volt conductors: For conductors sized 2 AWG and above, lighting circuits within 3-inches of a ballast, underground in raceway, or feeders, provide type XHHW-2 conductors. For all other circuits, provide either type THHN-2/THWN-2 or type XHHW-2, at the Contractor's option. Provide ground and neutral wires identical to circuit wires.
- H. Observe code restrictions with respect to wet and dry locations. At the Contractor's option, conductors with insulation systems rated for high operating temperatures may be substituted for lower temperature rated conductors. However, no reduction in conductor size will be permitted from that indicated. When using small diameter wire,

do not reduce conduit size below that required for Type THW or RHW (without outer jacket covering), whichever is larger, as shown in NEC.

### 3.02 Installation

- A. Conductors 600 Volts and Below: Use compression connectors with tools by same manufacturer and/or UL listed for connectors of all stranded conductors. Soldered mechanical joints insulated with tape will not be acceptable.
- B. Splicing of conductors 8 AWG or smaller shall be by preinsulated spring-pressure connectors, such as "Scotchlok" Types Y, R and B, Ideal "Wingnut" or equal. All uninsulated splices, joints, and free ends of conductors shall be covered with rubber and friction tape or high-dielectric strength, plastic tape. All splices in underground boxes or direct buried shall be insulated and waterproofed, using Scotchcast epoxy splicing compounds suited for the purpose.
- C. Where conductors will be connected by others, provide adequate length pigtails (12-inches, minimum).
- D. Provide terminals and connectors acceptable for the type of material used.
- E. Arrange wiring in cabinets and panels neatly cut to proper length and remove surplus wire. Identify all circuits entering control cabinets or panels in accordance with the conductor identification system specified herein.
- F. Pulling:
  1. Provide suitable installation equipment to prevent cutting or abrasion of conduits and conductor insulation during pulling.
  2. Ropes, tape, or cords used for pulling shall be made of suitable non-metallic material.
  3. Attach pulling lines by means of either woven basket grips or pulling eyes attached directly to the conductors, as approved by the Engineering.
  4. All cables in a single conduit shall be pulled in together.
  5. The cable jacket and/or conduit walls shall be completely lubricated when cable is pulled into conduit. The lubricant shall be applied immediately before or during a pull. Minimum quantities of lubricant shall be as recommended by the lubricant manufacturer for the pull. Increased lubricant quantity as needed for difficult pulling situations (high temperatures, multiple bends, poorly placed conduit, etc.).
  6. Pull conductors simultaneously where more than one cable is indicated in same raceway. Use NRTL-listed and manufacturer-approved pulling compound or lubricant where necessary. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

- G. In manholes, handholes, pull boxes, junction boxes, and cable vaults, train cables around walls by the longest route from entry to exit and support cables at intervals adequate to prevent sag.
- H. Install terminations at ends of conductors with standard kits. Conform to manufacturer's written instructions. Comply with classes of terminations indicated.

### 3.03 Control Wire

- A. Do not splice without permission of the Engineer. Locate splices, when necessary, only in readily accessible cabinets or junction boxes using terminal strips.
- B. Where connections of wires installed under this section are to be made under the instrumentation and control section, leave pigtails of adequate length for neat bundled type connections.
- C. Maintaining the integrity of shielding of control wires is essential to the operation of the control systems. Take special care in cable installation to ensure that grounds do not occur because of damage to the jacket over the shield.

### 3.04 Field Tests

- A. Perform insulation resistance testing of all power and control circuits below 600 Volts with a 500 Volt megger. Prepare a written test report of the results and submit to the Engineer prior to final inspection. Equipment which may be damaged during this test should be disconnected. Perform tests with all other equipment connected to the circuit.

**END OF SECTION**



## SECTION 26 05 26 GROUNDING AND BONDING

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. This section covers the work necessary to furnish and install and complete the electrical grounding system.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00 GENERAL ELECTRICAL REQUIREMENTS.

#### 1.04 System Description

- A. Provide grounding and bonding of electrical service, circuits, equipment, signal, and control systems.
- B. Performance Requirements: Supplement the grounded neutral of the secondary distribution system with an equipment grounding system to properly safeguard the equipment and personnel. Install equipment grounding such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment and other conductive items in close proximity with electrical circuits, operate continuously at ground potential and provide a low impedance path for possible ground fault currents.

#### 1.05 Regulatory Requirements

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJ's.
- B. Furnish products listed by UL or other Nationally Recognized Testing Laboratory (NRTL) acceptable to AHJ.

#### 1.06 Sequencing And Scheduling

- A. Concrete Encased Grounding Electrode: Coordinate placement of grounding

electrode conductors in base of structure footing or equipment pad prior to placement of concrete. Coordinate bonding of rebar with rebar installer prior to rough-in.

## **PART 2 PRODUCTS**

### **2.01 Materials**

- A. Ground Rods (When Used): Copper or Copper-clad steel, 3/4 inch diameter, 10 feet long, tapered point, chamfered top. Weaver, Thomas & Betts, Talley, or approved.
- B. Grounding Connectors:
  - 1. Below Grade Connections: Hydraulic compression tool applied to irreversible compression type connectors designed for this special purpose, exothermic welding process connectors, or powder actuated compression tool applied connectors. Mechanical type of connectors are not acceptable. Burndy Hyground Compression System, Erico/Cadweld, Amp Ampact Grounding System, or approved.
  - 2. Above Grade Connections: Irreversible compression, exothermic welded, or brazed connectors.
- C. Pipe Grounding Clamp: Mechanical ground connector with cable parallel or perpendicular to pipe. Burndy GAR Series, O Z Gedney, Thomas & Betts, or approved.
- D. Telecommunications Grounding Bar (Where Required): 1/4 inch thick by 4 inch high by 20 inch long copper ground bar with insulators. Erico/Cadweld, or approved.
- E. Grounding Electrode Conductor: Bare copper stranded conductor.

### **2.02 Equipment Grounding Conductors**

- A. Provide equipment grounding conductors of the size indicated and the same insulation type as the circuit conductors, unless otherwise shown.

## **PART 3 EXECUTION**

### **3.01 General**

- A. Provide all grounding and bonding systems and make connections mechanically secure and electrically continuous. Ground all line voltage electrical systems completely and effectively as required by code and as specified herein.
- B. Ground all raceway systems and equipment enclosures. Where not otherwise indicated, grounding conductor size shall conform to the most stringent of the governing codes, except that no grounding conductor shall be smaller than 12 AWG.

1. Ground the service and transformers in an approved manner.
2. Provide grounding where indicated on the drawings or as required. All ground mat conductors shall be bare soft drawn copper, sized as noted. Bury all conductors approximately 12-inches below grade.
3. Grounding conductor connections shall be bolted except at inaccessible ground rods, buried ground conductors and reinforcing steel grounding conductor connections, where connections shall be brazed or an irreversible compression system used. Exothermic welded connections may be substituted for brazed connections subject to the Engineer's approval and demonstration on the project with actual test connections that the connections will be successfully made.
4. Equipment grounding conductors, unless otherwise noted, shall be the same insulation type as the circuit conductors and shall be run in conduit.
5. Continuity of equipment ground shall be maintained throughout the entire raceway, cabinet, and equipment enclosure system.
  - i. Bond the grounding wires to metallic enclosures at each end and to all intermediate metallic enclosures. Connect grounding conductors to all grounding bushings on raceways. Where any equipment contains a ground bus, extend and connect grounding conductors to that bus. Connect the enclosure of the equipment containing the ground bus to that bus. Run ground conductors inside conduits enclosing the power conductors.
  - ii. Ground bushings and jumpers shall be used wherever normal conduit termination does not ensure continuity. Where nonmetallic conduit is used for distribution or where direct burial cables are employed, install a green insulated equipment ground conductor with each circuit.
6. Metal parts of lighting fixtures shall be bonded to conduit system with green grounding wire. Receptacles shall be grounded to outlet boxes with green grounding wire and machine screw.
7. Motors and equipment shall be bonded to the equipment grounding system by a continuous green insulated equipment ground conductor run with each circuit through approved flexible conduit connections as permitted by code. Where flexible conduit size exceeds the code approved limits, provide a separate green grounding conductor inside each flexible conduit, bonded to the inside of the connection box and to the nearest accessible supply end conduit junction box.
8. Where concrete pads are provided for utility-furnished transformers, suitable grounding systems shall be provided under this section, including driven ground rods. Installation shall conform with the serving utility company requirements.

9. Ground metal sheathing and any exposed metal vertical structural elements of buildings. Ground metal fences enclosing electrical equipment. Bond any metal equipment platforms which support electrical equipment to that equipment. Provide good electrical contact between metal frames and railings supporting pushbutton stations, receptacles, instrument cabinets, etc., and raceways carrying circuits to these devices.
10. Ground shield of any control cables in accordance with the details or schematics shown.

### 3.02 Installation

#### A. Concrete Encased Ground Electrode:

1. From the ground bus of service equipment, separately derived system equipment, and/or separate main distribution panels located remote from service entrance equipment or installed in separate structures, install grounding electrode conductor to footing foundation rebar.
2. Bond the grounding electrode conductor to three independent steel rebars. Each rebars minimum length is 20-feet.
3. Protect grounding electrode conductor extension from footing/foundation to service equipment with rigid PVC conduit. Do not use metal conduit for grounding electrode conductor protection.

#### B. Water Service Grounding: Bond building/structure ground electrode and metallic water service pipe to ground bus of service equipment, separately derived system equipment, and/or separate main distribution panels located remote from service entrance equipment or installed in separate structures. Connect to metallic water pipe on utility side of isolating fittings or meters, bond across water meters.

#### C. Raceways:

1. Ground all metallic raceway systems. Bond to ground terminal with code size jumper except where code size or larger grounding conductor is included with circuit, use grounding bushing with lay-in lug.
2. Connect all metal raceways, which terminate within an enclosure but without mechanical connection to the enclosure, by grounding bushings and ground wire to the grounding bus.
3. Where equipment supply conductors are in flexible metallic conduit, install stranded copper equipment grounding conductor from outlet box to equipment frame.
4. Install equipment grounding conductor, code size minimum unless noted on

Drawings, in all raceway systems (nonmetallic and metallic).

D. Feeders and Branch Conduits:

1. Install continuous insulated, copper equipment grounding conductors with all feeder and branch circuits.
2. Provide insulated equipment grounding conductors for feeders and branch circuits sized in accordance with NEC Article 250.

E. Boxes, Cabinets, Enclosures and Panelboards:

1. Bond grounding conductors to enclosure with specified conductors and lugs. Install lugs only on thoroughly cleaned contact surfaces.
2. Bond all sections of service equipment enclosure to service ground bus.

F. Motors, Equipment, and Appliances: Install code size equipment grounding conductor from outlet box to (motor) equipment frame or manufacturer's designated ground terminal.

G. Receptacles: Connect ground terminal of receptacle to equipment ground system by 12 AWG (unless larger size is indicated) conductor bolted to outlet box except isolated grounds where noted. Self grounding nature of receptacle devices does not eliminate conductor bolted to outlet box.

H. Telecommunications Backboard: Where installed, provide telecommunications grounding bar at each telecommunications backboard. Bond the grounding bar to service grounding bar in the main service equipment with a 6 AWG copper equipment grounding conductor.

### 3.03 Grounding Connections

- A. Unless shown otherwise, make connections of grounding conductors to ground rods at the upper end of the rod with the end of the rod and the connection point below finished grade. Make connections of other grounding conductors generally accessible.
- B. When making thermite welds, wire brush or file the point of contact to a bare metal surface. Use thermite welding cartridges and molds in accordance with the manufacturer's recommendations. After welds have been made and cooled, brush slag from the weld area and thoroughly clean the joint. For compression connectors, use homogeneous copper, anti-corrosion, surface treatment compound at connectors in accordance with connector manufacturer's recommendations. Use connector of proper size for conductors and ground rods specified. Use connector manufacturer's compression tool. Notify Engineer prior to backfilling any ground connections.

### 3.04 Field Tests

- A. Notify Engineer at least 2-weeks prior to performing ground tests to allow Engineer option of witnessing tests.
- B. Provide copies of reports of all grounding system tests for inclusion in operation and Maintenance manuals and for review by the Engineer.

**END OF SECTION**

## SECTION 26 05 33 RACEWAYS AND BOXES

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. Work included: This section covers the work necessary to furnish and install complete electrical raceway systems.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Excavation and Backfill

- A. Perform all necessary excavation and backfilling for buried conduits and conductors as specified in Division 2 of the specifications, as applicable.
- B. No backfilling shall be done until all direct burial cables, conduits, and penetrations to be covered have been inspected and approved.

#### 1.04 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS.

### PART 2 PRODUCTS

#### 2.01 General

- A. All raceway shall be UL or other Nationally Recognized Testing Laboratory (NRTL) approved for the application.
- B. All conduit bodies used on 1.25-inch or larger shall be mogul type, unless otherwise allowed or approved by Engineer.
- C. All conduit terminating on outdoor enclosures, boxes, or cabinets shall use Myers type hubs.

#### 2.02 Rigid Steel Conduit

- A. Use only hot dipped galvanized rigid steel conduit, including bushings, couplings,

elbows, nipples, and other fittings, and meeting the requirements of ANSI C80.1, ANSI C80.4, UL, the NEC, and Federal Specification WW-C-581. Use only threaded (do not use setscrew or compression type) couplings, bushings, elbows, nipples, and other fittings unless approved in writing by the Engineer. All threads shall be coated after cutting.

- B. All threads shall be coated with an electrically conductive corrosion-resistant compound after cutting.

### 2.03 PVC Coated Rigid Steel Conduit

- A. Conduit used in the coating process shall be hot dip galvanized inside and out in accordance with Federal Specification WW-C-581-E, ANSI Standard C-80.1, and UL Standard 6. Finished conduit shall fully conform to the current NEMA RN-1 Standard and shall have a label affixed indicating compliance with UL Standard 6.
- B. The zinc surfaces of conduit and fittings shall remain intact and undisturbed on both the interior and exterior throughout the cleaning and coating processes as defined in section 4.3.1 of NEMA RN-1-1989.
- C. The PVC exterior coating on conduit, fittings, couplings, accessories, and hardware shall have a minimum thickness of 40 mils, except where part configuration or application dictate otherwise.
- D. A polyurethane coating having a nominal thickness of 2 mils shall be applied to the interior of conduit, couplings, elbows, nipples, and feed-through fittings, except where prohibited by design.
- E. All conduit threads shall be protected from corrosion by application of a polyurethane coating applied over the manufacturer's standard zinc coating.
- F. A "PVC Coated Sealing Locknut" shall be used on all exposed male threads transitioning into female NPT threads which do not have sealing sleeves, including transitions from PVC couplings/female adapters to PVC coated GRC elbows in direct burial applications. "PVC Coated Sealing Locknuts" are not to be used in place of a conduit hub.
- G. Fittings shall be Form 8 with a V-Seal tongue-in-groove gasket and supplied with plastic encapsulated stainless steel cover screws. Form 8 fittings shall be UL Type 4X listed and IEC IP69 certified. Fittings shall be from the same manufacturer as the conduit in order to maintain system continuity and warranty.
- H. Conduit dies and installation tools shall be as recommended by the manufacturer. Dies utilized shall be specific for the product being provided. Use only manufacturer approved PVC coated rigid steel conduit dies.
- I. Use PVC Coated Rigid Steel (PVC-RGS) Conduit in corrosive or hazardous (Classified) areas, unless otherwise noted.



#### 2.04 Flexible Metallic Conduit

- A. Use liquid tight flexible conduit, zinc-coated steel core, extruded gray PVC cover, UL approved, Sealtite type "UA" or Licutite type "LA", or equal. Where permitted by local inspection authority, sizes larger than 3-inch shall be Sealtite type "EF", or Licutite type "LT", or equal.

#### 2.05 Flexible Non-Metallic Conduit, Liquid-Tight

- A. Use UL listed, liquid-tight, flexible non-metallic conduit conforming to NEC Article 356. Use liquid-tight flexible non-metallic conduit suitable for conductors with 75 degree C insulation. Provide conduit labeled sunlight resistant where exposed or otherwise required by local codes. Conduit connectors shall be UL listed, Appleton type STNM, or equal.

#### 2.06 PVC Schedule 40 Conduit

- A. Use rigid PVC Schedule 40 conduit, UL listed for concrete encasement, underground direct burial, concealed, direct sunlight exposed use, and marked for use with conductors having 90 degrees C insulation. Use conduits, couplings, bushings, elbows, nipples, and other fittings meeting the requirements of NEMA TC 2 and TC 3, Federal Specification WW-C-1094, UL, NEC, and ASTM specified tests for the intended use.

#### 2.07 Reinforced Thermosetting Resin (Fiberglass) Conduit

- A. Fiberglass conduit may be used in lieu of PVC conduit.
- B. Conduit shall be UL listed for both below ground and above ground installation. Internal conduit and elbow walls shall be smooth and all fibers embedded in the epoxy. Carbon black shall be used as an ultraviolet inhibitor to protect conduit and fittings. Conduit shall be marked in accordance with NEMA TC 14.
- C. Fiberglass conduit fittings, elbows, and accessories shall be manufactured by the same manufacturer as the conduit.

#### 2.08 Conduit Bodies, Boxes, and Fittings

- A. Provide conduit bodies, boxes, and fittings, as required. Use appropriate fittings for the conduit system used.
  1. For PVC-coated rigid conduit systems, conduit bodies, boxes, and fittings shall be PVC-coated, as applicable, and shall be by the same manufacturer as the conduit.
  2. Conduit bodies and boxes shall be cast steel or "greyloy iron"; aluminum is unacceptable.
- B. Conduit bodies smaller than 1.25-inches shall be Crouse-Hinds Form 7, Appleton FM7, or approved. Covers shall be gasketed.

#### 2.09 Warning Tape

- A. Provide heavy-gauge, yellow plastic tape of 3-inch minimum width for use in trenches containing electric circuits. Utilize tape made of material resistant to corrosive soil. Use tape with printed warning that an electric circuit is located below the tape. Manufacturers and types: ITT Blackburn Type YT, Griffolyn Co., Terra-Tape, or approved equal.

## **PART 3 EXECUTION**

### **3.01 General**

- A. No raceway shall be installed until work which might cause damage to wires, conduit boxes, or fittings has been completed; conduit, boxes, fittings, and wires which become damaged in any way shall be removed from the job and replaced at expense of the Contractor.
- B. Conduit buried in earth: Install raceways to provide not less than 30 inches cover to finished grade. Pitch to drain away from buildings or other structures; avoid trapped runs. Grade trenches and place pipe bedding material to provide uniform trench bottom for raceway support. Buried raceway shall not be smaller than 1 inch (unless otherwise approved) and shall be PVC, PVC-coated-RGS (PVC-RGS), or fiberglass, unless otherwise indicated. All underground elbows shall be PVC, PVC-RGS, or fiberglass, unless otherwise indicated or required by the power utility (in the case of service runs). All stub-up conduit sections (including transition elbows) shall be RGS with corrosion resistant tape or PVC-RGS; make transition from underground lateral run to RGS or PVC-RGS below grade.
- C. Provide rigid steel conduit for raceways embedded in structural reinforced concrete, below floor slabs-on-grade, for exposed installations where subject to damage, for sizes 1.25-inch and larger, and at all locations not otherwise specified.
- D. Provide PVC-coated rigid steel raceways in damp, corrosive, or hazardous areas.
- E. Provide flexible conduit connections at all motors and transformers plus other equipment connections subject to vibration. Utilize suitable fittings, keep route neat, at nominal right angles, and in conformance with equipment lines.
- F. Exposed conduit shall be run in straight lines parallel to structure lines, column lines, walls, or beams. Where conduit is grouped, the bends and fittings shall be installed to present an orderly appearance. Unnecessary bending or crossing shall be avoided.
- G. Supports for exposed conduit runs shall be furnished and installed within 3 feet of each box. Supports shall be secured by means of expansion inserts in concrete.
- H. Conduit and fittings shall be properly protected during the construction period against mechanical injury from any cause. Conduit which extends out of floors, walls, or slabs shall be boxed or otherwise protected and ends shall be capped with metal pipe plugs.

### **3.02 Size**

- A. Use raceways no smaller than 3/4 inch.

3.03 Raceway Installation

- A. Rigid conduit joints and connections shall be made thoroughly watertight and rustproof by means of thread compound which will not insulate the joint. Each threaded joint shall be thoroughly cleaned to remove all the cutting oil before the compound is applied. Running threads will not be allowed. Erickson couplings may be used in dry and exposed locations provided that they are installed with fixed threaded connection at the top of vertical runs.
- B. Raceways in Plain Concrete: Do not place raceways in cement toppings on structural floors without special approval. Install, however, in non-reinforced concrete headers and similar locations provided for their installation.
- C. Raceways in reinforced concrete: Do not displace reinforcing steel to accommodate the installation of raceways and outlet boxes. In general, locate all embedded conduits in the physical center of the particular section of concrete. Wooden plugs inserted in concrete or masonry are not acceptable as a base for raceway fastenings. Provide raceways embedded in reinforced concrete in conformance with the following usual types of conditions unless otherwise instructed by the Engineer. Particular attention is called to the fact that there are many extenuating conditions where the Contractor may be instructed during the course of the project not to place embedded conduits in certain areas, generally due to the possibility of unsightly cracking or for structural reasons. This instruction does not entitle the Contractor to extra compensation. Special approval will be required for any condition not covered by the following usual conditions.

<u>Location</u>	<u>Maximum Allowance</u>
Columns	Displacement of 4% of plan area of column
Floors and walls	Displacement of 1/3 of thickness of concrete, spaced not less than three diameters o.c.
Beams and joists	Displacement of 1/3 of least dimension, spaced not less than three diameters o.c.
Sleeves through floors and walls	Two-inch maximum pipe size, not less than three diameters o.c.

- D. Raceways Penetrating a Roof Seal: Provide suitable lead flashing with shrink tubing. Submit shop drawings of method to be used for approval.
- E. PVC Coated Rigid Steel (PVC-RGS) Conduit: Installation of PVC-RGS shall be by certified installers only. Installers shall be certified by the conduit manufacturer and shall be able to present a valid, unexpired "Certified Installer" card prior to start of conduit installation and on-demand at any time during installation. Any PVC-RGS conduit installed by a non-certified installer shall be removed and re-installed by a certified

installer at the contractor's expense.

### 3.04 Raceway Fittings and Connections

- A. Coupling and Connections: Make all connections in threaded conduit watertight.
- B. On rigid conduit system, use threaded connections at all locations. Conduits and threaded hubs shall have no less than five (5) threads engaged. Long threads known as "running threads" shall not be used. Erickson couplings or unions shall be used only in places where continuous conduit runs cannot be made satisfactorily. Regular cutting oil is suitable for threading steel conduit.
- C. Make all box connections with two locknuts and one insulated steel, plastic, or fiber bushing. On all conduit and tubing systems, provide grounding locknuts or grounding bushings where required.
- D. On non-metallic conduit systems, utilize solvent welded joints specifically recommended by the manufacturer; except at connections to metallic conduit systems, utilize threaded connections. Provide expansion fittings where required to compensate for thermal expansion and contraction. Utilize factory made long sweep ells throughout, except where space or similar restrictions dictate the use of minimum or special field bends.
- E. Stub Outs: Extend conduit stubs at least one foot outside slab or fill, before connections are made.
- F. Protection: Cap raceways immediately upon rough-in. Utilize temporary plastic caps designed for the purpose. The use of paper or rag wads will not be permitted.
- G. Expansion Joints: Provide expansion joint fittings in all raceways crossing expansion joints or because of the length of the conduit run and temperature variations. Where differential settlement may occur, use deflection fitting.
- H. Equipment Connections: Equipment connection indicated in plan are diagrammatic unless detailed. In general, a single stub up is indicated to serve the equipment and controls. Conform to the actual equipment connection requirements.
- I. For PVC-coated rigid conduit (PVC-RGS) systems, use PVC-coated rigid boxes and fittings (including seal-offs, etc.), where boxes or fittings are installed or required.
  - 1. Provide touch-up of all nicks, scrapes, cuts, gouges, etc. on PVC-coated rigid conduits and fittings. Use factory approved PVC coating compound. Make all touch-ups as smooth as possible and blending into original finish, matching original finish as close as practical.

**END OF SECTION**

## SECTION 26 09 00 INSTRUMENTATION AND CONTROL

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete and operational Instrumentation and Control System (System).
- B. This section covers all work necessary for furnishing, installing, adjusting, testing, documenting, and starting up the System, including the interconnection and integration of components furnished under other sections of this contract.
- C. Major constituents for the System include, but are not limited to, all materials, equipment, and work required to implement a complete and operating System. The System shall include primary elements for process variable measurements, analog display and control elements, and discrete display and control elements.
- D. Additional constituents for the System include, but are not limited to, all materials, equipment and work related to implementing System communications. System communications includes sending and receiving data between components of the System, and monitoring and alarming status of System components. This shall include the supply, installation, and testing of radio, and networking components and cabling required for System operation, and components specified in this and/or other sections.
- E. Responsibility for Complete System:
  - 1. The Contractor shall be ultimately responsible and shall provide for all labor, equipment, and materials not provided by others that are necessary for the supply, installation, certification, adjustment, testing, and start-up of a complete coordinated System that shall reliably perform the specified functions.
  - 2. The Contractor shall coordinate their work to ensure that:
    - i. All components provided under this section, whether Contractor provided or Owner Purchased Equipment, are properly installed.
    - ii. The proper type, size, and number of control wires with their conduits are provided and installed.
    - iii. Proper electric power circuits are provided for all components and systems.
  - 3. The Contractor shall participate in the testing of all field devices at start-up.

#### 1.02 Standards

- A. This Section incorporates the latest adopted revision of the following standards, by reference. In case of conflict between the requirements of this section and those of

the listed standards, the more stringent requirements shall prevail:

1. NFPA – National Fire Protection Association:
  - i. NFPA No. 70, NEC - National Electrical Code.
  - ii. NFPA No. 79, Electrical Standard for Industrial Machinery.
2. ISA – Instrumentation, Systems, and Automation Society.
3. ICS – NEMA (National Electrical Manufacturer's Association) Industrial Control and Systems including:
  - i. ICS-1 – General Standards for Industrial Control and System.
  - ii. ICS-2 – Standards for Industrial Control Devices, Controllers and Assemblies.
  - iii. ICS-3 – Industrial Systems.
  - iv. ICS-4 – Terminal Blocks for Industrial Control Equipment and Systems.
  - v. ICS-6 – Enclosures for Industrial Controls and Systems.
4. ANSI/IEEE – American National Standards Institute/Institute for Electrical and Electronics Engineers.
5. State and Local codes and ordinances.
6. UL – Underwriter’s Laboratory UL: (Note: Other Nationally Recognized Testing Laboratories [NRTL], such as ETL, may be used in lieu of UL.)
  - i. Standard 508 (Industrial Control Panels for General Use).
  - ii. Standard 698 (Industrial Control Panels Relating to Hazardous (Classified) Locations)
  - iii. Standard 913 (Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations)
7. NETA – National Electrical Testing Association.

#### 1.03 Electrical Testing Laboratory Labeling

- A. All panels provided under this section shall be labeled by a Nationally Recognized Testing Laboratory (NRTL) of electrical systems, acceptable to the State of Oregon; Underwriters’ Laboratory (UL) and Electrical Testing Labs (ETL) are such NRTLs. Labels shall be provided by an entity that is currently registered and authorized by the NRTL to provide such label.

- B. All panels provided under this section shall be acceptable to the State of Oregon and the authority having jurisdiction.
- C. All panels and components provided under this section shall conform to the more stringent of the technical specifications or the applicable NRTL standards: (for example: UL standards 508, 698, and/or 913).
  - 1. Provide documentation necessary to verify that all components, construction methods, and circuits conform to the standard.
  - 2. Panels that use Intrinsically Safe (IS) devices (barriers and/or relays) and built to UL standards shall include documentation of UL standards 698 and/or 913, as applicable. Panels built to other equally acceptable NRTL standards (such as ETL) shall provide required documentation showing IS components and wiring are in compliance with that standard.
- D. Contractor shall provide additional design, components, and equipment necessary to meet the requirements of the applicable NRTL standards.
- E. Contractor shall provide submittals for additional components that are required by the applicable NRTL standards, but not specifically listed in this section.

#### 1.04 Submittal Data

- A. Post-Contract Award Submittals: Submit shop drawings and equipment review data as specified in Division 1. In addition to the requirements of other Divisions and Sections of the specifications, the submittal information shall be provided within 30 days of award:
  - 1. All submittals shall be made in an electronic, PDF format. All materials provided in the PDF submittals shall use standard paper sizes of 8.5" x 11", 11" x 17", or 22" x 34". Sizes 11" x 17" and 22" x 34" are preferred for shop drawings, sketches, wiring diagrams, and similar, but may use 8.5" x 11" provided they are normally issued and/or are legible at that scale. Large spreadsheets may use the 11" x 17" where required for legibility. All cut-sheets, descriptive material, technical data, and similar shall use 8.5" x 11".
  - 2. Where manufacturer's standard literature with non-standard paper sizes are used, Contractor shall re-size such material to conform with the standard sizes listed.
  - 3. Electronic submittals with non-standard paper sizes are subject to being returned, unreviewed, for non-compliance.
- B. Submittals shall include, but not necessarily be limited to, the following:
  - 1. All equipment to be supplied shall be listed followed by descriptive data sheets. The equipment list shall include each component name, manufacturer, model number, description of the operation, quantity supplied, and any special setup and

operation and maintenance characteristics:

- i. Similar components used in the project shall be the product of a single manufacturer.
  - ii. Service and replacement components for all equipment shall be normally stocked and readily available from service centers and suppliers in Washington, Idaho, or Oregon.
2. Description and operation of all remote site hardware and the configuration features of the I/O and local control loop characteristics.
  3. Catalog information, descriptive literature, wiring diagrams, and shop drawings on all electrical devices, components, panels, and enclosures furnished under this section.
  4. Individual data (or specification) sheets shall be provided for all components provided under this section. The purpose of these data sheets is to supplement the generalized catalog information provided by citing all specific features for each specific component (e.g. materials of construction, special options included, calibration data including scale and range, etc.). Each component data sheet shall bear the component name and instrument tag number designation.
  5. Panel elementary diagrams of pre-wired panels. Show all signals, analog and discrete, and all auxiliary devices such as relays, terminals, alarms, fuses, lights, fans, heaters, etc. Diagrams, device designations, and symbols shall be in accordance with NEMA ICS 1-101.
  6. Panel elementary diagrams of panel assemblies. Show all signals, analog and discrete, and all auxiliary devices such as relays, terminals, alarms, fuses, lights, fans, heaters, etc. Diagrams, device designations, and symbols shall be in accordance with NEMA ICS 1-101.
  7. Interconnecting wiring diagrams, with terminal identification numbers and external wire numbers, for the System. This diagram shall include all intermediate terminations between field elements and panels (e.g. terminal junction boxes, motor control centers, etc.). This diagram shall be coordinated with the electrical contractor and shall bear his mark showing that this has been done. Diagrams, device designations, and symbols shall be in accordance with NEMA ICS 1-101.
  8. Loop diagrams, with terminal identification numbers and external wire numbers for each control loop in the System. This diagram shall include all intermediate terminations between field elements and panels (e.g. terminal junction boxes, motor control centers, etc.). This diagram shall be coordinated with the electrical contractor and shall bear his mark showing that this has been done. Diagrams, device designations, and symbols shall be in accordance with ISA Standards and



### Practices for Instrumentation.

NOTE: Power wiring diagrams shall be in the standard “ladder” format. “Flow diagram” type power wiring diagrams are unacceptable.

- C. In addition: Before any components are fabricated, and/or integrated into assemblies, or shipped to the site, the Contractor shall furnish to the Engineer, and receive his review of full details, shop drawings, catalog cuts, and such other descriptive matter and documentation as may be required to fully describe the equipment and to demonstrate its conformity to these Specifications. The decision of the Engineer upon the acceptability of any submittal shall be final.
- D. The intent of the submittal is to ensure complete project scope coverage and does not relieve the supplier from fulfilling any specified requirements. The submittal shall consist of legible printed text and high quality CAD drawings, bound, with index tabs that identify major sections of the document. The submittal shall address all hardware and software to be supplied:
  - 1. Catalog information shall be submitted for all equipment, regardless of whether or not it is of the same manufacturer as that listed in the Specifications.
  - 2. Where allowed, requests for substitution must be made in writing, and shall include corresponding copies of all literature and information required for evaluation of the proposed substitution. This must be done within 30 days of the contract award.
- E. All submittals shall be complete, neat, and orderly. Partial submittals are not acceptable and may be returned, without being reviewed, for correction. All components shall be referenced by the instrument name tag designations.
- F. If in the opinion of the Engineer a submittal is not clear, it will be returned to the Contractor and it shall be revised and resubmitted within 15 days.
- G. Requests for equipment substitutions will be reviewed during the submittal process. Requests for equipment substitution received prior to the bid opening date will not be reviewed.

### 1.05 Operational and Maintenance (O&M) Manuals

- A. The Contractor shall provide one (1) electronic copy (in PDF format), and two (2) printed (loose-leaf) copies of detailed sets of Operation and Maintenance (O&M) manuals with complete information concerning the operation of the System within 30 days after start-up of the equipment. The O&M manuals shall include information related to diagnosis, down to the module and card replacement level.
- B. The manuals shall include all project specific information and the printed copies shall be in three-ring binders with indexed tab sections. The PDF copy shall have descriptive bookmarks at all major and minor divisions, similar to the indexed tabbed sections of the printed copies. The O&M Manuals shall contain descriptive material, drawings, and figures bound in appropriate places:

1. The manuals shall include operation and maintenance literature for the entire System and all components provided. The submitted literature shall be in sufficient detail to facilitate the operation, removal, installation, adjustment, calibration, and maintenance of each component provided.
  2. The manuals shall include data sheets for all significant equipment used in the System. Significant equipment is defined as equipment performs a function other than simple interconnection. The data shall include, as a minimum, the component name, manufacturer, model number, quantity, and any special O&M characteristics:
    - i. Factory calibration data sheets shall be included for all transmitters and transducers.
  3. The manuals shall include wiring diagrams for all components provided. These wiring diagrams shall clearly show all terminals, terminal block number designations, and wire numbers. Diagrams, device designations, and symbols shall be in accordance with NEMA ICS 1-101.
  4. The manuals shall include final as-built drawings (22" by 34" and 11" x 17" reduced) of equipment. These drawings shall include:
    - i. Layout drawings for each panel shall include overall dimension details for each component and all door mounted operator devices including nameplate designations.
    - ii. Interconnecting wiring diagrams of all equipment installed or connected under this contract.
    - iii. Control loop diagrams showing operation of the System.
- C. The manuals shall include a detailed functional description of the System. Control loops shall be fully described in the functional description. A detailed description of remote site features such as I/O and local control loops shall be included.
- D. The manuals shall include final versions of the following software related items:
1. A fully documented back-up electronic copy of all controller logic programs, on non-magnetic media compatible with the System.
  2. A fully documented printed copy of the controller logic program.
  3. A fully documented printed copy of all custom software programs.
  4. A fully documented back-up electronic copy of all operator interface programs, on non-magnetic media compatible with the System.

- E. The manuals shall include a listing of all recommended spare parts:
1. Spares and Expendables Recommendations: The Contractor shall provide a list of recommended spares and expendable items in sufficient quantities to sustain the System for a period of one (1) year after acceptance.
  2. In addition to the Spares and Expendables List, the Contractor shall provide a Component Parts List. The Component Parts List shall be a complete parts list for the entire System and shall have the following features:
    - i. All components shall be grouped by component type, with the component types identified in a similar manner to the component identification code used in these Specifications.
    - ii. All components shall be listed with their exact and complete manufacturer's part number, including all options and accessories.
    - iii. All components shall be identified with their complete tag number as shown in these Specifications, or as modified or assigned by Contractor and approved by the Engineer.
    - iv. All components without tag numbers shall be grouped within component type by manufacturer's part number. Exact quantities shall be listed for each part number.

## **PART 2      PRODUCTS**

### 2.01    General

- A. Whenever any material, article, device, product, or fixture is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, as shown on the drawings, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design and shall be deemed to be followed by the words "or approved equivalent". The decisions relative to equivalency shall be by the Engineer and Owner.
- B. The design of the Instrumentation and Control System is based on the specific equipment specified hereinafter. For example, for equipment listed, the design is based on the named manufacturer. Should the Contractor select other equipment that requires different installation requirements, wiring and conduit, enclosures, accessories, etc., the Contractor shall obtain approval from the Engineer for such changes to the design in accordance with this Contract and shall make all approved changes at no additional cost to the Owner.
- C. Analog signals shall be 4 to 20 mA DC, unless otherwise shown, conforming to the compatibility requirements of ISA Standard S50.1. Unless otherwise shown, circuits

shall be Type 2 two-wire (“loop powered”). Transmitters shall have a load resistance capability conforming to Class L. Transmitters and receivers shall be fully isolated. All instrumentation shall be compatible with the type of signal specified.

- D. Discrete signals are two-state logic signals of two types: control and alarm. Control signals shall utilize 24 VDC or 120 VAC sources, as shown. Alarm signal shall utilize 24 VDC or 120 VAC sources, as shown. Unless otherwise shown, all alarm signals shall open on alarm condition, and have isolated contacts rated for 5 amperes (minimum) at 24 VDC.
- E. Nameplates, name tags, and service legends shall be used to identify all major components provided under this section. Major components are defined as components that perform a function other than simple interconnection:
  1. Nameplates are defined as engraved rigid laminated plastic plates bearing the entire identifying text or ISA tag number of the component. Nameplates shall be securely mounted under or near a mounted component.
  2. Name tags are defined as stamped stainless-steel tags, unless otherwise noted, bearing the entire identifying text or ISA tag number of the component. Name tags shall be securely attached to the component.
  3. Service legends are defined as engraved rigid laminated plastic legends bearing the entire identifying text or ISA tag number of the component integrally mounted on a panel face mounted instrument.
  4. Service legends and panel interior mounted nameplates shall be black with white letters, and letter height shall be minimum 3/16-inch high characters, unless otherwise noted.
  5. Panel exterior mounted nameplates shall be black with white letters, and letter height shall be minimum 3/8-inch high characters, unless otherwise noted.
  6. Each panel assembly shall be provided with a face mounted engraved rigid laminated nameplate bearing the entire identifying text for the panel assembly. The nameplate shall be securely attached to the panel.
- F. Wire labels are defined as machine printed heat-shrink tube type labels bearing the entire identifying text of the wire. Wire labels shall be furnished for all wires in each panel assembly provided. Label both ends of wires more than 6 inches in length. Label one end of wires less than or equal to 6 inches in length. Shrink labels in place with lettering in position to be easily read and no more than one (1) inch from the connecting terminal.
- G. Terminal markers are defined as machine printed markers bearing the entire identifying text of the terminal. Terminal markers shall be furnished for all terminal blocks, fuse blocks, and grounding blocks provided. Securely mount terminal markers with lettering in position to be easily read.

- H. Interposing relays, loop isolators, intrinsically safe barriers, and terminating resistors shall be furnished wherever necessary, as indicated by the instrument and/or installation, regardless of whether they are indicated in the drawings, to perform the functions shown herein and on the drawings.

## 2.02 Panel Assemblies

- A. Panel Assemblies shall be provided where indicated, specified, or required to meet the functional requirements of the System, as specified. Panel Assemblies shall be completely fabricated, instruments installed, and wired in the panel assembly manufacturer's factory. All wiring shall be completed and tested prior to shipment. All external connections shall be by way of numbered terminal blocks.

- B. Panel Assembly Electrical:

- 1. Power Distribution:

- i. Each panel will be provided with one or more 480 VAC, 60-Hz feeder circuits from the fused disconnect switch provided under Division 26 – ELECTRICAL, unless otherwise shown. On each panel, make provisions for feeder circuit entry and provide circuit breakers, disconnects, and power distribution blocks as required for termination of the wires.
    - ii. Provide circuit breakers as shown on schematic drawings. Circuit breakers shall be DIN rail mounted type.
    - iii. Provide fuse blocks and fuses as shown on schematic drawings. Fuse blocks shall be DIN rail mounted, finger-safe type:
      - (i) Provide blown fuse indication for all fused circuits.

- 2. Wiring:

- (i) All electrical wiring shall be in accordance with the applicable requirements of Section 26 05 19 LOW VOLTAGE ELECTRICAL CONDUCTORS:
  - (ii) Wiring for discrete signal circuits shall be 600-volt class, PVC insulated, stranded copper, and shall be of the size required for the current to be carried, but not smaller than 16 AWG, enclosed in plastic wiring duct unless otherwise noted.
  - (iii) Wiring for analog signal circuits shall be 600-volt class, PVC insulated, stranded copper, twisted shielded pairs or twisted shielded triads, as required by the application, no smaller than No. 18 AWG, and shall be separated at least 6 inches from any power wiring.
  - (iv) Separate AC and DC wiring by a minimum of 6 inches where possible. Where AC and DC wires must be run together with less than 6 inches separation, provide grounded metallic barrier for separation between AC and DC wires. Where AC and DC wires must cross, make crossings at 90 degrees.
- ii. All interconnecting wires between panel mounted equipment and external equipment shall be terminated at terminal blocks. All terminal blocks shall have terminal markers.
  - iii. All interconnecting wires between panel mounted equipment and external equipment shall be identified per the requirements of Section 26 05 19 LOW VOLTAGE ELECTRICAL CONDUCTORS.
  - iv. All wires of a panel assembly shall have wire labels per the requirements of this section. This shall be done at all wire terminations including terminal blocks, I-O terminals (even if the number is duplicated on the terminal), and terminations on panel-mounted devices.
- C. All components of the panel assemblies shall be identified with nameplates or service legends per the requirements of this section. Adhesive embossed plastic tape type labels are not acceptable.
  - D. Crate all panel assemblies with solid plywood sheeting and sufficient blocking and protective material to prevent damage during shipment and storage. Identify the contents of the crate with the full identifying text of the panel assembly, in block letters not less than two (2) inches in height, to allow the contents of the crate to be readily determined without opening the crate.

### 2.03 Enclosures

- A. Enclosures shall be provided as a Panel Assembly component where indicated, specified, or required to meet the functional requirements of the System, as specified.
- B. Enclosures shall meet the following minimum specifications, unless otherwise noted:

1. NEMA 4X stainless steel.
  2. Minimum metal thickness shall be 14-gauge.
  3. All doors shall be rubber gasketed.
  4. Wherever practical, enclosures shall be a manufactured item.
  5. All enclosures that are to be structurally modified or shop fabricated shall be summarized, and the summary together with catalog cuts and/or shop drawings shall be submitted to the Engineer for approval prior to purchase or fabrication.
  6. All surfaces, internal and external, shall be primed and painted in accordance with the following, unless otherwise noted:
    - i. Sand panel and remove all mill scale, rust, grease, and oil. Fill all imperfections and sand smooth. Paint panel interior and exterior with one coat of epoxy coating metal primer, two finish coats of two-component type epoxy enamel. Sand surfaces lightly between coats. Dry film thickness shall not be less than 3.0 mils.
    - ii. Touch up panel after installation.
    - iii. Paint shall be polyester urethane powder coat, alkyd liquid enamel, or epoxy.
    - iv. Interior panel color shall be white and exterior panel color shall be ANSI gray.
  7. Enclosure shall have the following accessories:
    - i. Corrosion Inhibitor (Outdoor enclosures only)
    - ii. Stainless Steel Padlocking Handles
    - iii. Thermostat controlled 100 watt controlled panel heater.
    - iv. Inner panel LED lighting with door switch.
- C. The control panel shall be fitted with a swing door with one-quarter (1/4) inch thick, clear polycarbonate overlay as a barrier between the operator and all exposed electrical components.
- D. Approved manufacturers include:
1. Pentair/Hoffman
  2. Saginaw
  3. Similar units by other manufacturers may be considered for use on this project

based on comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

#### 2.04 Primary Disconnects

A. Primary Disconnects shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified. Primary Disconnects are defined as Circuit Breakers, Molded Case Switches, Fused Switches, Non-Fused Switches, Rotary Switches, and appurtenances by which the Panel Assemblies can be disconnected from their source of supply.

1. All Primary Disconnects shall comply with Division 26 – ELECTRICAL.

#### 2.05 Circuit Breakers

A. Circuit breakers shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified:

B. Circuit breakers shall meet the following minimum specifications, unless otherwise noted:

1. Energy limiting design to protect downstream components better than conventional breakers during short circuits.
2. IP2x Finger protection
3. DIN rail mounted.
4. UL 489 approved.
5. UL 1077 approved.

C. Acceptable manufacturers and products include:

1. Allen-Bradley, Bulletin 1489.
2. Altech, UL Series
3. ABB, S2 Series
4. Weidmuller
5. Similar units by other manufacturers may be considered for use on this project based on comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

#### 2.06 Fuses



- A. Fuses shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified.

#### 2.07 Power Distribution and Grounding Blocks

- A. Provide UL 1953-listed enclosed power distribution and grounding block for use in UL508A panels to manage power wire and branching as well as provide tap-off points:
  1. Unit shall be din-rail mounted finger-safe and enclosed to prevent accidental contact with live wiring.
  2. Engineered to allow copper conductors.
  3. Designed with captive termination screws
  4. Power distribution block to be current rated and provided with the required primary and secondary lugs required for the system.

#### 2.08 Surge Suppressors

- A. Surge Suppressors shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified. Surge Suppressors are intended to protect dedicated control equipment and instrumentation from high energy spikes in the electrical supply.
- B. Surge Suppressors shall meet the following minimum requirements, unless otherwise noted:
  1. 120 VAC single phase input voltage.
  2. 47-63 Hz line frequency.
  3. 20 Amp continuous rating.
  4. All mode protection; L-N, L-G, N-G.
  5. 330 VAC minimum Suppressor Classification per UL-1449-2
  6. Form "C" status contact.
  7. Response time (common mode) of 0.5 nsec. or less.
- C. Approved manufacturers and products include:
  1. Emerson/Control Concepts Islatrol IE-120.
  2. Similar units by other manufacturers may be considered for use on this project based on a comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

## 2.09 Terminal Blocks

- A. Terminal Blocks shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified.
- B. Terminal Blocks shall meet the following minimum requirements, unless otherwise noted:
  - 1. Single circuit, feed-through type
  - 2. Two-level, feed through type for analog input signals, or where indicated.
  - 3. DIN rail mounted.
  - 4. Screw clamp connection.
  - 5. Sized for the application, minimum 30 A rated.
  - 6. 600 VAC/VDC rated.
  - 7. It shall be possible to use a 'standard' instrument screwdriver blade on the terminal screws. Terminals which require 'reduced size' or 'tweak' screwdrivers to access terminals will not be accepted.
- C. Approved manufacturers include:
  - 1. Allen-Bradley.
  - 2. ABB, type M4/6
  - 3. Phoenix Contact Inc.
  - 4. Weidmuller.
  - 5. Similar units by other manufacturers may be considered for use on this project based on a comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

## 2.10 Fuse-Holding Terminal Blocks

- A. Fuse-holding Terminal Blocks shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified.
- B. Fuse-holding Terminal blocks shall meet the following minimum specifications, unless otherwise noted:
  - 1. Single circuit, feed through type.

2. DIN rail mounted.
3. Screw clamp connection.
4. Sized for the application.
5. Blown fuse indication unless otherwise noted.
6. Contractor shall include appropriately sized fuses with all Fuse-holding Terminal Blocks.
7. It shall be possible to use a 'standard' instrument screwdriver blade on the terminal screws. Terminals which require 'reduced size' or 'tweak' screwdrivers to access terminals will not be accepted.

C. Approved manufacturers and products include:

1. Allen-Bradley, Bulletin 1492-WFB424/4250.
2. ABB, type M4/8 SFL
3. Phoenix Contact Inc., Type UK-5 HESI.
4. Weidmuller, type ASK.
5. Similar units by other manufacturers may be considered for use on this project based on a comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

## 2.11 Pilot Devices

- A. Pilot Devices shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified. All Pilot Devices shall meet the following minimum specifications, unless otherwise noted:
1. All pilot devices shall be of heavy-duty, metallic, type 4/13, watertight/oiltight construction. Units shall mount through a 30.5 mm round hole.
  2. All pilot devices shall have custom legends as shown. Legends shall be black with white letters, and letter height shall be minimum 3/16-inch high characters.
  3. All button and lens colors shall be as shown. Color code is as follows:  
A = Amber, B = Blue, G = Green, R = Red, Y = Yellow, W = White
  4. All pilot devices shall be equipped with a sufficient number of contact blocks to accomplish the switching functions specified.

- B. Indicating lights shall meet the following minimum specifications, unless otherwise noted:
  - 1. All indicating lights shall be full voltage type with LED lamps. Units shall be rated for the voltage shown.
  - 2. All indicating lights shall be "push-to-test" type.
  - 3. All indicating light lenses shall be plastic.
- C. Selector switches shall meet the following minimum specification, unless otherwise noted:
  - 1. All selector switches shall be full voltage type knob.
- D. Pushbuttons shall meet the following minimum specifications, unless otherwise noted:
  - 1. All pushbuttons shall be flush type.
  - 2. Unless otherwise shown, all pushbuttons shall be black in color.
- E. Approved manufacturers and products include:
  - 1. Allen-Bradley, Bulletin 800T.
  - 2. Square D. Co., Type 9001SK.
  - 3. Similar units by other manufacturers may be considered for use on this project based on a comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.
- F. Contractor shall provide to the Owner one complete set of specialty tools required for maintenance of the pilot devices provided, including, but not limited to, lamp removal tools, lens removal tools, button removal tools, mounting wrenches, and retaining nut wrenches

## 2.12 Power Supplies

- A. Power supplies shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified. Power supplies shall convert 120 VAC, 60-Hz power to DC power of the appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that the components being supplied can operate within their required tolerances.
- B. Power supplies shall meet the following minimum specifications unless otherwise noted:
  - 1. DIN rail mounted finger-safe type.
  - 2. Mounted such that dissipated heat does not adversely affect other components.

3. Input shall be rated for 85-254 VAC, 45-65 Hz.
  4. Output shall be rated  $\pm 1\%$  or less with 25 mV ripple phase to phase maximum.
  5. Wiring connections shall be made via screw terminals. Solder lugs are not acceptable.
  6. Protected against short-circuit, overload, over-voltage, and open-circuit type faults.
  7. Sized as shown. Where a size is not shown, units shall be sized for the application, with a minimum of 10% spare capacity.
- C. Approved manufacturers and products include:
1. Phoenix Contact, Quint-Series.
  2. Similar units by other manufacturers may be considered for use on this project based on a comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

#### 2.13 Auxiliary Relays/Terminal Block Relays

- A. Auxiliary relays shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified. Relays shall be suitable for control, interfacing, and interposing functions.
- B. Auxiliary Relays shall meet the following minimum specifications unless otherwise noted:
1. Plug-in general purpose, 2PDT minimum, power type relays rated for industrial use.
  2. Equipped with a push-to-test button and indicator light.
  3. Coil voltage shall match the control circuit voltage.
  4. Contacts shall be 10 Amp, 120 volt (resistive) rated.
  5. Mounted via DIN rail mounted, finger-safe sockets.
- C. Terminal Block Relays shall meet the following minimum specifications unless otherwise noted:
1. Din-rail general purpose, 1PDT minimum, power type relays rated for industrial use.
  2. Equipped with a supply voltage indicator light.
  3. Coil voltage shall match the control circuit voltage.

4. Contacts shall be 6 Amp, 120 volt (resistive) rated.
- D. Time Delay Relays. Provide where indicated, a manually set, adjustable to a selected time range by a set-pointer, 8-pin octal base mounted unit with instant monitoring of operational status by LED indicators. Timer shall operate at 120 volts and have one SPDT plus instantaneous SPDT, 5 AMP contacts.
  - E. Approved manufacturers and products include:
    1. Allen-Bradley, Bulletin 700-HB/700-HLT.
    2. Phoenix, PLC-RSC Series.
    3. Idec, RH Series.
    4. Idec, GE1A Series.
    5. Similar units by other manufacturers may be considered for use on this project based on comparison to the listed products. Approval of substitutions is solely at the discretion of the Engineer.

#### 2.14 Intrinsically Safe Devices

- A. Intrinsically safe devices (barriers/relays) shall be provided as a Panel Assembly component where indicated, specified, or required to perform the functional requirements of the System, as specified.
- B. General: All intrinsically safe devices shall be installed in accordance with applicable section of the NEC. Intrinsically safe wiring shall be separated from non-intrinsically safe wiring by at least 2-inches or by other means acceptable per the NEC. Intrinsically safe wiring must be identified, either by color coding, with light blue jacketed cable, or by tagging, at regular intervals, up to 25 feet. Non-intrinsically safe wiring shall not be connected to intrinsically safe terminations of intrinsically safe devices.
- C. Intrinsically safe barriers: Intrinsically safe barriers shall conform to UL-913 or FM-3610 standards as approved by ETL, FM, MSHA, or UL:
  1. Provide and install intrinsically safe barriers/relays acceptable for use in Class I, Division 1, Group D, as required or indicated.
  2. Provide and install intrinsically safe barriers/relays acceptable for use in Class I, Division 2, Group D, as required or indicated.
  3. Intrinsically safe barriers shall meet the following minimum specifications, unless otherwise noted:

- i. Barrier designed to be used with 4-20 ma DC signals.
  - ii. Solid State construction
  - iii. DIN rail mounted.
  - iv. FM approved
- 4. Provide intrinsically safe dual channel Zener barrier for the level transducer.
  - i. Channel 1 rating 28V, 300R, 93ma
  - ii. Channel 2 rating 10V, 50R, 200Ma
  - iii. VOC less than or = 28.75V
  - iv. ISC less than or = 189mA.
  - v. Units to be an MTL 788+, Pepperl&Fuchs Z788.H, or as approved by the manufacturer.
- D. Intrinsically safe relays shall be fixed sensitivity type U/L approved for use with a remote pilot device (dry contact) located in Hazardous (Classified) areas. Supply power shall be 120 volt AC 60 Hz. Final contact rating shall be 10 amperes or better at 120 volts AC:
  - 1. Provide and install intrinsically safe barriers/relays acceptable for use in Class I, Division 1, Group C or D, as required or indicated.
  - 2. Provide and install intrinsically safe barriers/relays acceptable for use in Class I, Division 2, Group C or D, as required or indicated.
  - 3. Relays should have a dip switch or other means of switching contact orientation from N/O to N/C.
- E. Approved manufacturers include:
  - 1. MTL Series 7700.
  - 2. PR Electronics.
  - 3. Turck IM Series.
  - 4. Similar units by other manufacturers may be considered for use on this project based on comparison to the listed products. Approval of substitutions is solely at the discretion of the ENGINEER.

## 2.15 Float Switches

- A. Float switches shall be provided where indicated, specified, or required to meet the functional requirements of the System, as specified.
- B. Float Switches shall meet the following minimum specifications, unless otherwise noted.
  - 1. Direct-acting float type consisting of a mechanically activated (non-mercury) switch enclosed in a float and connected to a multi-conductor combination support and signal cable. The entire assembly shall form a completely watertight and impact-resistant unit.
  - 2. Chemical-resistant polypropylene or other corrosion-resistant float material suitable for use in water and wastewater applications.
  - 3. Cable shall be rugged and flexible with heavy neoprene or PVC jacket.
  - 4. Actuation/deactuation differential shall be 1 inch minimum.
  - 5. Switch shall be form C, rated at 5 amps (minimum) at 120 VAC.
  - 6. Unit shall be suspended type, and provided with length of cable required to reach panel or junction box without splicing. Contractor to verify length of cable required for each float switch before ordering.
    - i. Float switches shall be provided with necessary brackets and clamps to suspend the unit from the top of a tank or vessel. The suspended type shall include an integral or attached weight assembly for stabilization and positive operation of the unit. All mounting clamps shall be PVC or Neoprene.
- C. Approved manufacturers and products include:
  - 1. ITT Flygt Corp., Model ENM-10.
  - 2. Pulsar Inc., Model 800-70 Signal Master.
  - 3. STI Corp., Series KA.
  - 4. Warrick Controls Inc., Series M.
  - 5. Similar units by other manufacturers may be considered for use on this project based on comparison to the listed products. Approval of substitutions is solely at the discretion of the Engineer.

## 2.16 Ultrasonic Level Transmitter

- A. The level transmitter system shall be a microprocessor based echo-time measuring type providing an electronic output signal proportional to the level of material, or distance to material, as may be required. It shall consist of a transmitter and a



- transducer connected by up to 1200 feet of cable.
- B. The transducer operating principle is based on acoustic impulses emitted from an ultrasonic transducer reflecting back from the material surface. The transit time of pulse travel from generation to echo is measured. The elapsed time is proportional to the distance between the transducer face and material surface.
  - C. The primary sensor shall be an acoustic transducer containing a polarized Zirconium crystal with acoustic impedance matching face and transformer and shall meet the following requirements:
    - 1. The transducer housings shall be Kynar, or approved, and shall include a submergence shield.
    - 2. The process connection shall be 1" NPT.
    - 3. The accuracy shall be +/- 0.25% of range or 6mm; whichever is greater.
    - 4. The resolution shall be 0.1% of program range or 2mm, whichever is greater.
    - 5. The units shall be FM approved for Class I, Div. 1 Groups A, B, C, & D; Class II, Div. 1, Groups E, F, & G.
    - 6. The range of the transducer shall be 1.5-50 ft with a 6 degree beam angle and shall supplied with submergence shield.
  - D. The primary sensor cable shall be of sufficient length to reach the pump disconnect panel without being spliced.
    - 1. In order to maintain hazardous location approvals, the primary sensor cable shall be installed using an intrinsically safe barrier between the sensor and the controller, per manufacturer requirements.
  - E. The transmitter shall have a multi-field backlit LCD display with individual alarm status lights and meet the following requirements:
    - 1. The transmitter power supply shall be 120VAC with an operating temperature of -5°F to 122°F.
    - 2. The transmitter shall have a minimum of (6) relay and (2) isolated 4-20mA outputs.
    - 3. Calibration and programming of the transmitter shall be via a removable keypad and shall not require opening the enclosure or additional equipment.
    - 4. Mount transmitter inside of the MCC Control section. Coordinate, as required, with MCC supplier.
  - F. The manufacturer shall warranty the above specified equipment for twenty-four months from equipment start-up or thirty months from date of shipment, whichever

occurs first, to be free from defects in design workmanship or materials.

- G. The contractor shall provide for a manufacturers representative to be onsite for 1 day during start-up for the start-up and calibration of the level transducer system.
- H. Approved manufacturers include:
  - 1. Siemens-Milltronics HydroRanger 200, with Milltronics Echomax XPS-15F Sensor.
  - 2. In order to maintain City of St. Helens standards, no other manufacturers will be used.

#### 2.17 Flow Meter

- A. Flow meters shall be a flange connection type Flow Tube Magmeter with a PFA lining and Haselloy C equivalent electrodes. Flowmeter structure to be IP67, Nema 4X watertight with an ambient temperature rating of -40 to 140 degrees F and of a size shown on the approved plans. Unit to be provided with flow meter converter and grounding rings.
- B. The flow meter shall be provided with an electronics converter providing a 4-20mA signal proportional to the flow rate and a digital output for use in providing a flow total pulse output to the PLC:
  - 1. Configure the output as follows:
    - i. Count Rate = 10
    - ii. Pulse width = 500 milliseconds
- C. The Flowmeter shall be Toshiba Flow Tube Magmeter Model LF654 "Mount Anywhere" and LF622FAC211E converter with optional digital output #2.

#### 2.18 Pressure Transmitters

- A. Pressure transmitter shall be rated for hazardous location and made of 316 stainless steel and Elgiloy wetted parts.
- B. Unit shall provide a 4-20mA output proportional to the pressure range being measured with a  $\pm 0.25\%$  full scale.
- C. Pressure Transmitters shall be NOSHOK model 621-100-1-1-2-6-ST8 or approved equal.
- D. Provide diaphragm seal to ensure integrity of pressure port of the transmitter against clogging.

#### 2.19 Telemetry System

- A. General: Provide a Telemetry panel at the Pump Station. The Telemetry panel will monitor and/or alarm various discrete and analog signals from the pump stations. The

Telemetry system will not provide any control for the pump station.

- B. The Telemetry panel will communicate via cellular modem to a third-party monitoring system, which will provide call-outs to the City on alarm conditions.
- C. Inputs: Provide a minimum of (16) discrete inputs and (3) analog inputs. Inputs shall be as shown on the drawings.
- D. Acceptable manufacturers:
  1. Mission Communications MyDro 150 base unit with expansions modules, accessories, and appurtenances as required.
  2. In order to maintain City of St. Helens standards, no other manufacturers will be used.

#### 2.20 Cable Seals

- A. All manufacturer power and control cables entering the pump disconnect panel shall be sealed using an acceptable cable sealing system. Cable seals shall be Appleton Protex 2000 or approved equivalent. Verify with local Authority Having Jurisdiction (AHJ) if cable seals are required.

#### 2.21 Pump Disconnect Plugs and Receptacles

- A. Pump disconnect plugs and receptacles shall be Meltric DS series with current and HP ratings as required. Provide NEMA 4X configuration, with auxiliary contacts.
- B. Plugs and receptacles shall have adequate accessory connections to accommodate the pump seal fail and over temp signals.

### **PART 3 EXECUTION**

#### 3.01 Panels and Panel Mounted Equipment

- A. Panels and panel-mounted equipment shall be pre-assembled at the control supplier's factory. No work, other than correction of minor defects or minor transit damage, shall be done to the panels at the job site.
- B. Panels shall be mounted where shown. Contractor shall anchor the panels as shown. Provide shims as required to set panels level. Conflicts with other equipment shall be brought to the attention of the Engineer for direction before taking any further action.
- C. Panel Assemblies:
  1. The supplier shall assume single source responsibility for each panel assembly. A panel assembly may include mounting and wiring of relays, motor starters, transformers, and disconnecting means, or other control devices as specified by customer-supplied documentation.

2. The supplier shall provide mounting and wiring of the panel assembly in a NEMA type enclosure as specified.
3. The supplier shall wire all controller inputs and outputs to terminal blocks as specified.
4. The panel assembly shall include fuse blocks as required.
5. All electrical control products within the panel assembly shall be grounded to meet equipment specifications.
6. All cables (with associated plugs, connectors, and receptacles) requiring user field installation shall be designed for use in an industrial environment.
7. Upon receipt of the purchase order, but prior to starting the manufacture of any panel assembly, the supplier shall submit drawings, as specified, of all panel assemblies for approval.
8. At the time a panel assembly is shipped, one (1) complete, reproducible copy of the panel assembly drawings shall be provided with the panel assembly.

### 3.02 Installation

- A. **Protection During Construction:** Throughout this Contract, the Contractor shall provide protection for materials and equipment against loss or damage and from the effects of the weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions.
- B. **Material and Equipment Installation:** Follow manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's instructions, and these Contract Documents, follow Engineer's decision, at no additional cost to Owner. Keep copy of manufacturer's instructions on the job site available for review at all times.
- C. The Contractor shall bear ultimate responsibility and shall provide for the supply, installation, adjustment, and startup of a complete, coordinated System that shall reliably perform the specified functions.
- D. The Contractor shall make all final power and signal connections (hydraulic, pneumatic, and electric) to all elements provided under this section. The Contractor shall verify and certify by written notice to the Engineer, the correctness of final signal connections and the correctness of adjustment for all elements provided under this section and all elements interfaced with the System
- E. All conduits are provided and installed under Section 26 05 33 RACEWAYS.
- F. All wiring and cables, with the exception of certain specified special control cables, are provided and installed under Section 26 05 19 CONDUCTORS. Specific special control cables as specified in this section shall be provided and installed under this

section.

- G. Cleaning and Touch-up Painting: Keep premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch-up scratches, scrapes, and chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the color, consistency, and type of surface of the original finish.

### 3.03 Electrical Power and Signal Wiring

- A. Control and signal wiring external to the panels and all power wiring shall conform to the requirements of Section 26 05 19 CONDUCTORS.
- B. Control and signal wiring in panels shall be restrained by plastic ties or ducts:
  - 1. Hinge wiring shall be double secured at each end with mechanically fastened, not adhesive, tie blocks or straps.
  - 2. Hinge crossings shall be either longitudinal crossings with a minimum length of 12 inches, so that any bending or twisting will be around the longitudinal axis of the wire, or loop crossings with a minimum loop diameter of 6 inches.
  - 3. The entire length of wire in the bend area, (between the tie blocks) shall be protected from abrasion with either convoluted tubing or spiral wrap.
  - 4. Wire bundles that pass through holes shall be protected from abrasion with either grommets or sleeves.
  - 5. Wires that pass across edges of sheet metal shall be protected from abrasion.
- C. Arrange wiring neatly, cut to proper length, and remove surplus wire.
- D. Use manufacturer's recommended tool with the proper sized anvil for all crimp terminations. No more than two wires may be terminated in a single crimp lug and no more than two lugs may be installed on a single screw terminal:
  - 1. All crimp lugs used in applications with two wires terminated in a single crimp lug shall be rated by the manufacturer for multiple wire use.
- E. Wiring shall not be spliced or tapped except at device terminals or terminal blocks.

### 3.04 Testing, Start-Up, and Training

- A. All elements of the System shall be tested to demonstrate that the System satisfies all of the requirements of this Specification.
- B. The Contractor shall provide all special testing materials and equipment.
- C. The Contractor shall coordinate all of his testing with the Owner's Representative and

all other associated contractors.

- D. Within 12 weeks after award of the contract, and no later than 60 days prior to the testing, the Contractor shall prepare and submit to the Engineer for review, a detailed description of the test procedures proposed to demonstrate conformance of the System to this Specification and the report forms to be used for recording the test results. The testing procedures shall be designed by the Contractor to duplicate normal operating and all alarm conditions. The Contractor shall ensure that the equipment and facilities are not damaged during testing. The decision of the Engineer upon the acceptability of the test procedures and report forms shall be final.
- E. As a minimum, the testing shall include the following:
1. Factory tests: Prior to shipment, all panel assemblies shall be tested for proper operation at the manufacturer's factory. Results of the factory tests shall be recorded and submitted for approval before shipment of any panel assembly to the project site:
    - i. Contractor shall notify the Engineer at least one (1) week prior to the date of factory tests to allow the Engineer to witness the tests.
    - ii. Contractor shall schedule at least one (1) full day of testing at the test facility.
    - iii. All analog and discrete signals (inputs and outputs), power distribution equipment, pilot devices, control relays, and other devices shall be tested on a "line-by-line" basis using the schematics for reference. All analog and discrete field connections shall be simulated at the panel terminal blocks. At a minimum, analog signals shall be tested at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of signal to verify device operation. Alarm and control set-points shall also be tested as directed by the Engineer.
    - iv. Control components that are found to be non-functional or damaged shall be replaced prior to panel assembly approval and shipment to the project site.
  2. Operational Acceptance Tests:

- i. The objective of these tests is to demonstrate that the System is READY for final operation.
  - ii. The System shall be checked for proper installation, adjustment, and calibration on an “element-by-element” basis to verify that it functions as specified and that all terminations have been made correctly.
  - iii. All discrete element set-points shall be adjusted and checked for proper operation (e.g., interlock function, contact closure on rising/falling P.V., etc.).
  - iv. All analog loops shall have three-point calibrations performed.
  - v. All initial controller tuning constants shall be adjusted to preliminary settings as recommended by the manufacturer.
  - vi. The "Operational Acceptance Tests" shall be completed prior to starting the "Functional Acceptance Test". The actual testing program shall be conducted in accordance with prior approved procedures and shall be documented.
3. Functional Acceptance Tests:

- i. The objective of these tests is to demonstrate that the System operates correctly and complies with the specified performance requirements. All data points shall be tested by activating the field elements and verifying proper System response. The Contractor shall provide a minimum one (1) day Functional Acceptance Test by qualified personnel. One day of testing shall constitute eight (8) hours of on-site work. During this period, the Contractor's personnel shall operate the System under normal and all alarm conditions to simulate all operating modes of all equipment.
  - ii. A witnessed "Functional Acceptance Test" shall be performed on the System. Each function shall be demonstrated to the satisfaction of the Engineer.
  - iii. Each instrument and final element shall be field calibrated in accordance with the manufacturer's recommended procedure and then tested in accordance with the Contractor's approved test procedure. Data shall be entered on the applicable test form at the time of testing. Alarm trips, control trips, and switches shall be set to initial values. Final elements shall be checked for range, dead-band, and speed of response. Any component that fails to meet the required tolerances shall be repaired by the manufacturer or replaced, and the above tests repeated until the component is within tolerance.
  - iv. Adjust tuning constants as required for proper System operation. Provide final tuning constant information in tabular form for inclusion in the Operation and Maintenance Manuals.
  - v. Each test shall be witnessed and signed off by the Contractor and the Owner's representative upon satisfactory completion.
  - vi. The actual testing program shall be conducted in accordance with the prior approved procedures and shall be documented as required.
  - vii. The Contractor shall notify the Engineer and the Owner's representative and submit the results of the "Operational Acceptance Tests," at least 1 week prior to the date of the "Functional Acceptance Test".
- F. In addition to the test procedures, the Contractor shall provide a minimum of 1 day(s) of System training. The Contractor shall also provide an outline for the training to be provided that covers basic software and equipment training, operator training, System maintenance training, and programming training. Identify the course content and the time to be spent on each subject area.

### **END OF SECTION**



**SECTION 26 27 00 SERVICE AND DISTRIBUTION**

**PART 1 GENERAL**

1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. This section covers the work necessary to furnish and install a complete electrical service and distribution system.

1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

1.03 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00 GENERAL ELECTRICAL REQUIREMENTS.

1.04 Electrical Service

- A. The utility company rendering electrical service to this project is Columbia River PUD (CRPUD). Furnish all labor and install all material not furnished by the utility company, including meter bases, CT cans, and transformer pads or poles as shown, or as required by utility company to render service to the project from utility service point. Verify service point metering requirements, pad construction details, service charges, etc., and include all costs in bid proposal.
- B. Provide ground services as required to satisfy utility company and code requirements.
- C. Provide trenching and backfill at locations shown on the plans and as required by the utility company for service cable to the project site.
- D. For utility service conduit, provide sweeps per utility company standards.
- E. Verify all pull boxes, transformer details, and cable details with the utility company and observe utility company standards throughout.

1.05 System Voltage Characteristics

- A. Provide electrical system nominal utilization voltage characteristics as follows:

Typical Voltage	Nominal Utilization
-----------------	---------------------

Description Herein	Voltage
480/277	460/265
120/240	115/230

## **PART 2 PRODUCTS**

### **2.01 Combination Meter Base and Main Circuit Breaker**

- A. Where indicated, furnish and install a minimum 100 Amp rated combination Meter/Main, with safety socket (test bypass), suitable for use with a 480/277V, 3 phase, 4 wire system. Provide unit per power utility specifications and requirements. Meter/Main shall be ring type, NEMA 3R, painted steel (ANSI 61 gray) construction, unless otherwise noted. Meter/Main shall be UL 67 listed and meet ANSI C12.7 and EUSERC 305A standards, as applicable (verify with local power utility). Meter section shall be mounted to the side of the Main section and shall have provisions for installing a utility seal; it shall be possible to open Main section without breaking utility seal on Meter section. Contractor shall verify all meter/main requirements with local power utility prior to ordering. Manufacturer shall be B-line or as approved by local power utility.
- B. Main Circuit Breaker shall be sized as shown on drawings. Provide and install in an accessible location on the outside of the Main section, a metal nameplate that contains a permanent record of the catalog number and maximum ratings of the Main Circuit Breaker. Main section of Meter/Main shall have provisions for locking the Main Circuit Breaker in both the open ("Off") and closed ("On") positions.
- C. Main Circuit Breaker shall be molded case and have a quick-make, quick break, over-center toggle type, trip-free mechanism to prevent holding contacts closed against a position between "ON" and "OFF" when tripped automatically. Breaker shall be common trip such that an overload or short circuit on any one pole will result in all poles opening simultaneously.
- D. The interrupting capacity of the Meter/Main and Main Circuit breaker shall be at least equal to the available short circuit current at the line terminals of the breaker, but in no instance shall the rating be less than 14k AIC at 480 Volts.

### **2.02 Safety Switches and Disconnecting Means**

- A. Furnish safety switches as shown or required. All equipment shall conform to NEMA standards latest revision as applicable.
- B. Switches shall be heavy-duty class, quick-make, quick-break, safety-type, externally operable, with bypassable interlock to prevent opening of cover in "ON" position. Switch shall have positive indication of "OFF" and "ON" position. Devices shall have visible blades unless molded-case breaker mechanism is used. Switches shall be so constructed as to preclude single phasing of switch blades due to mechanical failure. Switches shall be padlockable in the "OFF" position.

- C. Switches shall be of the proper horsepower, ampere, and voltage rating with number of poles required to open all ungrounded conductors and with solid neutral bar where required. Provide auxiliary switch contacts in all disconnect switches.
- D. Unless otherwise indicated, individually-mounted switches shall be in NEMA type 1 enclosure except in wet locations or where indicated as weatherproof, in which case a NEMA type 4 stainless steel enclosure shall be provided.

### 2.03 Fuses, 600-Volt and Less

- A. Provide fuses as manufactured by Bussmann Manufacturing Company, Chase-Shawmut Company, or equal.
  - 1. Fuses protecting control circuits shall be Bussman "Fusetron", Chase-Shawmut "Trionic," or equal, dual-element type having an interrupting rating of at least 100,000 Amps RMS unless otherwise noted.
  - 2. The following general requirements shall apply to all fuses:
    - i. Fuses shall be coordinated with each other and with circuit breakers in the circuit.
    - ii. Make adjustments in the specified fuse sizes and provide substitute fuses as required to achieve reliable trouble-free operation of all fused circuits.
    - iii. Provide a fuse in each fuse holder.
    - iv. Provide a label inside each cover or adjacent to each fuse holder indicating specific type of fuse required for replacement.
    - v. Provide six spare fuses for each low-voltage current rating used on the project, except no spare fuses will be required for integral current-limiting fuse circuit breaker units.

## **PART 3 EXECUTION**

### 3.01 Equipment Bases

- A. Provide equipment bases for all floor-mounted electrical equipment. Unless otherwise indicated, bases shall be poured-in-place concrete, nominally 3.5 inches high, and be one inch larger on all exposed edges than the equipment to be mounted. Bolt equipment to pad. Provide concrete pads and mounting provisions for all exterior equipment as indicated on the drawings or specified in other portions of the specifications.

### 3.02 Supports

- A. Provide hangers or other devices such as pads, channels, struts, joists, anchors, etc.,

necessary for the support of electrical equipment. Provide the design, fabrication, and erection of supplementary structural framing electrical equipment. Show on shop drawing supplementary framing including design loads, member size, and location. When supplementary framing is indicated, verify that dimensions are suitable for the equipment furnished. Provide additional strength when equipment furnished is heavier than that specified.

### 3.03 Damp and Wet Location

- A. Provide 1/4-inch air space behind all electrical equipment mounted in damp and wet locations and on concrete walls below grade. Use corrosion-resistant washers, bolts and anchors.
- B. Unless otherwise specified, all electrical enclosures in damp and wet locations shall be NEMA 4, stainless steel.

**END OF SECTION**

## SECTION 26 27 26 BASIC ELECTRICAL MATERIALS AND METHODS

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. The work consists of furnishing all labor, materials, and equipment required for electrical work shown on the drawings and as further described in these specifications.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Regulations and Permits

- A. The Contractor shall comply with all applicable codes, ordinances, and regulations, including the National Electrical Code, National Electrical Safety Codes, and State and local codes.
- B. The Contractor shall obtain a Certificate of Electrical Inspection from the local inspecting authority and submit to the owner upon completion of the project.

#### 1.04 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS.

### PART 2 PRODUCTS

#### 2.01 Cast Steel (CS) Boxes

- A. For exposed box locations, provide boxes of cast ferrous metal with gasketed, cast ferrous metal covers and stainless-steel screws. Do not provide aluminum boxes or covers. Where indicated, provide covers which are weatherproof. Provide boxes with threaded conduit hubs and cast mounting lugs where lugs are required. Use Crouse-Hinds or Appleton Type FS or FD boxes, or approved equal.

#### 2.02 Large Cast Metal Boxes

- A. Where larger cast metal boxes are required, use neoprene gasketed, watertight boxes with hinged, cast metal full-access covers, stainless steel cover hardware, and drilled

and tapped conduit entrances. Use Crouse-Hinds Series W, O.Z./Gedney Series Y boxes, or approved equal. For conduit below grade, use Crouse-Hinds Type WJBF, O.Z./Gedney Series YR, or approved equal, minimum size 8 inches by 8 inches by 6 inches. For hazardous areas, use boxes applicable for the location and hazardous atmosphere present. Use special boxes where indicated or required.

### 2.03 Junction and Pull Boxes

- A. Provide code gage galvanized sheet steel pull boxes as required or shown on the drawings. Provide removable screw cover on the largest access side of the box unless otherwise detailed. Where cast boxes are indicated or specified, provide conduit entrances with threaded hubs. Provide stainless steel screws at all exterior and damp locations. Where pull boxes are required but not shown, provide pull boxes as specified above sized per NEC requirements.
- B. Outdoor or Wet Locations: Utilize NEMA 4 watertight enclosures for outdoor or wet locations and where subscript WP is indicated at the box location on the Drawings.
- C. Where outlet boxes are used as junction or pull boxes, use materials as specified under CAST STEEL BOXES.

### 2.04 Wiring Devices

#### A. Switches:

- 1. Provide AC-type, gray colored, rated 20 amp or higher suitable for the type load to be controlled. Manufacturers: General Electric, Bryant, Hubbell, Sierra, Pass and Seymour, or approved equal.
  - i. Where indicated, provide single-pole, double-throw, center-off units.
- 2. Weatherproof Switches: Use switches as specified mounted in a cast metal box with gasketed, weatherproof device plate as specified.

#### B. Receptacles:

- 1. Where indicated, provide receptacles with ground fault interrupter. Unit shall be furnished with internal, solid state, ground fault current sensing and tripping. The receptacles shall include built-in "TEST" and "RESET" switches and "TRIPPED" indicator and shall be gray colored, rated 20-amp, 120-volt, and of the "feed-thru" type. The receptacles shall be UL approved. They shall be as manufactured by Square D, 3M, Square D, or equal.
- 2. Weatherproof Receptacles: Use receptacles labeled WR as specified mounted in a cast metal box with gasketed, weatherproof device plate as specified, below.
- 3. Special Purpose Receptacles: Provide receptacles of the type, rating, and number of poles indicated or required for the anticipated purpose. Furnish a matching plug with cord-grip features for each special purpose receptacle.

## 2.05 Device Plates

- A. Provide plates for all wiring devices. Where weatherproof devices are specified on exterior or damp locations, use weatherproof covers as specified, below.

## 2.06 Engraved Plates

- A. Where device titles are indicated, provide black device plates engraved with the designated titles. Provide engraved letters, numbers, or characters 1/8-inch high with filler of white color.

## 2.07 Cast Metal (CM) Plates

- A. Provide cast metal device plates of malleable ferrous metal with gaskets and stainless steel screws with oval heads.

## 2.08 Weatherproof (WP) Plates

- A. Where weatherproof switches are designated, the switch shall be installed in the specified box with a gasketed, weatherproof, cast-metal cover plate incorporating an external operator for the internal switch and with stainless steel mounting screws. Manufacturers and types: Crouse-Hinds DS 181 or DS-185, Appleton FSK-IVTS or FSK-IVS, or approved.
- B. Where weatherproof receptacles are designated, the receptacle shall be installed in the specified box with a gasketed, metallic, die-cast Alloy 360 copper-free aluminum, "in-use" weatherproof rated ("bubble type") cover plate with stainless steel mounting screws and padlock provision, unless otherwise shown. Manufacturers: Hubbell #WP8M, #WP8MH (Horizontal mount), #WP26M (for GFI type receptacles), or #WP26MH (for Horizontal mount GFI type receptacles); Intermatic #WP1010MC, or #WP1010HMC (Horizontal mount); or approved.
- C. All receptacle covers shall be mounted with the hinge of the cover at the top.

## 2.09 Underground Electrical Manholes and Handholes

- A. Provide precast concrete manhole and handhole units of the size and configuration indicated. Precast units shall be capable of supporting all in-plate external loads plus an H-20-44 truck loading. Concrete in the precast unit shall develop a minimum compressive strength of 4,500 psi in 28 days. Cover units and frames shall be the type as specified as to size, appearance, and mechanical strength. Covers shall seat properly to prevent rocking. Provide racks for all cables. Provide pulling irons. Manholes and handholes shall be Utility Vault Company with hinged and spring locked steel cover, similar by Brooks Products, or equal.
- B. Provide extensions sections as required to accommodate duct bank burials and to bring cover flush with finished grade.

**PART 3 EXECUTION**

3.01 Equipment Installation

- A. Boxes and cabinets shall be installed on the surface level and plumb and affixed to the surface with expansion inserts in concrete and machine screws to tapped holes in metal surfaces.
- B. Interconnections between equipment shall be made per manufacturer's wiring diagram. All wiring shall be clearly labeled and external connections in control panels and remote cabinets brought out to terminal blocks. All equipment connected to telephone lines shall be protected against voltage transients.

3.02 Outlet and Device Boxes

- A. Provide a box suitable for the conditions encountered at each outlet in the wiring or raceway system and sized in accordance with the NEC. Use the listed types unless otherwise indicated or accepted.
- B. Types to be Provided, Metal Raceway System:

<u>Locations</u>	<u>Box Type</u>
All	Cast Steel

- C. Mount receptacle boxes at 36-inches, AFF/AFG and light switch boxes at 48-inches, AFF/AFG, unless otherwise shown.
- D. Where above heights do not suit the structure construction or finish, locate boxes as indicated by the Engineer.
- E. Locations indicated are approximate. Study the Drawings in relation to spaces and equipment surrounding each outlet. When necessary, relocate outlets to avoid interference.
- F. Mount all boxes plumb and level.
- G. Install boxes in a secure, substantial manner supported independently of conduit by attachment to the building structure or a structural member.

3.03 Junction and Pull Boxes

- A. Where indicated on the Drawings, and where necessary to terminate, tap-off, or re-direct multiple conduit runs, provide and install appropriately designed junction boxes. Furnish and install pull boxes where necessary in the raceway system to facilitate conductor installation. Provide pull boxes to limit conduit runs to less than 150 feet and to contain no more than the equivalent of three right-angle bends.
  - 1. Use outlet boxes as junction boxes and pull boxes wherever possible and allowed by applicable codes.



2. Installation: Make all boxes accessible. Do not install boxes in finished areas unless accepted by the Engineer. Mount all boxes plumb and level.
3. Install boxes in a secure, substantial manner, supported independently of conduit by attachment to the structural member.

3.04 Wiring Devices

- A. Receptacles: Mount receptacles with grounding slot down except where horizontal mounting is indicated, in which case mount with neutral slot down. Ground receptacles to boxes with grounding wire, not by yoke or screw contact. Mount weatherproof receptacles with the hinge for the protective cover above (not at side, or below) the receptacle opening.
- B. Special Purpose Receptacles: Locate special purpose receptacles where shown. Install and mount the receptacles in accordance with the manufacturer's instructions and the applicable codes.
- C. Label all receptacles with panel and circuit information indicating its power source.

3.05 Device Plates

- A. Types to be Provided:

<u>Locations</u>	<u>Plate Type</u>
All	Cast Metal
WP Designation	Weatherproof

- B. Installation: Securely fasten device plates to the receptacle boxes or the wiring device contained therein. Install device plates vertically or horizontally with an alignment tolerance of 1/16 inch. Do not use sectional type device plates.

3.06 Manholes and Handholes

- A. Inspect actual field conditions at the proposed location for each manhole and handhole and verify that it is free from interference with other utilities and free of flooding due to the characteristic flow of surface water. Make minor relocations as required to clear obstructions and minimize flooding. Set all manholes and handholes on a 24-inch deep (minimum) rock bed. Provide a gasket and grout between all extension sections to seal manholes watertight.
- B. Conduits generally shall enter the handhole or manhole at approximate right angles to the wall and as near as possible to one end of the wall. Grout around all conduits and duct banks entering the manhole or handhole. Conduits entering manholes or handholes shall have bell ends flush with interior wall, but in no instance extend more than 2 inches into space.
- C. All non-current carrying metal parts in the manhole or handhole shall be bonded to the

- effective ground fault current path via the largest Equipment Grounding Conductor (EGC) entering the manhole or handhole; EGC used for bonding shall not be smaller than 8 AWG.
- D. If a ground rod is installed at the manhole or handhole, it shall be copper clad, having a diameter of not less than 3/4-inch and not less than ten feet in length. The upper end of the rod shall terminate 6 inches above the manhole or handhole floor. The ground rod shall be connected to the rest of the grounding electrode system with a minimum 6 AWG bare copper conductor.
  - E. All conductors, wires, and cables installed in manholes or handholes shall be neatly racked and secured within the manhole or handhole. All AC circuits to be racked below DC circuits and a minimum of 6-inches of separation maintained between AC and DC circuits.

**END OF SECTION**

## SECTION 26 29 00 LOW VOLTAGE MOTOR CONTROLS

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. Work consists of all motors and controls shown on the drawings and specified herein and in other divisions of the specifications. In general, all motors shall be furnished with the driven equipment. The requirements of all other sections of the specifications are equally applicable to the work to be performed under this section. Motors and controls are specified in this and other divisions of the specifications. In the event of conflicts, the more restrictive specifications shall apply.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS.
- B. Furnish submittal data including the following information:
  - 1. One-line diagrams
  - 2. Elementary diagrams
  - 3. Connection diagrams
  - 4. Interconnection diagrams
  - 5. Operational description
  - 6. Installation instructions
  - 7. Maintenance instructions
  - 8. Spare parts list
  - 9. Test reports

## **PART 2      PRODUCTS**

### 2.01    Service Conditions

- A. All equipment shall be designed and built for industrial service and be capable of operating successfully under the following applicable conditions:
  1. 40 degrees C maximum ambient temperature.
  2. Voltage variations to +10% of nameplate rating.
  3. Frequency variations to +5% of nameplate rating.
  4. Combined voltage and frequency variations to +10% total, as long as frequency does not exceed +5%.
  5. 3,300-foot maximum altitude.

### 2.02    Motor Control

- A. General:
  1. Furnish and install a complete motor control system as specified, shown on the drawings, or required for the control and protection of all motors and motor-operated equipment in conformance with manufacturer's recommendations and applicable codes.
  2. This section of the specification applies to all motor controls specified herein and in other sections of the specification.
  3. All controls shall conform to the requirements of NEMA standards latest revision.
  4. Motor control shall be manufactured by General Electric, Allen-Bradley, Square D, Cutler-Hammer/Westinghouse, or approved.
- B. Control requirements: Provide for each motor a suitable controller and devices that will perform the functions specified or shown on the drawings for the respective motor. Each motor shall be provided with thermal overload protection:
  1. Single-phase motors shall be self-protected, and control shall be through manual switches or automatic contacts as specified or indicated on the drawings.
  2. Polyphase motors shall have thermal overload heater elements provided integral in the motor controller for each ungrounded conductor.

- C. Overload relays:

1. Polyphase motor protection shall utilize electronic overload units. Adjustment range shall be 85% to 115% of the unit's basic current rating. Utilize standard trip characteristic units unless otherwise recommended by the manufacturer. Make the initial setting of overload units to provide a maximum of 115% protection or equal to the motor-rated service factor current, whichever is less.
2. Adjust thermal overload units initially provided under this contract as required to provide the closest possible, trouble-free, thermal overload protection consistent with the motor, control, and driven equipment manufacturer's recommendations and sound application practice including but not limited to consideration of motor service factor, special motor characteristics, and ambient temperature conditions at the motor and controller locations.
3. Manual reset shall be utilized for all overload relays installed integrally with motor controllers and shall have external reset pushbuttons.

D. Controller:

1. Magnetic motor starters shall be utilized at all locations unless otherwise noted. Controllers shall be AC full voltage non-reversing type unless otherwise noted or required, NEMA Size 1 or larger.

- E. Combination starter units shall utilize Motor Circuit Protectors (MCPs), of the same manufacturer as the motor control. Each MCP shall be rated 35,000 AIC (minimum) symmetrical at 600 volts and be three poles. The MCP shall provide adjustable magnetic protection and be provided with pin inserts to stop magnetic adjustment at 1300% motor nameplate full load current to comply with NEC requirements. All MCPs shall have a "TRIPPED" position on the unit disconnect and a push-to-test button on the MCP. MCPs shall include a transient override feature for motor inrush current. MCPs shall be operated by a single toggle type handle and shall have a quick-make, quick-break, over-center switching mechanism, which is mechanically trip free, from the handle so that the circuit breaker cannot be held closed against abnormal currents. All poles of the MCP shall trip simultaneously.

F. Pilot:

1. Operate 120-volts unless otherwise noted.
2. Push button, selector switches, and pilot lights shall be as follows unless otherwise indicated:
  - i. Push-buttons: Oil-tight, heavy-duty type.
  - ii. Pilot Lights: Provide oil-tight, heavy-duty, 125-volt full voltage push-to-test type with LED lamp and lens colors as shown.
3. Elapsed time meter:

- i. Provide a running time meter where indicated. Utilize a non-resettable unit with four registers to indicate up to 9,999 hours.
  - ii. Elapsed time meters requiring batteries for any reason, including display readout, are not acceptable.
4. Control relays and contacts: Provide control relays as specified and as required to accomplish the control functions indicated. Relays shall be industrial control relays conforming to NEMA Standard ICS, Part ICS 2-12. Contacts shall have current and voltage rating as required by the application, but not less than required in NEMA Standard ICS for Class B1. Contact arrangement shall be Subclass B.
- G. Timer: Provide where indicated, a manually set, adjustable to a selected time range by a set-pointer, 8-pin octal base mounted unit with instant monitoring of operational status by LED indicators. Timer shall operate at 120 volts and have one SPDT plus instantaneous SPDT, 5 AMP contacts. Timer shall be IDEC GE1A Series or approved.

### 2.03 Motor Control Centers (MCC)

- A. Provide circuit breakers, motor starters, fused switches, and control components as indicated on the one-line diagrams, schedules, and control schematics. Units shall be free-standing, with nominal dimensions of 90 inches high, 15 or 20 inches deep, as required, and individual sections 20 inches wide, unless otherwise shown or required. The enclosure shall be NEMA 3R with space heaters, as required, and individual units front-mounted. Sections shall be bolted together to form a rigid assembly. Minimum requirements for construction shall be the latest published NEMA standards. Wiring shall be NEMA Class I, Type B. All devices shall have an interrupting capacity of 42,000 amperes RMS symmetrical minimum, at 480 Volts:
- B. Main lug compartments: A front accessible, main lug compartment shall be provided complete with suitable main lugs to accommodate incoming cables. The compartment shall be located conveniently near the point where cables enter the cabinet. The compartment shall be covered by a hinged door for convenient access and be equipped with an engraved laminated plastic nameplate for identification purposes. The door shall be held closed with captive-type screws to discourage unauthorized opening. Provide three-phase and ground lug terminations.
- C. Horizontal wireways: Adequate conduit entrance space and wire entry room shall be provided at both the top and bottom of each section. Covers over these wireways shall be equipped with captive-type screws to prevent loss of hardware during installation. These wireways shall be isolated from the bus bars.
- D. Vertical wireways: A vertical wire trough located on the right-hand side of each standard section and having a cross sectional area of not less than 19 square inches shall extend from the top horizontal wire trough to the bottom horizontal wire trough for the purpose of routing user's motor and control wires to the control units. This wire trough shall be isolated from the bus bars to guard against accidental contact. A separately hinged door, having captive-type screws, shall cover the vertical wire trough for safe and easy access to wiring without disturbing control units. Wire ties shall be furnished in the vertical wire trough to group and securely hold wires in place

for a neat, orderly installation.

- E. Bus bars: Main horizontal bus bars rated as noted on the one-line diagram shall be provided near the top of the control center and extended its entire length, except when cut and supplied with splice bars to divide the control center for ease in handling. Bussing shall be braced for 42,000 amperes. Provide a properly sized equipment grounding bus secured to each vertical structure and extend the total length of the motor control center assembly:
  - 1. Vertical bus bars shall be rated not less than 300 amperes.
  - 2. Horizontal and vertical bus bars shall be electrolytically tin-plated. Connections between horizontal and vertical busses shall be jointed by bolts, conical spring washers for constant pressure joints, and self clinching nuts to allow joint maintenance using one wrench from the front only.
  - 3. High-strength glass, reinforced alkyd insulators shall be used as bus supports and as unit plug-on insulators. Bus insulators shall have generous surface clearances in the vertical plane to shed dust and maintain dielectric integrity. Bus and plug-on insulators shall be red to indicate the proximity of energized bus parts.
  
- F. Bus barriers: Insulated horizontal and vertical bus barriers shall be furnished to reduce the hazard of accidental contact. These barriers shall have a red color to indicate proximity to energized busses. Vertical bus barriers shall have interlocking front and back pieces to give added protection on all sides and shall segregate the phases from each other to reduce the chance of accidental "flash over". Small, separate openings in the vertical bus barriers shall permit unit plug-on contacts to pass through and engage the vertical bus bars. Bottom bus covers shall be provided below the vertical bus to protect the ends of this bus from contact with fish tapes or other items entering the bottom of the enclosure. Unused plug-on openings shall have plastic snap-in closing plates for added safety.
  
- G. Unit plug-on: For convenient unit connection to energized bus bars, unit plug-on contacts shall be provided on full voltage starters and branch circuit breaker units 255 ampere frame and smaller. The plug-on connection shall be a high quality, 2-point connection for each phase designed to tighten during heavy current surge. The plug-on fingers shall be silver-plated to yield a low resistance connection. Contact fingers become floating and self-aligning to allow solid seating onto the vertical bus bars.
  
- H. Unit doors: Each unit shall have a door securely mounted with rugged hinges, which allow the door to swing open a minimum of 112 degrees for ease of maintenance. Unit doors shall be fastened to the stationary structure so they can be closed to cover the unit space when the units have been temporarily removed. Unit doors shall be held closed with captive-type knurled thumb screws which engage self-aligning cage nuts. These screws shall provide at least two threads for engagement to help hold unit doors closed under fault conditions. Removable door panels held with captive-type screws shall be provided on starter unit doors for mounting pushbuttons, selector switches, or pilot lights. Blank door panels capable of accepting future push-button devices, shall be furnished when push-button devices are not originally specified for starter units. Starter units shall have an external, low profile overload reset button.

- I. Unit support pan: Each plug-on unit shall be supported and guided by a “tilt and lift-out” removable pan so that unit rearrangement is easily accomplished. For each unit installation and rearrangement, transfer of this unit support pan from one location to another shall be accomplished without the use of tools after the unit and door have been removed.
- J. Unit saddles: Each plug-on unit shall have a sheet steel saddle designed to physically isolate the unit from the bus compartment and adjacent units. Saddles shall be equipped with captive, self-aligning mounting screws, which hold the unit securely in place during shipment and maintain the unit and structure at the same potential. Hand holds shall be provided on each plug-on unit to facilitate unit removal. For added safety during installation and maintenance, the saddle shall be equipped with a provision to permit it to be padlocked in the section in a position such that contact fingers are disengaged from the bus bars.
- K. Disconnect operators: A rugged, flange-mounted operator handle shall be supplied for each switch or breaker. The operator handle shall have a conventional up/down motion with the down position as OFF. For added safety, it shall be possible to lock this handle in the OFF position with shackle padlocks:
  - 1. The operator handle shall be interlocked with the unit door so that the disconnect cannot be switched to the ON position unless the unit door is closed. It shall be possible to defeat this interlock by a deliberate act of an electrician should he desire to observe the operation of the operator handle assembly. This interlock shall also prevent opening the unit door unless the disconnect is in the OFF position. A defeater for this action shall also be provided in the event an electrician must gain access to the unit without interrupting the service.
- L. Where shown, magnetic starters shall be furnished. Thermal-overload relays on starter shall be electronic type. Three overload relays shall be furnished on each starter as specified.
- M. Where shown, provide solid-state Reduced Voltage (“soft”) Starters, as specified.
- N. Where shown, provide Variable Frequency Drive (VFD) motor controllers. as specified.
- O. Circuit breakers: Molded case circuit breakers shall be furnished for combination starters and branch circuit-breaker units in accordance with the motor control center diagrams. All circuit breakers shall be current limiting, high interrupting capacity type. Circuit breakers applied to polyphase motor circuits, where the breaker is installed in a separate enclosure from the motor starter, shall be the same as specified for “Panelboards”. Where the breaker is installed in the same enclosure as the motor starter and associated overload protection devices, provide breakers with “magnetic only” trip. The magnetic trip unit shall be adjustable, and the breaker shall have a continuous rating suitable for the load served. “Magnetic only” circuit breakers shall not be separately mounted:
  - 1. Continuous ratings and trip settings, where indicated on the drawings, are based on estimated motor requirements with typical starting currents. The continuous ratings indicated are the minimum permissible. Trip settings indicated are for



estimating purposes only and shall be changed by the Contractor to suit the manufacturer's recommendations before initial equipment start-up. Coordinate the indicated ratings and settings to conform to the requirements of the actual motors served under this contract and conform with equipment, motor, and control manufacturer's recommendations. The final installation shall provide the closest possible protection without unnecessary tripping. After final setting, mark the established setting position with red paint.

- P. Identification: A control center identification nameplate describing section catalog numbers and characteristics shall be fastened on the vertical wire-trough door of every section. Each control center unit shall have its own identification nameplate, giving unit catalog number fastened to the unit's saddle near the upper left-hand corner. These nameplates shall also have suitable references to factory records for efficient communication with suppliers. Each control center unit shall also have an engraved, laminated plastic nameplate fastened to the outside of the unit door.
- Q. Wiring: The control center shall be wired in accordance with NEMA class and type previously specified:
1. Quick-separating, pull-apart terminals shall be mounted on lift-out brackets in the units.
- R. Control components shall be provided and installed in motor control centers as shown on the drawings:
1. Push-buttons and selector switches shall be heavy-duty, oiltight. Contact ratings shall be as specified by NEMA A600.
  2. Pilot lights shall be heavy-duty, oiltight, transformer style with color caps as shown on the drawings. R = Red, G= Green, A = Amber, W = White, B = Blue. The pilot lights shall be of the push to test type.
  3. Control relays shall be of the heavy-duty solenoid type, calibrated contact ratings as specified by NEMA A600.
  4. Time delay relays shall be of the pneumatic or solid state type with time calibrated adjustment knobs. Physical arrangement shall be similar to that of control relays.
- S. Finish: All painted parts shall undergo a phosphatizing pre-painting treatment for rust resistance and good paint bond. All painting shall be with enamel which shall be baked for a durable, hard finish. Removable push button plates, flange-mounted operator handles and trim plates, and top horizontal wire-trough cover plates shall be painted a contrasting color:
1. Color to be manufacturers' standard, unless otherwise indicated.
- T. Motor control centers shall be manufactured by General Electric, Cutler-Hammer/Westinghouse, Allen-Bradley, Furnas Electric, Square D. Co., or approved.

## 2.04 Solid State Soft Starter

- A. Combination starter unit shall be solid-state, reduced voltage with built-in bypass and overload protection. Design is based around Allen-Bradley SMC Flex. If another manufacturer/model is provided, any modifications required to provide the same functionality shown shall be the responsibility of the Contractor and shall be provided at no additional cost to the owner.
- B. Acceptable manufacturers:
  - 1. Allen-Bradley SMC Flex series
  - 2. Cutler-Hammer IT series, S801+/S811+
  - 3. ABB PSTX series
  - 4. Similar units by other manufacturers may be considered for use on this project based on comparison to the listed products. Approval of substitutions is solely at the discretion of the Engineer.
- C. Rating: The solid-state soft starter unit shall be rated for “Heavy duty” and sized as recommended by the manufacturer, but in no instance shall the maximum input current rating of the unit be less than as shown, unless specifically allowed by the Engineer. Maximum continuous operation shall be at 115% of the continuous ampere rating.
- D. Starter shall be provided with built-in bypass contactors, which will automatically close once the motor is “up-to-speed”. Upon receipt of a “stop command”, the contacts will open and shut-down of the motor will be controlled based on parameters set in the starter. Starter shall use a “pump control” or “torque control” stopping option to limit water hammer.
- E. Unit shall have the following types of starting options, as a minimum:
  - 1. Voltage Ramp
  - 2. Kick-Start
  - 3. Current Limit
  - 4. All starting options shall have a programmable starting ramp time that is adjustable from 0-to-30 seconds, minimum. Initial setting of ramp time shall be 10-seconds, but shall be adjusted in the field as may be required.
- F. Control Wiring and Connections: All control wiring shall be minimum 14 gauge Machine Tool Wire (MTW) or approved equal and labeled.
- G. Motor Lead Connections: All terminal blocks shall be rated at 600 volts.
- H. Control Power: For soft starters that utilize 24VDC control power, a 3 phase, 240V-to-24VDC power supply shall be firmly mounted within the unit. Power supply shall

have overcurrent protection on both the 240V line side and the 24VDC load side.

- I. Arrangement of Devices: Devices shall be mounted to permit normal maintenance and replacement of components without interference. No device shall be mounted in front of, block the visibility of, or block the access to any other device unless it can be quickly and easily swung out of the way for servicing inaccessible devices.
- J. Circuit Breaker Molded Case: Combination starter units shall utilize Motor Circuit Protectors, of the same manufacturer as the motor control. Each Motor Circuit breaker shall be rated 35,000 AIC (minimum) symmetrical at 600 volts and be three pole. The Motor Circuit breaker shall provide adjustable magnetic protection and be provided with pin inserts to stop magnetic adjustment at 1300% motor nameplate full load current to comply with NEC requirements. All Motor Circuit breakers shall have a "TRIPPED" position on the unit disconnect and a push to test button on the Motor Circuit breaker. Motor Circuit breakers shall include a transient override feature for motor inrush current. Breakers shall be operated by a single toggle type handle and shall have a quick make, quick break, over center switching mechanism, which is mechanically trip free, from the handle so that the circuit breaker cannot be held closed against abnormal currents. All poles of the breaker shall trip simultaneously.
- K. Starter Thermal Overload Relays: An electronic overload relay shall be built-in to the soft starter. It shall be possible to reset an overload trip alarm without opening the compartment door.
- L. Wiring: Wiring between devices and terminal boards shall be neatly trimmed (perpendicular transitions) and supported. Power wiring and terminal boards in combination starters shall be sized in accordance with NEMA ICS2. Control wiring shall not be smaller than 14 AWG. Hinge wiring, where used, shall be extra flexible, 90 C, flame retardant, switchboard wire. No more than one wire shall be terminated under a compression terminal unless the terminal is rated for multiple wires by the terminal manufacturer. Both ends of all wires shall be identified as indicated on vendor drawings. Wiring shall conform to NEMA Class II, Type B. Each termination point of the block shall be marked with the wire number for ease of identification when more than one wire is disconnected. Only sleeve type markings will be used on all wiring at terminals and connections.

#### 2.05 Pump Moisture/Temperature Relay

- A. Where shown or required, install a relay designed to detect a leak in a submersible pump's outer casing and/or winding thermal protection. Install relay(s) with motor controller. Where a Motor Control Center (MCC) is used, install relay in MCC in same bucket as motor controller, unless otherwise shown.
  - 1. Design is based around Flygt pumps utilizing the Mini-CAS 120 relay. If another pump manufacturer is used, Contractor shall be responsible for making any and all modifications required to accommodate requirements of pump manufacturer.
- B. Each submersible pump shall be protected by a solid-state relay to monitor motor winding temperature and seal leakage. The relays shall be wired to prevent motor operation when an overtemperature alarm condition is present. The relay shall have an 8 pin octal base and shall be flanged for mounting on the inner door. The relay

shall be power by 24VAC, 28VDC, or 120VAC supply. LED indicators shall be provided on the relay for power on, over temp, and seal fail conditions. An over temp reset pushbutton shall be mounted on the relay. The sensor input circuitry shall contain both hardware and software filters to provide noise immunity, as well as sensor input short circuit protection.

## 2.06 Customer Metering

- A. Provide Motor Control Center (MCC) mounted, customer metering devices as shown on the drawings in conformance with the following specification. Metering devices shall measure and display voltage (both Phase-to-Neutral and Phase-to-Phase, selectable) and current (Phase and Neutral)
- B. The meter(s) shall be NRTL (such as UL) listed and CE marked.
- C. The meter(s) shall accept input from standard instrument transformers (5 A secondary current transformers and 120 volt secondary potential transformers). The meter(s) shall accept a voltage monitoring range of up to 600 volts, phase to phase.
  - 1. The current meter shall withstand 200% rated current continuously. It shall withstand 10X rated current for at least 3 seconds.
  - 2. The meter(s) shall be capable of connection to a three phase, four wire wye system or a three phase, three wire, open delta system.
  - 3. Surge withstand shall conform to IEEE C37.90.1
  - 4. The meter(s) shall be user programmable to any PT (voltage) or CT (current) ratio. DIP switches or other fixed ratio designs shall not be acceptable.
  - 5. Voltage and current connections shall be segregated from each other on the back of the meter(s) to provide safe connections.
- D. The meter(s) shall have an accuracy of +/- 0.25% or better.
  - 1. The meter(s) shall measure True RMS values for all values.
  - 2. The meter(s) must be capable of providing readings for both instantaneous and average readings.
  - 3. The meter(s) shall monitor max/min average values for all voltage readings and max/min demand values for all current readings.
- E. The meter(s) shall include a three line, integrated, light-emitting diode (LED) display.
  - 1. The measured values must be displayed on LED's that are at least 0.56" high on each of the 3 separate lines.
  - 2. Each phase of Volts or Amps shall be displayed on a separate line simultaneously.

3. The display must provide user access to max/min values for all displayed quantities.
  4. The user must have the capability to toggle between the phase-neutral voltage and phase-phase voltage (for voltage) and toggle the neutral current (for current).
- F. The meter(s) shall include output options for analog milliamp signals.
1. The meter(s) shall have up to 4 channels of analog output, 4-20mA.
  2. The analog outputs must map to any of the instantaneous readings.
  3. The analog output connections shall be separated from the voltage and current connections.
- G. The meter(s) shall have two form C, dry contact relay outputs for alarm or control.
1. The current meter must be capable of tripping its dry contact outputs for over/under current, phases A, B, C and Neutral.
  2. The voltage meter must be capable of tripping its dry contact outputs for over/under voltage, both on phase-to-phase and phase-to-neutral for all phases, for voltage imbalance, and for overage on %THD/K-factor.
- H. The meter(s) shall have the capability of utilizing either an RS232 or RS485 port for digital communications using an open ASCII-based protocol.
1. The Monitor shall have the capability of having up to 9999 separate addresses for multi-point communication.
  2. The digital port connections shall be separated from the voltage and current connections.
- I. The meter(s) case shall be fully enclosed and shielded.
1. The meter(s) shall fit a standard 4 1/2" switchboard instrument size mounting per ANSI C39.1. Any other mounting configuration shall be unacceptable.
  2. The meter(s) shall have a separable input module which can be remote mounted up to 3 feet from the display mounting.
  3. The meter(s) shall be rated for use at temperature from  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .
- J. The meter(s) shall support control power options for 120 VAC, 230 VAC, 125 volts AC/DC, or 24-48 VDC.
- K. The meter(s) shall be capable of gathering and reporting harmonic data.

1. The meter(s) shall calculate the harmonic signature, %THD and K-Factor for all voltage and current inputs with valid data for harmonic spectrum capability to the 31st harmonic
- L. The meter(s) shall have a standard 4-year warranty.
- M. Acceptable manufacturers:
1. Electro Industries/GaugeTech, Model 3DVA120 (voltage) and Model 3DAA5 (current).
  2. Similar units by other manufacturers may be considered for use on this project based on comparison to the listed products. Approval of substitutions is solely at the discretion of the ENGINEER.

#### 2.07 Surge Protection Device (SPD)

- A. The Surge Protection Device (SPD) shall be Listed in accordance with UL 1449 Third Edition to include Section 37.3 highest fault current category. SPD shall be UL 1283 listed.
- B. SPD shall be installed integral to the MCC's at the equipment manufacturer's factory.
- C. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G and shall be suitable for service on high resistance-grounded power distribution systems when the power system is maintained in an overdamped state.
- D. SPD shall be modular in design. Each mode including N-G shall be fused with a 200 kAIR UL recognized surge rated fuse and incorporate a thermal cutout device.
- E. Audible diagnostic monitoring shall be by way of audible alarm. This alarm shall activate upon a fault condition. An alarm on/off switch shall be provided to silence the alarm. An alarm push to test switch shall be provided. SPD shall be provided with one set of NO/NC dry contacts.
- F. SPD shall meet or exceed the following criteria: Minimum surge current capability (single pulse rated) per phase shall be 160kA per phase.
- G. UL 1449 Suppression Voltage Ratings at 480Y/277Volt shall be 600V L-G, L-N, and N-G.

### **PART 3 EXECUTION**

#### 3.01 General

- A. Install equipment and materials in a neat and workmanlike manner and align, level, and adjust for satisfactory operation. Install equipment so that all parts are easily accessible for inspection, operation, maintenance, and repair.

### 3.02 Wiring

- A. Arrange wiring in cabinets, panels, and similar enclosures, cut to proper length, and remove surplus wire. Apply stake-on or similar terminals to control wiring for connection to terminals, and bridle and secure in an approved manner. List all circuits emanating from power, distribution, and lighting panelboards by function on the directory card. Identify all circuits entering motor control centers or other control cabinets by directory card listing terminal block number and function or by means of tags securely fastened to the conductors.

### 3.03 Equipment Bases

- A. Provide equipment bases for all floor-mounted electrical equipment. Unless otherwise indicated, bases shall be poured-in-place concrete, nominally 3.5-inches high, and be one inch larger on all exposed edges than the equipment to be mounted. Provide concrete pads and mounting provisions for all exterior equipment as indicated on the drawings or specified in other portions of the specifications.

### 3.04 Supports

- A. Provide hangers or other devices such as pads, channels, struts, joists, anchors, etc., necessary for the support of electrical equipment. Provide the design, fabrication, and erection of supplementary structural framing required for attachment of hangers or other devices supporting electrical equipment.

### 3.05 Installation

- A. After the equipment is installed, touch up any scratches, marks, etc., incurred during shipment or installation of equipment. If required by the Engineer because of undue amount of scratches, repaint the entire assembly.

### 3.06 Field Tests/Functional Test

- A. Prior to station start-up, all equipment shall be inspected for proper alignment, proper connection, and satisfactory performance.

### 3.07 Final Test

- A. Correct promptly any failure or defects revealed by these tests as determined by the Engineer. Re-conduct tests on those corrected items as directed by the Engineer.

**END OF SECTION**

## SECTION 26 32 13 STANDBY POWER SYSTEM

### PART 1 GENERAL

#### 1.01 Description of Work

- A. The work consists of furnishing electric generating set with features and accessories as specified herein and shown on the drawings. Standby Power System shall consist of a diesel engine-driven alternator rated 480/277-volt, 3-phase, 60 Hz; digital (micro-processor based) electronic generator set control system; "regional" type dual-walled, sub-based fuel tank, with fuel transfer pump (if required); and all necessary appurtenances and/or accessories required for fully functional system. Minimum rating of the generating set will be as shown.
- B. Automatic Transfer Switch (ATS), as described hereinafter.

#### 1.02 General Requirements

- A. Materials and workmanship:
  - 1. Materials and parts comprising the standby power system specified herein shall be new, unused, of current manufacture and of the highest grade, free from all defects.
  - 2. Workmanship shall be the highest grade, in accordance with modern practice.
- B. Parts and service: Bidders shall specify nearest location of permanent parts depots from which replacement parts may be obtained in necessary quantities at any time, day or night. Service facilities and personnel shall be equally available and shall be within a 50-mile radius of the project site.

#### 1.03 Generator Set Performance

- A. Steady-State Voltage Operational Bandwidth: 0.25% of rated output voltage from no load to full load.
- B. Steady-State Voltage Modulation Frequency: Less than one Hz.
- C. Transient Voltage Performance: Not more than 15 percent variation for 50 percent step-load increase; not more than 10 percent variation for 50 percent step-load decrease. Voltage recovers to remain within the steady-state operating band within 2 seconds.
- D. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
- E. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there are no random speed variations outside the steady-state operational band and no hunting or surging of speed.



- F. Transient Frequency Performance: Less than 4-Hz variation for a 50 percent step-load increase or decrease. Frequency recovers to remain within the steady-state operating band within 2.5 seconds.
- G. Output Waveform: At no load, harmonic content measured line-to-line or line-to-neutral does not exceed 5 percent total and 3 percent for single harmonics. The telephone influence factor, determined according to NEMA MG 1, does not exceed 50.
- H. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at the system output terminals, the system will supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to any generator system component.
- I. Temperature Rise of Generator: Within limits permitted by NEMA MG 1 when operating continuously at full-rated load, including 2 hours per 24 hours at 110 percent of rated capacity.
- J. Starting Time: Maximum total time period for a cold start, with ambient temperature at the low end of the specified range, is 7 seconds. Time period includes output voltage and frequency settlement within specified steady-state bands.

#### 1.04 Submittals

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL REQUIREMENTS.
- B. Product Data: For each component. Include data on features, components, ratings, and performance. Include dimensioned outline plan and elevation drawings of engine generator set and other system components.
- C. Shop Drawings: Show details of fabrication, piping, wiring, and installation of field-installed portions of system, including remote fueling station. Include general arrangement drawings showing locations of auxiliary components in relation to engine generator set and duct, piping, and wiring connections between generator set and auxiliary equipment. Show connections, mounting, and support provisions and access and workspace requirements.
  - 1. Wiring Diagrams: Show details of power and control connections and differentiating between factory-installed and field-installed wiring.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article.
- E. Field Test and Observation Reports: Indicate and interpret test results for compliance with performance requirements.
- F. Certified Test Reports of Components and Accessories: For devices that are equivalent, but not identical, to those tested on prototype unit.
- G. Certified Summary of Performance Tests: Demonstrate compliance with specified requirement to meet critical performance criteria.

- H. Factory Test Reports: For units to be shipped for this Project showing evidence of compliance with specified requirements.
- I. Exhaust Emissions Test Report: To show compliance with applicable, current regulations.
- J. Sound measurement test report.
- K. Certification of Torsional Vibration Compatibility: Comply with NFPA 110.
- L. Certificate of Compliance for Seismic Design of Nonstructural Components and Systems for generator set and automatic transfer switch
- M. Field test report of tests specified in Part 3.
- N. Maintenance data for system and components to include in the maintenance manuals specified in Division 1. Include the following:
  - 1. List of tools and replacement items recommended to be stored at the site for ready access. Include part and drawing numbers, current unit prices, and source of supply.
  - 2. Detail operating instructions for both normal and abnormal conditions.

#### 1.05 PROJECT CONDITIONS

- A. Environmental Conditions: Standby power system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
- B. Ambient Temperature: -15.0 deg C (5.0 deg F) to 40.0 deg C (104.0 deg F).
- C. Relative Humidity: 0 to 95 percent.
- D. Altitude: Sea level to 3,000 feet (909 m).
- E. Unusual Service Conditions: Standby power system and installation is required to operate in the following conditions:
  - 1. Applicable seismic requirements as defined in the International Building Code (IBC) for the location of installation.

#### 1.06 Quality Assurance

- A. Manufacturer Qualifications: Engage a firm experienced in manufacturing equipment of types and capacities similar to those indicated for this Project and with a service center maintained by engine generator set manufacturer capable of providing training, parts, and emergency maintenance and repairs at the Project site with 24 hours maximum response time.
- B. Source Limitations: Obtain engine generator set and auxiliary components from a

single manufacturer with responsibility for entire system, including the automatic transfer switch.

1. Automatic transfer switch shall be provided by same supplier as generator set. Automatic transfer switch may be of different manufacturer than generator set; however, the responsibility for performance of this Specification in its entirety shall be assumed solely by the supplier of the standby system.
- C. Listing and Labeling: Provide system components of types and ratings for which listing or labeling service is established and components specified in this Section that are listed and labeled.
1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- D. Comply with NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines.
- E. Comply with NFPA 70.
- F. Comply with NFPA 110.
- G. Comply with NFPA 704, Hazard Identification signage.
- H. Comply with UL 2200.
- I. Engine Exhaust Emissions: Comply with applicable federal, state, and local government requirements.
- 1.07 Delivery, Storage, and Handling
- A. Deliver engine generator set and system components to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards.
- 1.08 Warranty
- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. The following warranty requirements shall be applicable to both the Automatic Transfer Switch (ATS) and the generator set package systems.
- B. Special Warranty: Submit a written warranty signed by Contractor and manufacturer, with single-source responsibility for engine generator and auxiliary components,

agreeing to repair or replace items that do not meet requirements or that deteriorate as defined in this Section within the specified warranty period.

- C. Warranty Period: 5 years (for engine-generator set) from date of Substantial Completion. Warranty shall cover 100% parts (except consumables, unless consumables were damaged by the failure) and labor.

#### 1.09 Maintenance Service

- A. Maintenance: Beginning at Substantial Completion, provide 12 months full maintenance by skilled employees of the manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies as used in the manufacture and installation of original equipment.

## **PART 2 PRODUCTS**

#### 2.01 Manufacturers

A. Manufacturers:

1. Peterson Power/Caterpillar (Preferred)
2. Cummins/Onan
3. Power Systems West/Kohler
4. Similar units by other manufacturers may be considered for use on this project based on comparison to these lines. Approval of substitutions is solely at the discretion of the Engineer.

#### 2.02 Diesel Engine-Generator Set

A. Rating: The generator rating is summarized below:

1. Standby rating (kW) as shown on the drawings, 480/277 V, 60 Hz, three-phase, 4 wire, 0.8 Power Factor

B. Generator Set Performance: As specified in 1.3.

1. The diesel engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
2. The generator set shall be capable of sustaining a minimum of 90% of rated kVA load at no more than 35% voltage dip applied to the generator set.

C. AC Generator, Regulator and Exciter Units.

1. The AC Generator shall comply with NEMA MG 1 and specified performance requirements. The generator shall be synchronous, four pole, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc(s). Exciter shall rotate integrally with generator rotor. All insulation system components shall meet NEMA MG1 standard temperature limits for Class H insulation systems. Actual temperature rise measured by resistance method at full load shall not exceed 105°C. The generator shall have 2/3 pitch stator winding. The subtransient reactance 15 percent maximum.
2. A permanent magnet generator (PMG) shall provide excitation power to the automatic voltage regulator for immunity from voltage distortion caused by non-linear SCR controlled loads on the generator. The PMG shall sustain main field excitation power for optimum motor starting and to sustain short circuit current for selective operation and coordination of system overcurrent devices. The automatic voltage regulator shall be temperature compensated, solid-state design.
3. The voltage regulator shall be equipped with three-phase RMS sensing. The regulator shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The regulator shall include an under frequency rolloff torque-matching characteristic, which shall reduce output voltage in proportion to frequency below a threshold of 58 hertz. The torque-matching characteristic shall include differential rate of frequency change compensation to the maximum available engine torque and provide optimal transient load response. Regulators that use fixed volts per hertz characteristic are not acceptable. The voltage regulator shall have adjustable rheostat on control and monitoring panel to provide plus or minus 5 percent adjustment of output voltage operating band.
4. The generator shall be broad range, 12 lead reconnectable. Instrument transformers shall be mounted within generator enclosure. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage within the broad range.

#### D. Engine-Generator Set Controls

1. The controls shall be digital (microprocessor based) electronic, fully NFPA 110 compliant, and shall have automatic remote start capability from a panel-mounted 3-position (Stop, Run, Remote) switch.
2. Provide cycle cranking of 15 SEC (ON)/15 SEC (OFF) for three attempts (75 SEC). If engine fails to start, lockout the engine, and indicate overcrank on alarm status panel.
3. The control shall shut down and lock out upon:

- i. Failing to start (overcrank)
  - ii. Overspeed
  - iii. Low lubricating oil pressure
  - iv. High engine temperature
  - v. Operation of a remote manual stop station.
4. The NEMA 1 enclosed control panel shall be mounted on the generator set with vibration isolators. A front control panel illumination lamp with ON/OFF switch shall be provided. Control panel shall provide a multi-line LCD display capable of displaying the following:

- i. Engine Oil Pressure
  - ii. Coolant Temperature
  - iii. DC Voltage
  - iv. Total Run Time (hours)
  - v. Output AC Voltage, for each phase, simultaneously
  - vi. Output AC Amperage, for each phase, simultaneously
  - vii. Output Frequency
  - viii. Alarms and Warnings - as a minimum, the following alarms and warning shall be displayed upon activation:
    - (i) Overcrank shutdown
    - (ii) Overspeed shutdown
    - (iii) Low oil pressure shutdown
    - (iv) High engine temperature shutdown
    - (v) High engine temperature pre-alarm
    - (vi) Low engine oil pressure pre-alarm
    - (vii) Low coolant temperature
    - (viii) Low coolant level
    - (ix) Low fuel
    - (x) Not in automatic start
5. Provide “dry” contacts for the following conditions, as a minimum. Contacts shall be rated 10 Amps at 120 VAC:

- i. Generator in “Auto”
- ii. Generator fail (common failure alarm)
- iii. Low fuel
- iv. Generator running
- v. Tank Rupture (Leak)
- vi. Fuel Tank 90% Full (for remote fueling station)
- vii. Fuel Tank 95% Full (for remote fueling station)
- viii. Fuel Tank High Level (this is in addition to, and different from, the 95% full level. High level shall be higher than 95% full level)

6. Provide either (Contractor’s Option):

- i. A remote annunciator, to be installed at the remote fueling station; remote annunciator shall communicate with the generator control panel via a communications cable. Or,
- ii. Dry contacts for the alarms shown.
- iii. Minimum alarms (from “a” or “b”, above) at remote fueling station shall be:
  - (i) Leak
  - (ii) Fuel Tank High Level

E. Engine: The engines shall be 4 cycle, 1800 RPM, diesel.

- 1. Governing: The unit shall have an engine speed electronic governor to provide isochronous generator set frequency control. The governor shall be capable of parallel operation with the addition of load sharing controls.
- 2. Cooling Systems: The engines shall be cooled by a skid-mounted closed loop horizontal radiator systems, including centrifugal fan, coolant pump and thermostat temperature control. The cooling system shall be rated for full rated load operation in 122°F (50°C) ambient conditions. The size of radiator shall be adequate to contain expansion of total system coolant from cold start to 110 percent load condition. The cooling system, including cooling air flow paths, shall be designed to minimize noise. The cooling capability of the generator set shall be demonstrated by prototype tests on a representative generator set model. The provided engine thermostat shall regulate engine water temperature as recommended by the manufacturer. Provide a high-coolant temperature device to



shut down the engine through the engine control panel when the engine temperature exceeds 200°F. The engine cooling system shall be filled with an extended life coolant to protect the system to a temperature of 0°F.

3. Engine Fuel System: Comply with NFPA 30. Fuel: Diesel fuel oil grade DF-2.
4. Lubrication System: Pressurized by a positive-displacement pump driven from engine crankshaft.
5. Accessories: To include:
  - i. An electric starter capable of three complete cranking cycles
  - ii. Block heater(s), size as recommended by manufacturer. Block heater(s) shall be 120V or 240V, 1-phase for units 1500W and smaller. Units larger than 1500 Watts to be powered by 240V, 1-phase.
  - iii. Battery charger with “high charge” option
  - iv. Positive displacement, mechanical, full pressure, lubrication oil pump.
  - v. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.
  - vi. Fuel filter with replaceable spin-on canister element.
  - vii. Replaceable dry element air cleaner with restriction indicator.
  - viii. Flexible supply and return fuel lines.
  - ix. Engine mounted battery charging alternator, 45 ampere minimum, and solid-state voltage regulator.
  - x. Starting batteries with 1400-ccA, 200-AH operation and 425 minutes of reserve capacity.
6. Engine Exhaust System:

- i. Primary and secondary exhaust silencers (muffler) shall be provided for the engine of size and type as shown on the plans. Silencers shall have high temp black paint finish for corrosion resistance.
- ii. Primary exhaust silencer shall have chambered construction and have a maximum length of 103 inches, and maximum outside diameter of 30.25 inches. Primary silencer shall have the following characteristics:

Octave Band	63	125	250	500	1k	2k	4k	8k
Insertion Loss	22	30	35	33	29	28	28	29

- iii. Secondary exhaust silencer be straight through absorptive design and have a maximum length of 54 inches and maximum outside diameter of 15.25 inches. Sound attenuation shall be “30 dBA typical on steam vents”.
- iv. Contractor shall mount silencers so the engine does not support its weight. All exhaust piping suspended from the roof shall have spring hanger vibration isolators with a nominal static deflection of one inch. Provide flexible exhaust connection as shown for connection between engine exhaust manifold(s) and exhaust line. Provide an exhaust condensation trap with manual drain valve to trap and drain off exhaust condensation and to prevent condensation from entering the engine. Contractor shall mount and install all exhaust components as shown on drawings and as required for code compliance. All components shall be properly sized to assure proper operation without excessive back pressure when installed as shown on drawings. Make provisions as required for pipe expansion and contraction. Contractor shall cover exhaust silencers (where mounted indoors) and all indoor exhaust piping with a proper insulating material in a manner not to interfere with flexible exhaust connection(s).

F. Bases: The engine-generator set will be mounted with vibration isolators on a heavy-duty steel base to maintain proper alignment between components. The engine-generator set shall incorporate a battery tray with battery hold down clamps within the base rails. The engine-generator sets will have Seismic isolator pads for mounting.

G. Main Circuit Breaker: Provide a generator mounted circuit breaker, molded case, 80% rated, 3 pole, NEMA 1/IP22, which will disconnect the generator from the supply circuit. Circuit breaker to be sized as shown. Breaker shall utilize a solid-state trip unit and shall have the electrical characteristics, rating, and modifications as shown. The breaker shall be UL/CSA Listed and connected to engine/generator safety shutdowns. Breaker shall be housed in an extension terminal box which is isolated from vibrations induced by the generator set and shall have a metal nameplate that contains a permanent record of the circuit breaker catalog number and maximum ratings. Mechanical type lugs, sized for the circuit breaker feeders shown on drawing, shall be supplied on the load side of breaker.

1. Circuit breaker trip system shall be a microprocessor-based true rms sensing designed with sensing accuracy through the thirteenth (13th) harmonic. Sensor ampere ratings shall be as indicated on the associated drawing. The solid-state trip circuit breaker shall include the following adjustments; each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments:
  - i. An ampere trip setting (long time pickup) that is adjustable from 0.5 times (minimum) to 1.0 times the plug ampere rating, in 0.1 increments.
  - ii. An adjustable long time pickup delay, with a minimum of 5 different delay settings.
  - iii. A short time pickup trip setting that is adjustable from 2 times (minimum) to 9 (minimum) the long time ampere trip setting.
  - iv. An adjustable short time delay ramp function, with a minimum of 5 different delay settings.
  - v. An instantaneous pickup that is capable of being disabled (preferable) or is adjustable from 1.5 times (or less) to 15 times (or greater) the long time ampere trip setting. Units that are capable of disabling the instantaneous pickup shall be configured with the instantaneous pickup disabled.
2. Main Circuit Breaker shall have a quick-make, quick break, over-center toggle type, trip-free mechanism to prevent holding contacts closed against a position between "ON" and "OFF" when tripped automatically. Breaker shall be common trip such that an overload or short circuit on any one pole will result in all poles opening simultaneously.
3. The interrupting capacity of the Main Circuit Breaker shall be 14 kAIC at 480 volts, minimum.
4. Provide a "Circuit Breaker Tripped/Off" status contact. Contact shall be rated 10 Amps at 120 VAC.
- H. Provide a "regional" double-walled, sub-base fuel tank for the generator set, sized to allow for full load operation of the generator set for 24 hours (nominal). The sub-base fuel tank shall be UL142 listed and labeled. Installation shall be in compliance to NFPA37. The fuel tank shall be a double-walled, steel construction and include the following features:
  1. Emergency tank and basin vents.
  2. Mechanical level gauge.
  3. Fuel supply and return lines, connected to generator set with flexible fuel lines as

recommended by the engine manufacturer and in compliance to UL2200 and NFPA 37 requirements.

4. Leak detection provisions wired to the generator set control for local and remote alarm indication.
5. High and low level float switches to indicate fuel level. Wire switches to generator control for local and remote indication of fuel level
6. Basin drains.

### 2.03 Automatic Transfer Switch

- A. Provide a NEMA 12 enclosed, 3-pole, with solid neutral bus, “programmed (delayed) transition” style Automatic Transfer Switch (ATS). ATS contacts shall be rated as shown on drawing (minimum), 600 V, 3 phase, with features/accessories, enclosures, etc. as indicated on the drawings or noted herein. To maintain maintenance compatibility, automatic transfer switches shall be provided by engine-generator supplier.
  1. ATS shall be a contactor style unit. Units which use interlocked or “walking beam” circuit breakers are not acceptable.
- B. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
  1. Provide a Surge Protection Device (SPD) option installed on the ATS bus.
- C. The transfer switch equipment as specified herein shall be 100% equipment rated for continuous duty at the ratings indicated and shall conform to the applicable requirements for UL 1008 for emergency total system load. All transfer switch equipment supplied shall bear the UL (or other State of Oregon Nationally Recognized Testing Laboratory [NRTL]) label. Minimum withstand rating shall be 42 kAIC at 480 Volts.
- D. All main power contacts shall be rated for multiple fault interruptions per UL 489, and/or UL 1087. Main contacts shall have independent “break-before-make” transfer action which shall positively prevent dangerous “source-to-source” connections. Main contacts shall also have a mechanical interlock to prevent simultaneous closing of “normal” and “standby” contacts and interconnection of “normal” and “standby” sources through the control wiring.
- E. Automatic transfer switches specified herein shall consist of completely enclosed contact assemblies and a separately mounted control logic panel. Control power for all automatic transfer operations shall be derived from the line side of the source to which the load is being transferred.
- F. Upon loss of phase-to-phase voltage of the normal power source on any phase to 70%

of nominal, and after a time delay of 0-5 seconds (adjustable to meet conditions present) to override momentary dips and/or outages, starting of the emergency/standby power source shall be initiated.

- G. When the normal power source has been restored to 90% of rated voltage and after a time delay adjustable from 0-30 minutes (to ensure the integrity of the normal power source), the load shall be retransferred to the normal source.
- H. Upon disconnecting from either source, the transfer switch shall be capable of switching to a neutral position for a user specified time delay of 0-120 seconds, minimum, to allow spinning motors to come to coast to a full stop and VFD control voltage to completely discharge before connecting to the alternate source.
- I. A time delay, adjustable 0-10 minutes, shall delay shutdown of the emergency/standby power source after retransfer to allow the generator to run unloaded for cool-down, after which the generator shall be automatically shut down.
- J. If the emergency/standby power source should fail while carrying the load, transfer to the normal power source shall be made instantaneously upon restoration of the normal source to satisfactory conditions.
- K. The following features/accessories shall be provided:
  - 1. Auto/test switch to provide test operation of the automatic transfer switch by simulating a loss of the normal power source.
  - 2. LED Pilot lights or digital graphics indicating to which source the load is connected.
  - 3. LED Pilot lights or digital graphics to indicate that an integral overcurrent protective device has tripped.
  - 4. Plant exerciser timer providing automatic test operation of the emergency/standby power source at pre-selected intervals at least once per week, including a selector switch to select exercise with or without load or a bypass of the exercise period. The clock timer shall be provided with a digital readout and include a lithium battery backup to assure continuity of power to the clock timer for a minimum of 72 hours during an outage.
  - 5. Provide "dry", form C contacts for the following conditions, as a minimum. Contacts shall be rated 10 Amps at 120 VAC and 30VDC. Use of interposing relays to provide multiple contacts and/or ratings is permitted:

- i. ATS in “Normal” position
  - ii. ATS in “Generator” position
  - iii. “Normal” power source available
  - iv. ATS failure (common failure alarm)
- L. Installation of all transfer switch equipment specified herein shall be in accordance with all applicable codes, standards, and practices. Installation of all transfer switch equipment specified herein shall be in accordance with the recommendations of the manufacturer.

### **PART 3 EXECUTION**

#### **3.01 General**

- A. Install equipment and materials in a neat and workmanlike manner and align, level, and adjust for satisfactory operation. Install equipment so that all parts are easily accessible for inspection, operation, maintenance, and repair.
- B. Provide manufacturer’s representative services in accordance with Section 01 75 16.

#### **3.02 Supports**

- A. Provide hangers or other devices such as pads, anchors, etc., necessary for the support of the equipment.
- B. Provide anchorage according to manufacturer’s written instructions, unless otherwise indicated.

#### **3.03 Installation**

- A. Material and Equipment Installation: Follow manufacturer’s installation instructions explicitly, unless otherwise directed. Wherever any conflict arises between manufacturer’s instructions and these Contract Documents, follow Engineer’s direction, at no additional cost to the Owner. Keep copy of manufacturer’s instructions on the job site available for review at all times.
- B. The Contractor shall be responsible and shall provide for the supply, installation adjustment, and startup of complete, coordinated systems, which shall reliably perform the specified functions.
- C. Maintain minimum workspace around components according to manufacturer’s Shop Drawings and National Electrical Code.

#### **3.04 Field Quality Control**

- A. Manufacturer’s Field Service: Provide services of a factory-authorized service representative to supervise installation and connection of the generator-set unit and to

report results in writing.

- B. Supervised Adjusting and Pretesting: Under supervision of factory-authorized service representative, pretest all system functions, operations, and protective features. Provide all instruments and equipment required for tests. Adjust to ensure operation is according to Specifications. Load system using a variable resistive load bank simulating kW of loads for which unit is rated.

### 3.05 Testing and Startup

A. The following shall be provided:

1. The manufacturer shall provide a certified copy of a 4-hour full-load factory test of a prototype engine-generator unit of the same size as the one being provided with recordings of voltage, frequency, amperage, engine temperature, lube oil pressure, and load transfer results to the Engineer.
2. The actual generator unit shall be field tested with all standby loads picked up and operated for a minimum period of 4 hours. One electronic PDF copy of the test results shall be provided to the Engineer. This testing is to be accomplished only after control system startup and verification to ensure only the correct load is brought on line with the generator in operation.

### 3.06 Cleaning

- A. Upon completion of installation, inspect system components. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean components internally using methods and materials recommended by manufacturer.

### 3.07 Demonstration

- A. Training: Engage a factory-authorized service representative to demonstrate adjustment, operation, and maintenance of system and to train Owner's maintenance personnel as specified below.
  1. Conduct a minimum of 8 hours of training as specified in Section 01 75 16 TESTING, TRAINING, AND SYSTEM STARTUP.
  2. Schedule training with at least 7 days' advance notice.

### 3.08 Spare Parts

- A. Provide the following spare parts for each generator unit
  1. Three sets fuel oil filter elements and gaskets.
  2. Three lubricating oil filter elements and gaskets.

3. Three coolant filter elements and gaskets.
4. One set of silicon coolant hoses.
5. One air cleaner filter element.
6. Fuses: 1 for every 10 of each type and rating, but not less than 1 of each.

**END OF SECTION**



## SECTION 26 50 00 LIGHTING

### PART 1 GENERAL

#### 1.01 Scope

- A. The following supplements all sections of this specification and applies to all work specified, shown on the drawings, or required to provide a complete installation of approved electrical systems.
- B. This section covers the work necessary to furnish and install and complete the electrical lighting system.

#### 1.02 General

- A. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, and Section 26 05 00, GENERAL ELECTRICAL PROVISIONS, which contain information and requirements that apply to the work specified herein and are necessary for this project.

#### 1.03 Submittals After Award of Contract

- A. Submittals after award of Contract shall be made in accordance with Division 1, GENERAL REQUIREMENTS, and Section 26 05 00 GENERAL ELECTRICAL REQUIREMENTS.
- B. Provide submittals for:
  - 1. Luminaires: Include electrical ratings (input watts and voltage), dimensions, mounting, material, required clearances, terminations, wiring and connection diagrams, photometric data (lumen output, lamp/LED color temperature, CRI, etc.), diffusers, and louvers.
  - 2. Drivers.
  - 3. Lamps.
- C. Provide the following operating and maintenance instructions from the manufacturer for project closeout, see Operation and Maintenance Manuals in Division 1:
  - 1. Luminaires.
  - 2. Drivers.
  - 3. Lamps.

#### 1.04 Quality Assurance

- A. The Contractor shall test all lighting installations and demonstrate satisfactory

operation of switching controls upon completion of the installation. The Contractor shall replace all defective components (including LEDs and drivers) prior to occupancy by the Owner. All luminaires shall be cleaned, and visible labels removed.

B. Regulatory Requirements:

1. Provide luminaires acceptable to code authority for application and location as indicated.
2. Comply with applicable ANSI standards pertaining to materials, drivers, transformers, and luminaires.
3. Comply with applicable NEMA standards pertaining to lighting equipment.
4. Provide luminaires and lampholders which comply with UL standards and have been UL listed and labeled for location and use indicated.
5. Comply with NEC 410 as applicable to installation and construction of luminaires.
6. Comply with fallout and retention requirements of UBC 52 for diffusers, baffles, louvers, and the like.

1.05 Warranty

- A. Driver Manufacturer's Warranty: Not less than 2 years for LED drivers based on date of manufacturer embossed on driver, current with installation date. Warranty includes normal cost of labor for replacement of driver.
- B. LED Warranty: 36 months, minimum.

**PART 2 PRODUCTS**

2.01 Luminaires

- A. Luminaires installed under canopies, roof or open porches and similar damp or wet locations, UL labeled as suitable for damp or wet locations.
- B. Manufacturer's standard finish (unless otherwise indicated) over a corrosion resistant primer.

2.02 LED Luminaires

- A. General:
  1. LED luminaires shall be in accordance with IES, NFPA, UL, as shown on the drawings, and as specified.
  2. LED luminaires shall be Reduction of Hazardous Substances (RoHS)-compliant.

3. LED drivers shall include the following features unless otherwise indicated:
  4. Field replaceable.
  5. Indoors: 0-10V low voltage dimming.
  6. Minimum efficiency: 85% at full load.
  7. Minimum Operating Ambient Temperature: -20° C. (-4° F.)
  8. Input Voltage: 120V (±10%) at 60 Hz.
  9. Integral short circuit, open circuit, and overload protection.
  10. Surge protection rated to meet ANSI category 2 for indoors, category C low for outdoors, and shall be field replaceable.
  11. Power Factor:  $\geq 0.95$ .
  12. Total Harmonic Distortion:  $\leq 20\%$ .
  13. Comply with FCC 47 CFR Part 15.
  14. LED modules shall include the following features unless otherwise indicated:
  15. Comply with IES LM-79 and LM-80 requirements.
  16. Minimum CRI 90 and color temperature 4000°K unless otherwise specified.
  17. Minimum Rated Life: 100,000 hours per IES L70 and TM-21 with 70% rated lumen output at 40oC, ambient.
- B. Housing, LED driver, and LED module shall be products of the same manufacturer.

### **PART 3 EXECUTION**

#### 3.01 Coordination

- A. Verification of Conditions: Verify ceiling construction, recessing depth, and/or other construction details prior to release of luminaire for shipment. Refer cases of uncertain applicability to Engineer for resolution prior to release of luminaires for shipment.
- B. Provide all lighting to comply with Oregon Energy Code and appropriate for location.

#### 3.02 Installation

- A. Install luminaire in accordance with manufacturer's written instructions and with recognized industry practices to ensure that luminaires comply with requirements and

serve intended purposes.

- B. Align, mount, and level luminaires uniformly. Use ball hangers for suspended stem mounted luminaires.
- C. Avoid interference with and provide clearance for equipment. Where intended locations for luminaires conflict with locations of equipment, change locations for luminaire by minimum distance necessary.
- D. Suspended Luminaires: Mounting heights indicate clearances between bottom of luminaire and finished floors. Unless otherwise shown, suspension mounting type shall be chain, cable, or stem (Contractor's option, unless specifically indicated).
- E. Wiring:
  - 1. Luminaires to be installed using flexible metallic or non-metallic liquid-tight conduit, with luminaire conductors to branch circuit conductors in a nearby accessible junction box on ceiling. Junction box to be fastened to a building structural member within 6-feet of luminaire.
  - 2. Flexible connections where permitted to exposed luminaires; neat and straight, without excess slack, attached to support device.
- F. Relamp luminaires which have failed lamps at completion of work.

### 3.03 Adjusting

- A. Align luminaires that are not straight and parallel/perpendicular to structure.

### 3.04 Cleaning

- A. Clean paint splatters, dirt, dust, fingerprints, and debris from luminaires.
- B. Where finish of luminaires has been damaged, touch up finish as directed by manufacturer's instructions.

**END OF SECTION**

## SECTION 31 23 19 DEWATERING

### 1.01 GENERAL

#### 3.05 DESCRIPTION OF WORK

A. Furnish all labor, materials, equipment, supervision, and incidentals required to maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades. Control of surface water shall be considered as part of the work under this Section.

#### B. Related Sections

1. Section 00294, Contaminated Media
2. Section 00330, Earthwork
3. Section 00405, Trench Excavation, Bedding, and Backfill

#### 3.06 REFERENCE STANDARDS AND DOCUMENTS

- A. Geotechnical engineering report prepared by NV5 titled Report of Geotechnical Engineering Services; 1<sup>st</sup> and Strand Streets; St Helens, Oregon, dated January 5, 2022.
- B. Oregon Administrative Rules 340-41-006 and 340-41-455 as well as Columbia County and St Helens regulations governing erosion control for construction projects.
- C. Oregon Administrative Rules 690-240-005, Construction, Maintenance, Alteration, Conversion and Abandonment of Monitoring Wells, Geotechnical Holes and Other Holes in Oregon.

#### 3.07 SUBMITTALS

- A. Prior to installation of the dewatering system submit shop drawings and design data indicating the following:
  1. The proposed type of dewatering system
  2. Arrangement, location, and depths of system components
  3. Complete description of equipment and instrumentation to be used, with installation, operation, and maintenance procedures

- i. Types and sizes of filters
  - ii. Design calculations demonstrating adequacy of the proposed system and equipment
  - iii. Methods of disposal of pumped water
- B. Submit copies of the special permits required for performing the work of this Section, including dewatering discharge approval from applicable regulating authority.

### 3.08 SITE CONDITIONS

#### A. Subsurface and Groundwater Information:

1. The geotechnical engineering report for this project can be provided by the Engineer. This information does not necessarily reflect soil types, strata thicknesses, or water level variations that may exist between explorations and should not be construed as warranty of the subsurface conditions. Neither the Owner, Engineer, nor the Geotechnical Engineer will be responsible for interpretations or conclusions drawn there from by the Contractor.
2. Additional explorations may be performed by the Contractor at no additional cost to the Owner, provided such explorations are acceptable and approved in writing by the Owner.

## **PART 4 PRODUCTS**

### 4.01 EQUIPMENT

#### A. Dewatering Equipment:

1. Pipes, wells, deep wells, well points, pumps, electrical generators, and other equipment.
2. Standby pumps and a generator with effective muffling devices to keep noise levels within allowable levels.

#### B. Monitoring Equipment:

1. Provide piezometers for monitoring groundwater levels, flow meters, and other instruments and measuring devices as required.

## **PART 5 EXECUTION**

### 5.01 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards

created by dewatering operations.

- B. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding areas.
- C. Protect subgrades and foundation soil from softening and damage by rain or water accumulation.
- D. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent structures or buildings.
  - 1. Do not close or obstruct streets, walks, or other occupied or adjacent buildings without permission from the Authority and the agencies having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required.

## 5.02 INSTALLATION

- A. Provide temporary grading to facilitate dewatering and control of surface water.
- B. Monitor dewatering systems continuously.
- C. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.
- D. Install dewatering system using wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface water controls.
  - 1. Space well points or wells at intervals required to provide sufficient dewatering.
  - 2. Use filters or other means to prevent pumping of sand or silt from the subsurface.
- E. Before excavating below the groundwater level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- F. Provide an adequate system to lower and control groundwater to permit excavation, construction of structures, subgrade compaction, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  - 1. Do not permit open-sump pumping that leads to loss of soil, soil piping, subgrade softening, and slope instability.
- G. Reduce hydrostatic head in water-bearing strata below subgrade elevation of foundations, drains, sewers, and other excavations.
  - 1. Maintain piezometric water level a minimum of 12 inches below surface of excavations.

- H. Provide complete standby equipment, installed and available for immediate operation, as may be required to adequately maintain dewatering on a continuous basis if any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
- I. Remove dewatering system from the site upon completion of dewatering. Plug or fill well holes in accordance with Oregon Water Resources Department requirements.

#### 5.03 WATER DISPOSAL

- A. Dispose of water removed from the excavations in such a manner as:
  - 1. Will not endanger portions of work under construction or completed.
  - 2. Will cause no inconvenience to others working near site.
  - 3. Will comply with the stipulations of required permits for disposal of water.
  - 4. Will Control Runoff: The Contractor shall be responsible for control of runoff in all work areas, including, but not limited to, excavations, access roads, parking areas, laydown, and staging areas. The Contractor shall provide, operate, and maintain all ditches, basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas. All water shall be removed from the immediate work areas and shall be disposed of in accordance with applicable permits.

#### 5.04 RESTORATION

- A. Restore existing structures to conditions equivalent to those existing prior to the start of work, including repair of any settlement-related damage.

**END OF SECTION**



## SECTION 33 05 17 PRECAST CONCRETE UTILITY STRUCTURES

### PART 1 GENERAL

#### 1.01 SUMMARY

##### A. Section Includes:

1. Precast concrete valve vaults.
2. Precast concrete wet well.

#### 1.02 RELATED SECTIONS

- A. Section 05 50 00, Metal Fabrications.
- B. Section 09 90 00, Painting and Coating.

#### 1.03 REFERENCE STANDARDS

##### A. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
3. ASTM A536 - Standard Specification for Ductile Iron Castings.
4. ASTM A706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
5. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
7. ASTM C33 - Standard Specification for Concrete Aggregates.
8. ASTM C150 - Standard Specification for Portland Cement.
9. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
10. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
11. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or

Tile.

12. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
13. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
14. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
15. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
16. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
17. ASTM D4104 - Standard Test Method (Analytical Procedure) for Determining Transmissivity of Nonleaky Confined Aquifers by Overdamped Well Response to Instantaneous Change in Head (Slug Tests).
18. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

#### 1.04 COORDINATION

- A. Coordinate Work with utilities within construction area.

#### 1.05 SUBMITTALS

- A. Product Data: Submit material data for valve vault and wet well.
- B. Buoyancy design calculations.
- C. Shop Drawings for Precast Concrete Valve Vaults:
  1. Indicate plan, location, and inverts of connecting piping.
  2. All interior and exterior dimensions.
  3. Location and type of lifting inserts, connection embeds and joints.
  4. Details of reinforcement.
  5. Triple leaf H20 rated hatch with diaphragm seal and drain isolation ball valve.
  6. Ladders and grating.

D. Shop Drawings for Precast Concrete Wet Well:

1. Indicate plan, location, and inverts of connecting piping.
2. All interior and exterior dimensions.
3. Location and type of lifting inserts, connection embeds and joints.
4. Details of reinforcement.
5. H2O rated hatch with safety grate and channel frame.

E. Manufacturer's Certificate: Certify that precast concrete valve vault meets or exceeds ASTM standards and specified requirements.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.06 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations and inverts of buried pipe, components, and connections.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Transport and handle precast concrete units with equipment designed to protect units from damage.

C. Storage:

1. Store precast concrete valve vaults and meter boxes according to manufacturer instructions.
2. Do not place concrete units in position to cause overstress, warping, or twisting.

**PART 2 PRODUCTS**

2.01 DESIGN REQUIREMENTS

A. Performance and Design Criteria:

1. Watertight, Precast, Reinforced, Air-Entrained Concrete Structures:
  - i. Manufactured to conform to ASTM C913.
2. Loading:

- i. Design to ASTM C890-A16 / AASHTO HS20 live loading and installation conditions.
  - ii. Where structures are below grade, a dead load of 125 pounds per cubic foot shall be added for the soil.
  - iii. Lateral loads:
    - (i) Static: 105 x Depth of fill (psf) triangular equivalent fluid pressure plus a surcharge of an additional three (3) feet of soil depth in areas subject to vehicular traffic (assume traffic load in all areas, unless indicated otherwise by the Contract Documents).
    - (ii) Seismic acceleration: UBC Zone 3 requirements ( $I = 1.25$ ) where  $I =$  importance factor,  $I = 1.25$ , but not less than 0.20 g acting on structure mass. Seismic loading need not be considered simultaneously with traffic surcharge.
3. Minimum 28-Day Compressive Strength: 4,000 psi.
  4. Reinforcing steel shall conform to ASTM A706.
  5. Honeycombed or retempered concrete is not permitted.
  6. No knockouts shall be cast into vault or wet well walls. All pipe penetrations shall be core-drilled at the required locations.
  7. Accessories: Accessories such as ladders, floor grates at sumps, and other features shall be provided as shown on the Drawings.
  8. Size: Structure dimensions shall be as required by the Drawings.
  9. Structures shall be designed by a structural engineer licensed in the State of Oregon.

## 2.02 PRECAST CONCRETE VALVE VAULTS

### A. Manufacturers:

1. Vault manufacturer shall be Oldcastle Precast, Inc., Columbia Precast Products, LLC or approved equal.

### B. Sump Covers

1. The sump shall be equipped with a grating cover that is flush with the floor and able to withstand a 300 lbs load.

### C. Access ladder with aluminum extension:

1. See Section 05 50 00, 2.3.
2. Access Ladder:
  - i. Galvanized steel.
  - ii. Rungs: 3/4" diameter with minimum width of 12 inches.
  - iii. Side rails minimum 5/16" x 2" flat bar.
  - iv. Vertical spacing of 12-inches between rungs.
  - v. Provide minimum 7" clearance between ladder and vault wall / lid.
3. Aluminum extension:
  - i. Aluminum: ASTM B221, Alloy 6061-T6.
  - ii. Extends 36" above top slab of vault.

## 2.03 PRECAST CONCRETE WET WELL

### A. Manufacturers:

1. Vault manufacturer shall be Oldcastle Precast, Inc., Columbia Precast Products, LLC or approved equal.

### B. The wet well shall meet the requirements of ASTM 478 for precast reinforced manhole sections.

### C. The wet well wall thickness shall be a minimum of 9 inches and shall include steel reinforcement.

### D. All hardware within the wet well shall be 316 stainless steel.

### E. The wet well shall be designed by the Contractor to counteract buoyancy forces based on the conditions below:

1. Groundwater level = ground surface
2. No soil friction forces are exerted on the structure (i.e. dead weight resistance only)
3. Factor of safety = 1.1

## 2.04 ACCESS HATCHES AND LIDS

### A. Unless noted otherwise elsewhere in the Contract Documents, structures shall have concrete top slabs with access openings as shown on the Drawings.

### B. Precast manufacturer shall provide the access hatches per the requirements of

Section 05 50 00, Metal Fabrications.

- C. Lids shall have lifting holes. Lifting holes shall be grout packed and smoothed after installation is complete.
- D. When leveling bolts are used to set the top sections, ensure the load from the top slab is transferred through grout to the vault walls so that the load is not carried by the leveling bolts.

## 2.05 MATERIALS

A. Portland Cement:

- 1. ASTM C150, Type II.

B. Coarse Aggregates:

- 1. ASTM C33.
- 2. Graded 1 inch to No. 4 sieve.

C. Sand:

- 1. ASTM C33.
- 2. Fineness Modulus: 2.35.

D. Water:

- 1. Potable.
- 2. Clean and free of injurious amounts of acids, alkalis, salts, organic materials, and substances incompatible with concrete or steel.

E. Air-Entraining Admixtures: ASTM C260.

F. Reinforcing Steel:

- 1. Deformed Bars: ASTM A615, Grade 40 minimum.
- 2. Welded Wire Fabric: ASTM A185.

G. Gaskets:

- 1. Rubber gaskets: ASTM C443.

H. Joint Sealant:

- 1. Butyl rubber sealant conforming to ASTM C990.

I. Bedding:

1. Provide a minimum of 12-inches of compacted bedding as shown in the Drawings.

2.06 FABRICATION

A. Fabricate precast reinforced concrete structures according to ASTM C913, to dimensions indicated on Drawings, and to specified design criteria.

B. Vaults may be formed with separate top and bottom slabs.

C. Walls shall be cast so that all sides are continuous at corners and their full length with no block-outs or knockouts. Holes for pipe penetrations shall be core drilled.

D. Horizontal joints may be provided so that walls can be placed in horizontal segments.

E. All horizontal joints shall be keyed to prevent offsets and shall be provided with a watertight gasket.

F. Finish:

1. Formed surfaces shall be smooth and uniform with no fins, bulges, or other irregularities.

2. Any void greater in width than 1/2-inch or deeper than 3/8-inch shall be repaired.

3. Unformed interior slab surfaces shall have a smooth steel trowel finish.

4. Unformed exterior slab surfaces shall have a light broom finish applied to a steel trowel finish.

G. Coating:

1. Refer to Section 09 90 00 Painting and Coating, Part 3.8 for exterior and interior surface coating requirements.

2.07 MIXES

A. Design concrete mix to produce required concrete strength, air-entrainment, watertight properties, and loading requirements.

**PART 3 EXECUTION**

3.01 EXAMINATION

A. Verify that piping connections, sizes, locations, and inverts are as indicated on Drawings.

3.02 PREPARATION

- A. Ream pipe ends and remove burrs.
- B. Remove scale and dirt from components before assembly.
- C. Establish invert elevations for each component in system.
- D. Hand trim excavation to suit valve vaults and meter boxes; remove stones, roots, and other obstructions.

### 3.03 INSTALLATION

- A. Structures and Bedding:
  - 1. Excavate as required.
  - 2. Hand trim excavation for accurate placement of structure base to elevations indicated.
  - 3. Place bedding material level in one continuous layer to a minimum compacted depth of 6 inches. Total bedding thickness shall be a minimum of 12 inches.
  - 4. Compact bedding material to 95 percent maximum density.
  - 5. Bases for precast concrete structures shall be set level so that bedding material fully and uniformly supports them in true alignment with uniform bearing throughout full perimeter. Do not level bases by wedging gravel under the edges.
  - 6. Sections shall be joined using a minimum of two rows of joint sealant placed around the full perimeter of the joint base.
  - 7. Backfill around sides of structure as required by the Drawings.
- B. Connect piping and appurtenances.

### 3.04 FIELD QUALITY CONTROL

- A. Request examination of subgrade by Engineer prior to placing aggregate base under precast materials.
- B. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.
- C. Tests:
  - 1. Wet well: Vacuum test the wet well using the following test procedures and requirements:



- i. After completion of the wet well barrels install a temporary lid with standard 25 inch diameter opening. Prior to backfilling, seal all openings in the wet well with plugs and a manhole test plug inserted in the temporary lid opening.
- ii. Attach a small vacuum pump to a hose connected to the manhole test plug and apply 4 pounds per square inch of vacuum.
- iii. Allow vacuum to stabilize at 3.5 pounds per square inch for 1 minute, then begin the test.
- iv. The wet well must maintain vacuum such that no greater than 0.5 pounds per square inch of vacuum is lost during the specified test period.
- v. The specified test period is 6 minutes.
- vi. Patch as required and retest wet well that fail the test.
- vii. Provide a vacuum regulator on the vacuum pump such that no greater than 4 pounds per square inch can be applied to the manhole during the test.
- viii. Repair all manholes that do not meet the leakage test or are unsatisfactory from visual inspection.
- ix. Retest after repair is completed.

**END OF SECTION**

## SECTION 40 05 13 COMMON WORK RESULTS FOR PROCESS PIPING

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section applies to the furnishing and installation of piping inside a building, structure, enclosure piping and miscellaneous yard piping.

#### 1.02 RELATED SECTIONS

- A. Section 05 50 00, Metal Fabrications.
- B. Section 09 90 00, Painting and Coating.
- C. Section 40 05 23, Common Work Results for Process Valves.

#### 1.03 REFERENCE STANDARDS

- A. American Society of Mechanical Engineers:
  1. ASME B1.20.1 Pipe Threads, General Purpose (inch)
  2. ASME A13.1 - Scheme for the Identification of Piping Systems.
  3. ASME B16.5 Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and other Special Alloys
  4. ASME B16.15 - Cast Copper Alloy Threaded Fittings: Classes 125 and 250.
  5. ASME B31.3 - Process Piping.
  6. ASME B31.9 - Building Services Piping.
- B. ASTM International:
  1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  2. ASTM A307 - Specification for Carbon Steel Bolts and Studs, 6,000 psi Tensile.
  3. ASTM A325 - Specification for High-Strength Bolts for Structural Steel Joints.
  4. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
  5. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
  6. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

7. ASTM D792 - Test Methods for Specific Gravity and Density of Plastics by Displacement.
8. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
9. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
10. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
11. ASTM D2000 - Classification System for Rubber Products in Automotive Applications.
12. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
13. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
14. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

C. American Water Works Association:

1. AWWA C200 - Steel Water Pipe - 6 In. (150 mm) and Larger.
2. AWWA C207 - Steel Pipe Flanges for Water Works Service, Sizes 4 in through 144 in.
3. AWWA C219 - Bolted, Sleeve-Type Couplings for Plain-End Pipe.
4. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
5. AWWA C510 - Double Check Valve Backflow Prevention Assembly.
6. AWWA C511 - Reduced-Pressure Principle Backflow Prevention Assembly.
7. AWWA C606 - Grooved and Shouldered Joints.
8. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.

D. American Welding Society:

1. AWS D1.1 - Structural Welding Code.

- E. Manufacturers Standardization Society of the Valve and Fittings Industry:
  1. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.
- F. NSF International:
  1. NSF 61 - Drinking Water System Components - Health Effects.
  2. NSF 372 - Drinking Water System Components - Lead Content.

#### 1.04 COORDINATION

- A. Coordinate installation of specified items with installation of valves and equipment.

#### 1.05 SUBMITTALS

- A. Product Data:
  1. Submit manufacturer catalog information for each product specified.
- B. Shop Drawings:
  1. Identification:
    - i. Submit list of wording, symbols, letter size, and color coding for pipe identification.
    - ii. Comply with ASME A13.1.
  2. Provide all necessary dimensions and details on pipe joints, restraints, fittings, fitting specials, valves, appurtenances, design calculations, and material lists.
  3. Provide detailed layout, spool, or fabrication drawings which show all pipe spools, spacers, adapters, connectors, fittings, couplings, and pipe supports necessary to accommodate the equipment and valves provided in a complete and functional system.
- C. Manufacturer's Statement: Certifying pipe fabrication and products meet or exceed specified requirements.
- D. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS and ASME qualification within previous 12 months.
- E. Manufacturer Instructions: Submit special procedures and setting dimensions.
- F. Source Quality-Control Submittals: Indicate results of shop tests and inspections.
- G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

## 1.06 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of piping appurtenances.
- B. Identify and describe unexpected variations to pipe routing or discovery of uncharted utilities.

## 1.07 QUALITY ASSURANCE

### A. Drawings:

1. Piping layouts shown in the Drawings are intended to define the general layout, configuration, routing, method of support, pipe size, and pipe type. The mechanical drawings are not pipe construction or fabrication drawings. It is the Contractor's responsibility to develop the details necessary to construct all mechanical piping systems, to accommodate the specific equipment provided, and to provide and install all spools, spacers, adapters, connectors, etc., for a complete and functional system.

### B. Inspection:

1. All pipe shall be subject to inspection at the place of manufacture.
2. During the manufacture of the pipe, the Engineer shall be given access to all areas where manufacturing is in progress and shall be permitted to make all inspections necessary to confirm compliance with the Specifications.

### C. Welding:

1. All welding procedures used to fabricate pipe shall be prequalified under the provisions of ANSI/AWS D1.1.
2. Welding procedures shall be required for, but not necessarily limited to, longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

### D. Welders:

1. Skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used shall do all welding.
2. Welders shall be qualified under the provisions of ANSI/AWS D1.1 by an independent local approved testing agency prior to commencing work on the pipeline.
3. Machines and electrodes similar to those used in the Work shall be used in qualification tests.

4. The Contractor shall furnish all material and bear the expense of qualifying welders.
- E. Tests: Except where otherwise specified, all materials used in the manufacture of the pipe shall be tested in accordance with the applicable Specifications and Standards. Welds shall be tested as specified. The Contractor shall perform all tests at no additional cost to the Owner.

#### 1.08 MATERIAL DELIVERY, STORAGE AND INSPECTION

##### A. Inspection:

1. Accept materials on Site in manufacturer's original packaging and inspect for damage.
2. All piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition.

##### B. Storage:

1. Store materials according to manufacturer instructions.
2. Store materials off the ground, to provide protection against oxidation caused by ground contact

##### C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Furnish temporary end caps and closures on piping and fittings and maintain in place until installation.
3. Provide additional protection according to manufacturer instructions.

D. All defective or damaged materials shall be replaced with new materials.

#### 1.09 EXISTING CONDITIONS

##### A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. All materials in contact with potable water shall conform to ANSI/NSF Standard 61 and meet the “lead free” requirements of the Safe Drinking Water Act amendment as per the lead content evaluation procedures outlined in NSF/ANSI Standard 372.1.
  - 1. All fittings shall either be cast or permanently stamped with markings identifying the item as complying with NSF 61 per the requirements of NSF 372 for “lead free”.
  - 2. All brass in contact with potable water shall comply with ASTM B584.

## 2.02 DUCTILE IRON PIPE AND FITTINGS

- A. See Section 01140 of the Standard Specifications.

## 2.03 STEEL PIPE AND FITTINGS

- A. General Service Piping:
  - 1. ASTM A53, seamless, Grade B.
  - 2. Schedule: 40, unless indicated otherwise on Drawings.

## 2.04 COPPER PIPE AND FITTINGS

- A. Description:
  - 1. Seamless; ASTM B88.
  - 2. Type:
    - i. Type L, hard drawn.
    - ii. For pipe under floor slabs, underground or cast in concrete: Type K, annealed, seamless.
- B. Joints:
  - 1. Compression.
  - 2. Manufacturer: Mueller Model 110 or approved equal
- C. Dissimilar Metals: See Dielectric Unions specified herein.

## 2.05 BRASS PIPE AND FITTINGS

- A. Pipe: ASTM B43, chrome plated.
- B. Fittings:
  - 1. ASTM B584, brass.

2. 2. ASTM B16.15.

C. Joints:

1. Mechanical compression.
2. Threaded: Tapered and smooth threads, ASME B1.20.1 and ASTM B43.

D. Dissimilar Metals: See Dielectric Unions specified herein.

## 2.06 POLYVINYL CHLORIDE (PVC) WATER PIPE AND FITTINGS

A. PVC Pipe and Fittings:

1. 4-inch diameter and smaller:
  - i. Pipe: ASTM D1785, Schedule 40.
  - ii. Fittings: ASTM D2466, Schedule 40.
  - iii. Joints: Socket, solvent-welded, ASTM D2855.
  - iv. Materials: ASTM D1784, minimum cell classification 12545-C.
2. 6-inch diameter and larger:
  - i. Pipe: AWWA C900, Class 235.
  - ii. Fittings: AWWA C111, cast iron.
  - iii. Joints: ASTM D3139, compression gasket ring.
  - iv. Materials: ASTM D1784, minimum cell classification 12545-C.

## 2.07 FLEXIBLE TUBING

A. Polyethylene thermoplastic tubing:

1. Standard weight, conforming to ASTM D1248 Type 1, Class A, Category 4, Grade E5.

## 2.08 GALVANIZED STEEL PIPE AND FITTINGS

A. Pipe: Seamless, or electric resistance welded, ASTM A53, Schedule 40.

B. Joints: Threaded.

C. Fittings:

1. Threaded, 150 lb. malleable iron, galvanized, ASTM A197 or ASTM A47,



dimensions conforming to ANSI B16.3.

2. Unions, 300 lb. malleable iron, galvanized with dimensions conforming to ANSI B16.3, brass to iron seat.
3. Thread lubricant shall be Teflon tape or joint compound that is insoluble in water.

D. Buried Service:

1. Galvanized pipes shall be spirally wrapped with polyvinyl chloride or polyethylene pressure sensitive tape, applied with a suitable primer.
2. The wrap shall have a nominal thickness of 20 mils, consisting of either one layer of 20-mil tape or two separate layers of 10-mil tape.
3. Before the primer and wrap is applied, the piping shall be thoroughly cleaned so that all surfaces shall be dry and free of dirt, dust, rust, oil scale, oil, grease, or other foreign matter.
4. Any solvents used shall be totally volatile so as to leave no trace of oil.
5. Weld spatters, burrs, or sharp points and edges shall be removed by chiseling, ball peening or filing.
6. After thorough cleaning, the piping shall be coated with a primer applied in accordance with the tape manufacturer's recommendations. Spiral wrappings shall be applied with an overlap of at least 1-inch.

## 2.09 STAINLESS STEEL TUBING AND FITTINGS

- A. Type 316 stainless steel, unless otherwise specified or shown in the Plans.
- B. Meet the material standards set forth in ASTM A269.
- C. Fittings: ASTM A276 and ASTM A182.
  1. Threaded fittings: National pipe thread meeting the requirements of ASME B1.20.1.
  2. Compression fittings: Two-ferrule, mechanical grip design.
- D. Unions: Provide to facilitate installation and maintenance of tubing.
- E. Manufacturer:
  1. Swagelock, or approved equal.

## 2.10 STAINLESS STEEL PIPE AND FITTINGS

- A. Pipe:

1. Size: 4 inches and smaller, schedule 80, type 304, unless otherwise specified.
  2. Conforming to ASME B36.19 dimensions.
  3. Conforming to ASTM A312 material requirements.
- B. Fittings: Conform to ASME B16.11 dimensions and ASTM A182 material requirements.
- C. Threads: Conform to ASME B1.20.1.
- D. Socket welds: Conform to ASME B16.11.

## 2.11 FLEXIBLE COUPLINGS

### A. Description:

1. Sleeve-type, couplings. Comply with AWWA C219.
2. Minimum design pressure rating: 150 psi.
3. Middle Ring: As required for coupling based upon connecting pipe materials, steel or ASTM A536, ductile iron.
4. Followers: As required for coupling based upon connecting pipe materials, steel or ASTM A536, ductile iron.
5. Gaskets:
  - i. Material: Buna-N.
  - ii. Comply with ASTM D2000.
6. Bolts:
  - i. Buried: Steel.
  - ii. Submerged: Stainless steel.
7. Center Pipe Stop: Required where shown on the Drawings.

### B. Finishes:

1. Buried Couplings, Bolts: Factory epoxy coated.

### C. Manufacturers:

1. For ductile iron and steel pipe:

- i. Dresser, Style 38.
  - ii. Romac, Model 501.
  - iii. Smith-Blair.
- 2. For PVC pipe:
    - i. Romac, Model 501 or approved equal.
  - 3. For flanged steel and ductile pipe:
    - i. Dresser, Style 128 or approved equal.

## 2.12 RESTRAINED FLANGE ADAPTERS FOR DUCTILE IRON PIPE

### A. Description:

- 1. ASTM A536, ductile iron.
- 2. Flange bolt circles compatible with ANSI/AWWA C115/A21.15.
- 3. Restraint for the flange adapter shall consist of a plurality of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges.
- 4. Capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6-inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
- 5. Safety factor of 2:1 minimum.
- 6. Manufacturer:
  - i. EBAA Iron, Series 2100 Megaflange or approved equal.

## 2.13 FLANGED INSULATING JOINTS

- A. Set shall include a full faced gasket, a full length insulating sleeve for each flange bolt, and two insulating washers and two steel washers for each bolt.
  - 1. Gaskets:

- i. Full face, comply with ASME 16.21.
  - ii. Non-asbestos and non-phenolic compressed sheet packing with nitrile rubber binder.
  - iii. Manufacturer: Garlock, Style 3505, or equal.
- 2. Insulating sleeves:
  - i. G-10 glass epoxy.
  - ii. Extend the full width of both flanges, except where one flange hole is threaded where the sleeve shall extend through one flange and the gasket.
- 3. Insulating washers:
  - i. G-10 glass epoxy.
  - ii. 1/8-inch thickness.
- 4. Washers:
  - i. Buried: Cadmium plated steel.
  - ii. Submerged: Stainless steel.
- B. The complete assembly shall have an ANSI/AWWA pressure rating equal to or greater than that of the flanges between which is installed.
- C. After assembly, the joint shall be tested for continuity. Electrical resistance between flanges and between each bolt and each flange shall be not less than 100,000 ohms.

## 2.14 INSULATING UNION

### A. Description:

- 1. Material: Galvanized malleable iron with a ground joint.
- 2. Iron pipe threads: Conform to ANSI B2.1.
- 3. Insulations: Nylon, bonded and molded onto the metal body.
- 4. Union: Rated for the operating and test pressures of the pipe system.
- 5. Joint connections to copper alloy pipe and tube shall be copper solder or threaded brass ground joints.
- 6. Isolation Barrier: Impervious to water.

## 2.15 BACKFLOW PREVENTERS

### A. Manufacturers:

1. Nibco.
2. Watts.

### B. Reduced-Pressure Backflow Assemblies:

1. Size: 3/4 inch to 2 inches.
2. Comply with AWWA C511.
3. Materials:
  - i. Body: Bronze.
  - ii. Internal Parts: Bronze.
  - iii. Springs: Stainless steel.
4. Check Valves:
  - i. Quantity: Two, operating independently.
  - ii. Spring loaded.
  - iii. Third Check Valve: Open under back pressure in case of diaphragm failure.
5. Differential Pressure Relief Valve:
  - i. Type: Diaphragm.
  - ii. Located between check valves.
6. Ball Valves:
  - i. Type: Full port, resilient seated.
  - ii. Quantity: Two.
  - iii. Operation: Quarter turn.
  - iv. Material: Bronze.
7. Accessories: Strainer and test cocks.

## 2.16 DISMANTLING JOINT

A. Description:

1. Comply with AWWA C219, where applicable.
2. Self-contained flanged restrained joint fitting, including both flanged components and sufficient harness bars to withstand the imposed thrust.
3. Design: No part of the restraint system extends outside the flange diameter. The internal bore shall match that of the pipe system.
4. Dismantling joints will allow for a minimum of 2 inches of longitudinal adjustment.
5. Furnish as a complete assembly consisting of spigot piece, flange adaptor, tie bars and gasket.
6. The gasket seal and compression stud and nut arrangement shall be independent of the tie rod restraint system. Tie Rod diameter shall be compatible with the corresponding bolt diameter of the mating flange. The Tie Rod restraint system shall be capable of withstanding the full pressure thrust that the pipe system can develop at no more than 50% of the yield strength of tie rod material.
7. Pressure Rating:
  - i. Determined by the flange configuration, and all commonly used flanges shall be available.
  - ii. Design pressure rating shall be equal to or greater than the mating flanges.
  - iii. Dismantling joints will be specially fabricated to accommodate pressure requirements with ANSI B16.5 or ANSI B16.47 300-pound class flanges, depending on size of dismantling joint.
8. Lining and Coating:
  - i. Shop-applied fusion bonded epoxy coating applied by fluidized bed method, complying with the requirements of NSF 61 and AWWA C550 as applicable.
  - ii. As an alternative, a shop-coat primer suitable for field applied coatings can be supplied.
9. Flanges: Flat-faced, rated to pressure requirements as shown on the Drawings.
  - i. Where design pressure is greater than 300 psi, flanges shall conform to ASME B16.5 and ASME B16.47 300-pound class.

B. Materials:

1. Spigot piece: Steel, ASTM A283 Grade C.
2. Flange adaptor:
  - i. Up to 12-inch diameter: Ductile iron, ASTM A536 Grade 65-45-12.
  - ii. Above 12-inch diameter: Steel, ASTM A283 Grade C.
3. Tie bars: Stainless steel per ASTM A193 gr B8 or B8M.
4. Gasket: EPDM Grade E.
5. Nuts, Bolts and Washers: Type 304 stainless steel.

C. Manufacturer:

1. Romac or approved equal.

## 2.17 PIPE SUPPORTS

A. Floor Support for Pipe:

1. Flanged Pipe Support:
  - i. Construction:
    - (i) Adjustable vertical pipe support, flange plate, extension pipe from base cup to top collar cup with threaded stud.
    - (ii) Bolts directly to flange.
    - (iii) Anchorable base plate.
  - ii. Material: Stainless steel, 304L or 316L. Extension pipe shall be of same material type pipe support.
  - iii. Finish: Mill finish.
  - iv. Manufacturers:
    - (i) Standon - Model S89.
2. Cradle Pipe Support:

- i. Construction:
  - (i) Adjustable vertical pipe support with saddle strap, extension pipe from base cup to top collar cup with threaded stud.
  - (ii) Anchorable base plate.
  - (iii) Supply with neoprene liner to isolate pipe from the saddle.
- ii. Material: Stainless steel, 304L or 316L. Extension pipe shall be of same material type pipe support.
- iii. Finish: Mill finish.
- iv. Manufacturers:
  - (i) Standon - Model S92.

## 2.18 PIPE PENETRATIONS

### A. Sleeves for Pipes through Walls and Floors:

1. Material: Galvanized steel.
2. Thickness: Schedule 40.
3. Inside surface of all wall sleeves shall be coated with coal-tar.
4. Annular space between penetrating pipe and wall sleeve shall be filled with an approved permanently flexible sealant.
5. Diameter of wall sleeve shall be as shown in the Drawings.

### B. Mechanical Sleeve Seals:

1. Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
2. Manufacturer: Link-Seal or approved equal.

### C. Pipes Cast-In Walls and Floors:

1. Material: Ductile iron or steel pipe, as required by the Drawings and the intended service.
2. Diameter: As shown in the Drawings.



3. End Type: As shown in the Drawings.

D. Seep Rings:

1. Material: 3/8-inch thick steel plate conforming to ASTM A36, unless otherwise noted.
2. Inside diameter: Equal to the outside diameter of the pipe or sleeve to which it is attached plus 1/4-inch.
3. Outside diameter: As shown in the Drawings.
4. Attach to the pipe or sleeve by means of a continuous seal weld located on both sides of the ring.

## 2.19 PIPE COATINGS

A. See Section 09 90 00, Painting and Coating.

## **PART 3 EXECUTION**

### 3.01 GENERAL

- A. Furnish and install all piping systems shown and specified, in accordance with the requirements of the Contract Documents. Each system shall be complete with all necessary fittings, hangers, supports, anchors, expansion joints, flexible connectors, valves, accessories, heat tracing, insulation, lining and coating, testing, disinfection, excavation, backfill and encasement, to provide a functional installation.
- B. Pipe shall be installed in accordance with good trade practice. The methods employed in handling and placing of pipe, fittings, and equipment shall be such as to ensure that after installation and testing they are in good condition. Should damage occur to the pipe, fitting or equipment, repairs satisfactory to the Engineer shall be made.

### 3.02 INSTALLATION

A. Buried Piping Systems:

1. Establish elevations of buried piping with not less than 3 feet of cover.
2. Remove scale and dirt from inside of piping before assembly, as may be required.
3. Excavate pipe trench as specified in Section 00405, Trench Excavation, Bedding, and Backfill.
4. Install pipe to accurate lines, elevations, and grades as shown on the Drawings.
5. Where grades are not shown, pipe shall be laid to grade between control elevations

shown on the Drawings.

6. Place bedding material at trench bottom to provide uniform bedding for piping.
7. Level bedding material in one continuous layer not exceeding 6 inches compacted depth.
8. Install pipe on prepared bedding.
9. Route pipe in straight line.
10. Install pipe to allow for expansion and contraction without stressing of pipe or joints.
11. Install shutoff and drain valves at locations as indicated on Drawings and as specified in this Section.
12. Pipe Cover and Backfilling:
13. Backfill trench as specified in Section 00405, Trench Excavation, Bedding, and Backfill.
14. All buried non-ferrous piping shall be installed with detectable tracer tape.
  - i. Tape shall be buried 12 inches above the top of the pipe or as recommended by manufacturer.
  - ii. Tape shall be continuous and labeled the same as the piping system.

#### B. Interior Piping Systems:

1. Install non-conducting dielectric connections wherever joining dissimilar metals.
2. Establish elevations of buried piping outside valve vault to obtain not less than 3 feet of cover.
3. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting as specified in Section 09 90 00, Painting and Coating.
4. Install water piping according to ASME B31.9.
5. Install unions downstream of valves and at equipment or apparatus connections.
6. Install brass male adapters each side of valves in copper piped system; solder adapters to pipe

#### C. Backflow Preventer Assemblies:

1. Install backflow preventers of type, size, and capacity indicated.
2. Comply with applicable code and authority having jurisdiction.
3. Install air-gap fitting on units with atmospheric vent connection.
4. Pipe relief outlet drain to nearest floor drain.
5. Do not install bypasses around backflow preventers.

**D. Pipe Supports and Hangers**

1. Install pipe supports according to MSS SP-58 & ASME B31.10.
2. All pipe shall be secured in place by use of blocking, hangers, brackets, clamps or other approved methods, and the weight thereof shall be carried independently of pump casings or equipment.
3. Special hangers and supports are shown on the Drawings.
4. The Contractor shall be responsible for determining the location of and providing all additional supports.
5. Hanger supports shall be as noted below with at least one support adjacent to the joint for each length of pipe, at each change in direction and at each branch connection. Sufficient hangers shall be provided to maintain proper slope without sagging. Support spacing shall not exceed manufacturer’s recommendations, nor as listed below.

<u>Pipe</u>	<u>Maximum Support Spacing (Feet)</u>
<b>Steel Pipe</b>	
Under 3 inches	6
3 inches and Over	12
<b>Cast or Ductile Iron</b>	
Under 4 inches	6
4 inches and Over	12
<b>Stainless Steel and Galvanized Iron</b>	
Under 1-1/2 inches	4
1-1/2 inches to 4 inches	6
Over 4 inches	12

Copper Pipe	6
PVC Pipe	
Under 2-1/2 inches	4
2-1/2 inches and Over	6

6. Spacing of clamps for support of vertical piping shall be close enough to keep the pipe in alignment as well as to support the weight of the piping and contents unless other vertical support is shown, but in no case shall be more than 12 feet.
7. Provide adjustable hangers for all pipes, complete with adjusters, swivels, rods, etc. Size hangers to clear insulation and guide where required, as well as support piping. All rigid hangers shall provide a means of vertical adjustment after erection. Hanger rods shall be machine-threaded. Continuous threaded rods will not be allowed.
8. Clevis or band-type hangers (B-Line FIG B3100) or approved equal shall be provided as required. Strap hangers not permitted.
9. Provide floor stands, wall bracing, concrete piers, etc., for all lines running near the floors or near walls and which cannot be properly supported or suspended by the walls or floors. Pipe lines near concrete or masonry walls may also be hung by hangers carried from wall brackets at a higher level than pipe. Hanging of any pipe from another is prohibited.
10. Equipment shall be positioned and aligned so that no strain shall be induced within the equipment during or subsequent to the installation of pipework.
11. When temporary supports are used, they shall be sufficiently rigid to prevent any shifting or distortion of the piping or related work.

E. Pipe Penetrations:

1. Exterior Watertight Entries: Seal with mechanical sleeve seals or grout, as shown in the Drawings.
2. Whenever a pipe line of any material terminates at or through a structural wall or floor, install piping or sleeve in advance of pouring of concrete required for the particular installation.
3. Plastic pipe shall not be cast in concrete or masonry walls.
4. Set sleeves in position in forms and provide reinforcing around sleeves.
5. Size sleeves large enough to allow for movement due to expansion and contraction

and provide for continuous insulation wrapping.

6. Extend sleeves through floors 1 inch above finished floor level and caulk sleeves.
7. Pipe other than concrete, to be cast in water-bearing walls or more than four feet below grade shall have seep rings.
8. All buried piping entering structures shall have a flexible connection installed less than two feet outside the structure line or as close to the wall as practical.

**END OF SECTION**

## SECTION 40 05 23 COMMON WORK RESULTS FOR PROCESS VALVES

### PART 1 GENERAL

#### 1.01 SUMMARY

A. This Section includes basic materials and methods related to valves commonly used for process systems, including pump stations, utility vaults and water & wastewater treatment. This Section is to be used in conjunction with Section 40 05 23.24, Check Valves, and 40 05 23.72, Miscellaneous Valves.

B. Section Includes:

1. Valves.
2. Valve actuators.

#### 1.02 RELATED SECTIONS

- A. Section 05 50 00, Metal Fabrications.
- B. Section 09 90 00, Painting and Coating.
- C. Section 10 14 10, Identifying Devices
- D. Section 40 05 13, Common Work Results for Process Piping.
- E. Section 40 05 23.24, Check Valves.
- F. Section 40 05 23.72, Miscellaneous Valves.

#### 1.03 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C504 - Rubber-Seated Butterfly Valves, 3 In. Through 72 In.
2. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.
3. AWWA C541 - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
4. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

B. ASTM International:

1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.

2. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.

C. Manufacturers Standardization Society of the Valve and Fittings Industry:

1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges and Unions.

D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

#### 1.04 COORDINATION

- A. Contractor shall be solely responsible to coordinate Work of this Section with piping, equipment, and appurtenances.

#### 1.05 SUBMITTALS

A. Product Data:

1. Submit manufacturer's latest published literature. Include illustrations, installation and maintenance instructions, and parts lists.
2. Submit valve cavitation limits.

- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- C. Manufacturer Instructions: Submit installation instructions and special requirements, including storage and handling procedures.

- D. Lining and coating data.

- E. Valve Labeling Schedule: Indicate valve locations and nametag text.

- F. Certification of Valves Larger than 12 inches: Furnish certified copies of hydrostatic factory tests, indicating compliance with applicable standards.

- G. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

- H. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections, including factory-applied coatings.

#### 1.06 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of valves and actuators.

- B. Operation and Maintenance Data: Submit information for valves.

## 1.07 MAINTENANCE MATERIAL SUBMITTALS

### A. Spare Parts:

1. Furnish one set of manufacturer's recommended spare parts.

### B. Tools:

1. Furnish special wrenches and other devices required for Owner to maintain equipment.
2. Furnish compatible and appropriately labeled toolbox when requested by Owner.

## 1.08 QUALITY ASSURANCE

A. Cast manufacturer's name, pressure rating, size of valve and year of fabrication into valve body.

B. Valve Testing: Each valve body shall be tested under a test pressure equal to twice its design water-working pressure.

C. Certification: Prior to shipment, submit for all valves over 12 inches in diameter, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, ASTM, etc. Valves tested and supplied shall be trackable and traceable by serial number, tagged or otherwise noted on valve, upon arrival to Site.

D. Maintain clearances as indicated on Drawings.

E. Unless otherwise noted, all water works materials provided for the Project shall be new, of first class quality and shall be made by reputable manufacturers.

F. All material of a like kind shall be provided from a single manufacturer, unless otherwise approved by the Engineer.

## 1.09 DELIVERY, STORAGE, AND HANDLING

A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

B. Store materials according to manufacturer instructions.

1. Store materials in areas protected from weather, moisture, or other potential damage.
2. Do not store materials directly on ground.

C. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.



2. Protect valve ends from entry of foreign materials by providing temporary covers and plugs.
  3. Provide additional protection according to manufacturer instructions.
- D. Handle products carefully to prevent damage to interior or exterior surfaces.
- E. All defective or damaged materials shall be replaced with new materials at no cost to the Owner.

#### 1.10 EXISTING CONDITIONS

##### A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. All materials in contact with potable water shall conform to ANSI/NSF Standard 61 and meet the “lead free” requirements of the Safe Drinking Water Act amendment as per the lead content evaluation procedures outlined in NSF/ANSI Standard 372.1.
1. All fittings shall either be cast or permanently stamped with markings identifying the item as complying with NSF 61 per the requirements of NSF 372 for “lead free”.
  2. All brass in contact with potable water shall comply with ASTM B584.

### 2.02 VALVES

- A. Description: Valves, operator, actuator, handwheel, chainwheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and other accessories as required and shown in the Drawings.
- B. Operation:
1. Open by turning counterclockwise; close by turning clockwise.
  2. Cast directional arrow on valve or actuator with OPEN and CLOSE cast on valve in appropriate location.
- C. Valve Construction:
1. Bodies: Rated for maximum temperature and pressure to which valve will be subjected as specified in valve Sections.

D. Connecting Nuts and Bolts: Stainless steel.

### 2.03 GATE VALVES

A. As specified in Section 02480, Potable Water Valve Materials.

B. Provide handwheel for valves installed within vaults.

### 2.04 CHECK VALVES

A. As specified in Section 40 05 23.24, Check Valves.

### 2.05 SOURCE QUALITY CONTROL

A. Testing: Test valves according to manufacturer's standard testing protocol, including hydrostatic, seal, and performance testing.

## **PART 3 EXECUTION**

### 3.01 EXAMINATION

A. Verify that piping system is ready for valve installation.

### 3.02 PREPARATION

A. Access: All valves shall be installed to provide easy access for operation, removal, and maintenance and to avoid conflicts between valve operators and structural members or handrails.

B. Valve Accessories: Where combinations of valves, sensors, switches, and controls are specified, it shall be the responsibility of the Contractor to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.

### 3.03 INSTALLATION

A. Install valves, actuators, extensions, and accessories according to manufacturer instructions.

B. Firmly support valves to avoid undue stresses on piping.

C. Coat studs, bolts, and nuts with anti-seizing lubricant.

D. Clean field welds of slag and splatter to provide a smooth surface.

E. Install valves with stems upright or horizontal, not inverted.

F. Install valves with clearance for installation of insulation and allowing access.

G. Provide access where valves and fittings are not accessible.

H. Comply with Division 40 - Process Integration for piping materials applying to various system types.

I. Valve Applications:

1. Install shutoff and drain valves at locations as indicated on Drawings and as specified in this Section.
2. Install shutoff and isolation valves.
3. Isolate equipment, part of systems, or vertical risers as indicated on Drawings.
4. Install valves for throttling, bypass, or manual flow control services as indicated on Drawings.

### 3.04 FIELD QUALITY CONTROL

A. Valve Field Testing:

1. Test for proper alignment.
2. If specified by valve Section, field test equipment to demonstrate operation without undue leakage, noise, vibration, or overheating.
3. Engineer will witness field testing.

**END OF SECTION**

## SECTION 40 05 23.24 CHECK VALVES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Work in this Section includes check valves for use in water and wastewater facilities. Work includes the furnish and install of all swing and silent check valves, complete, as shown on the Drawings and specified herein, including coating and lining, appurtenances, operators, and accessories.
- B. Section includes:
  1. Swing check valves, 1-inch through 4-inch diameter.
  2. Swing check valves, 4-inch diameter and larger

#### 1.02 RELATED SECTIONS:

- A. Section 40 05 23 - Common Work Results for Process Valves:

#### 1.03 REFERENCE STANDARDS

- A. American Society of Mechanical Engineers:
  1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings.
  2. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded.
  3. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings.
- B. ASTM International:
  1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
  2. ASTM A536 - Standard Specification for Ductile Iron Castings.
  3. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
  4. ASTM B148 - Standard Specification for Aluminum-Bronze Sand Castings.
  5. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
  6. ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

7. ASTM D3222 - Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.

8. ASTM D4101 - Standard Specification for Propylene Injection and Extrusion Materials.

C. American Water Works Association:

1. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.

D. National Sanitation Foundation International:

1. NSF 61 - Drinking Water System Components - Health Effects.

#### 1.04 SUBMITTALS

A. Product Data:

1. Submit catalog information, indicating materials of construction and compliance with indicated standards.

B. Source Quality-Control Submittals: Indicate results of shop/factory tests and inspections.

## **PART 2 PRODUCTS**

### 2.01 SWING CHECK VALVES, 1-INCH THROUGH 4-INCH DIAMETER

A. Description:

1. Horizontal T-pattern style. 2. 200# WOG.

2. Capable of functioning in the vertical position.

3. Connections shall be standard threaded or threaded for fire hose connections where shown on plans

B. Materials:

1. Body Cap and Disc: Brass conforming to ASTM B584 C85400.

C. Manufacturer:

1. Figure 246 as manufactured by Red White Valve.

### 2.02 SWING CHECK VALVES, 4-INCH DIAMETER AND LARGER

A. Description:

1. Meeting requirements of AWWA C508.
2. Type: Swing, resilient-seated, with outside lever and adjustable weight.
3. Flow Area: Full open.
4. Mounting: Horizontal or vertical.
5. Shall close tightly when the pressure downstream of the valve disc exceeds the upstream pressure.
6. Working Pressure: 150 psi.
7. Tight sealing, shockless in operation and absolutely prevent the return of water back through the valve.
8. The disc shall be attached to the sic arm by means of a center pin, disc nut and washer providing 360-degree angular articulation but not rotation.
9. Pin Shaft:
  - i. Discs shall be suspended from a non-corrosive hinge pin shaft that shall rotate freely without the need for external lubrication.
  - ii. The shaft shall be sealed where it passes through the body by means of a stuffing box and adjustable packing.
10. End Connections: As shown on Drawings. End connections shall be rated to the working pressure requirements specified above.

B. Materials:

1. Body and Disc: Constructed of heavy cast iron conforming to ASTM A126 class B, or ductile iron conforming to ASTM A536.
2. Cover: Steel conforming to ASTM A36 or Ductile iron conforming to ASTM A536.
3. Disc Arm: Ductile iron conforming to ASTM A536.
4. Body Seat: Type 316 stainless steel or Bronze ASTM B62.
5. Disc Seat: Field-replaceable, NBR or Buna-N.
6. Hinge Pin and Key: Stainless steel.
7. Rubber Components: NBR or Buna-N.

8. Connecting Hardware: Stainless steel.

C. Finishes:

1. Epoxy lining and coating conforming to AWWA C550.
2. For potable water service, epoxy lining and coating shall meet be provided with NSF 61 certification.

D. Manufacturer:

1. GA Industries, Figure No. 220-D.
2. Cla-Val, 585 Series.
3. Approved equal.

2.03 SOURCE QUALITY CONTROL

A. Testing:

1. Hydrostatically test check valves at twice rated pressure, in conformance with requirements of AWWA C508.
2. Permitted Leakage at Indicated Working Pressure: None.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install check valves according to AWWA C508, Section 40 05 23 Common Work Results for Process Valve, and as recommended by manufacturer.

3.02 SERVICES PROVIDED BY MANUFACTURER'S REPRESENTATIVES

- A. Provide the services of the valve manufacturer's representative to verify proper installation of the valves and to adjust the valves when construction is complete.

**END OF SECTION**

## SECTION 40 05 23.72 MISCELLANEOUS VALVES

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section includes miscellaneous valves not included in other Sections for use in buried service, pump stations, and utility vaults.
- B. Section Includes:
  - 1. Solenoid valves.
  - 2. Combination air/vacuum valves.
  - 3. Flap valves.
  - 4. Duckbill-Style Check Valve
  - 5. Ball valves, 2 inches and under-bronze
  - 6. Ball valves, 2 inches and under-stainless steel

#### 1.02 RELATED SECTION

- A. Section 05 50 00, Metal Fabrications.
- B. Section 09 90 00, Painting and Coating.
- C. Section 40 05 13, Common Work Results for Process Piping.
- D. Section 40 05 23, Common Work Results for Process Valves.

#### 1.03 REFERENCE STANDARDS

- A. American Society of Mechanical Engineers:
  - 1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings.
  - 2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through 24 - Metric/Inch Standard.
  - 3. ASME B16.11 - Forged Fittings, Socket-Welding and Threaded.
  - 4. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.
  - 5. ASME B1.20.1 - Pipe Threads, General Purpose (Inch).



B. ASTM International:

1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
2. ASTM A536 - Standard Specification for Ductile Iron Castings.
3. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.

1.04 SUBMITTALS

A. Product Data:

1. Submit manufacturer's latest published literature. Include illustrations, installation and maintenance instructions, and parts lists.
2. Submit valve cavitation limits.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Manufacturer Instructions: Submit installation instructions and special requirements, including storage and handling procedures.

D. Lining and coating data.

E. Valve Labeling Schedule: Indicate valve locations and nametag text.

F. Certification of Valves Larger than 12 inches: Furnish certified copies of hydrostatic factory tests, indicating compliance with applicable standards.

G. Source Quality-Control Submittals: Indicate results of factory tests and inspections.

H. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections, including factory-applied coatings.

**PART 2 PRODUCTS**

2.01 SOLENOID VALVES

A. Description:

1. Type: As indicated on Drawings
2. Working Pressure: 150 psig
3. Coil: Continuous duty.

4. Operation: Fail closed, energize to open.
5. Enclosures: NEMA rated according to area designation as indicated on Drawings.
6. Electrical Characteristics: As indicated on Drawings
7. End Connections: Screwed
8. Conduit Connection: As shown on Drawings

B. Materials:

1. Body: Brass or ASTM B62, bronze
2. Trim and Spring: Stainless steel.
3. Seals: Resilient, PTFE

## 2.02 COMBINATION AIR/ VACUUM VALVES

A. Air Valve Description:

1. Inlet Size: 2-inch diameter.
2. Body and base manufactured in 316 stainless steel or reinforced nylon.
3. Polypropylene float.
4. Air and Vacuum Seal and Air Release Seal: EPDM

B. Manufacturers and Models:

1. Air Valve: ARI – D-025 L series or approved equal.

## 2.03 FLAP VALVES

A. Description:

1. Material: ASTM A126, cast iron.
2. Seat and hinge pin: Bronze.
3. End connection: 125-pound flange, unless otherwise noted on the Drawings.
4. Two pivot points.
5. Valves 14-inches and smaller shall have the hinge pin secured with cotter pins.
6. Valves 16-inches and larger shall have the hinge pin secured with nuts.

B. Manufacturers:

1. M & H, Style 47 or approved equal.

2.04 DUCKBILL-STYLE CHECK VALVE

A. Description:

1. Duckbill-style check valves shall allow fluid to discharge through the valve and prevent flow in the reverse direction.
2. The duckbill-style valve shall be one-piece elastomer matrix with internal fabric reinforcing designed for low cracking pressure and minimum headloss.
3. The duckbill style valve shall be provided in EPDM elastomer that is resistant to hydrogen sulfide and is designed for use in domestic wastewater. It shall be provided as a slip-on sleeve connection to a pipe end and fastened with stainless steel clamps.

B. Manufacturer:

1. Duckbill-style check valve shall be model TF-2 as manufactured by Tideflex, or approved equal.

2.05 BALL VALVES, 2 INCHES AND UNDER - BRONZE

A. Description:

1. 400 lb. WOG with bronze body and trim, unless otherwise shown on the Drawings.
2. Seat ring: TFE.
3. O-ring seals: Fluorocarbon.
4. Three-piece construction so that maintenance can be performed without distributing the valve body after installation.

B. Manufacturer:

1. Nibco T-590-Y or equal.

2.06 BALL VALVES, 2 INCHES AND UNDER - STAINLESS STEEL

A. Description:

1. 1,000 psi rated with stainless steel body and trim.
2. Seat and union seal: Reinforced PTFE.

3. Three-piece construction so that maintenance can be performed without distributing the valve body after installation.
- B. Manufacturer:
1. Nibco T-595-S6-66-LL or equal.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install valves per manufacturer requirements and recommendations.
- B. Install all valves with valve seats level.
- C. Install protective strainers upstream of solenoid valves, pressure-reducing valves, and pressure-sustaining valves.

**END OF SECTION**

## SECTION 43 21 00 LIQUID PUMPS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. The provisions of this Section shall apply to all pumps and pumping equipment except where otherwise indicated.
- B. Where two or more pump systems of the same type or size are required, all pumps shall all be produced by the same manufacturer.
- C. Provide all labor, equipment and materials and perform all operations in connection with the installation and testing of pumps selected by the OWNER.
- D. Coordinate and utilize all factory testing, installation, start-up and field-testing services supplied in conjunction with the pumping equipment.
- E. All work performed under this Section shall be in accordance with all approved trade practices and manufacturer's recommendations.
- F. Section includes:
  - 1. General design requirements for liquid pumps.
  - 2. Factory testing.
- G. Related Requirements:
  - 1. Section 43 21 39 - Submersible Liquid Pumps.
  - 2. Section 01 75 16 – Testing, Training, and System Start-up

#### 1.02 SUBMITTALS

- A. Shop Drawings: Provide the following information:
  - 1. Pump name, identification number and applicable Section number from Project specifications.
  - 2. Performance Data Curves:

- i. Showing head, capacity, horsepower demand, NPSH required and pump efficiency over the entire operating range of the pump.
  - ii. Pump manufacturer shall indicate separately the head, capacity, horsepower demand, overall efficiency and minimum submergence required at the design flow conditions and the maximum and minimum flow conditions.
  - iii. A family of performance curves at intervals of 100 rpm from minimum speed to maximum speed shall be provided for each centrifugal pump equipped with a variable speed drive, and a curve for each speed on two-speed pumps.
- 3. The limits on the performance curves recommended for stable operation without surge, cavitation or excessive vibration.
- 4. Assembly and Installation Drawings: Including shaft size, seal, coupling, bearings, anchor bolt plan, part nomenclature, material list, outline dimensions, and shipping weights.
- B. Complete motor nameplate data as defined by NEMA, motor manufacturer and any motor modifications.
- C. Operation and Maintenance Manual: Containing the required information for each pump section.
- D. Spare Parts List: Containing the required information for each pump section.
- E. Factory Test Data: Signed, dated and certified for each pump system which requires factory testing submitted before shipment of equipment.
- F. Certifications:
  - 1. Manufacturer's certification of proper installation.
  - 2. CONTRACTOR's certification of satisfactory field testing.
- G. Reference Section 01 75 16, Part 1.3 for additional submittal requirements related to this section.

## **PART 2      PRODUCTS**

### **2.01    GENERAL**

- A. Materials and equipment shall be standard products of a manufacturer and distributor regularly engaged in the manufacture and distribution of such products for at least 2 (two) years and shall be suitable for the service intended.
- B. All materials and equipment shall be new and unused except for the testing specified herein.

- C. Compliance with the requirements of the individual pump sections may necessitate modifications to the manufacturer's standard equipment.
- D. The complete pump assembly shall be designed and built for continuous service at all points within the specified range of operation, without overheating, without damaging cavitation, and without excessive vibration or noise.
- E. All centrifugal pumps shall have a continuously rising performance curve. In no case shall the required horsepower at any point on the performance curve exceed the rated horsepower of the motor or engine or encroach on the service factor.
- F. All components of each pump system provided under the pump sections shall be entirely compatible. Each unit of pumping equipment shall incorporate all basic mechanisms, couplings, electric motors or engine drives, variable speed controls, necessary mountings and appurtenances.
- G. The pumping units shall all be supplied by one manufacturer and shall be complete including pumps, motors, suction cans, baseplates, couplings, guards and other accessories.
- H. All materials and coatings in contact with potable water shall be ANSI/NSF Standard 61 approved.
- I. The pumps shall be supplied by a distributor authorized to service them throughout the warranty period and beyond. The distributor shall be located within a 100-mile radius of the site.
- J. The pumps shall be warranted by the manufacturer for a minimum of one (1) year from the date of installation, unless otherwise specified in the individual pump Specification Section.

## 2.02 MATERIALS

- A. All materials shall be suitable for the intended application; materials not specified shall be high-grade, standard commercial quality, free from all defects and imperfection that might affect the serviceability of the product for the purpose for which it is intended, and shall conform to the following requirements:
  1. Cast iron pump casings and bowls shall be of close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Casings, Class 30, or equal.
  2. Stainless steel pump shafts shall be Type 416 or 316.
  3. Miscellaneous stainless steel shall be of Type 316, except in a septic environment.
  4. Anchor bolts, washers, and nuts supplied by the CONTRACTOR for non-corrosive applications shall be stainless steel in accordance with the requirements of Section 05 50 00, Metal Fabrications.

## 2.03 PUMP COMPONENTS, GENERAL

1. Flanges: Suction and discharge flanges shall conform to ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 12, 125, 250, and 800 or B16.5 - Flanges and Flanged Fittings dimensions.
2. Handholes: Handholes on pump casings shall be shaped to follow the contours of the casing to avoid any obstructions in the water passage.

#### 2.04 PUMP APPURTENANCES

- A. Nameplates: Each pump shall be equipped with a stainless-steel nameplate indicating serial numbers, rated head and flow, impeller size, pump speed and manufacturer's name and model number.

#### 2.05 FACTORY TESTING

- A. The following tests shall be conducted on each indicated pump system:
  1. Pump Systems: All centrifugal pump systems shall be tested at the pump factory in accordance with: the American National Standards Institute, Rotodynamic Pumps for Hydraulic Performance Tests, ANSI/HI 14.6; or the American National Standards Institute, Rotodynamic Submersible Pumps for Hydraulic Performance, Hydrostatic Pressure, Mechanical and Electrical Acceptance Tests (ANSI/HI 11.6) as approved by ANSI and published by the Hydraulic Institute. Tests shall be performed using the complete pump system to be furnished, including the motor.
  2. The following minimum test data shall be submitted:
    - i. Hydrostatic test data.
    - ii. A minimum of five hydraulic test readings between shutoff head and 25 percent beyond the maximum indicated capacity, recorded on data sheets as defined by the Hydraulic Institute.
    - iii. Pump curves showing head, flow, bhp, and efficiency.
    - iv. Submersible motor integrity test data.
    - v. Vibration test data.
  3. Acceptance: In the event of failure of any pump to meet any of the requirements, the CONTRACTOR and Pump Manufacturer shall make all necessary modifications, repairs or replacements to conform to the requirements of the Contract Documents and the pump shall be retested at no additional cost to the OWNER until found satisfactory.



## **PART 3 EXECUTION**

### **3.01 SERVICES OF PUMP MANUFACTURER**

- A. As part of this construction contract, the CONTRACTOR shall utilize the full services for start-up and testing services from the Pump Supplier as specified in specification section 01 75 16 Testing, Training and System Start-up.
- B. An authorized service representative of the manufacturer shall visit the Site to witness the following and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted and readied for operation:
  - 1. Installation of the equipment.
  - 2. Inspection, checking and adjusting the equipment.
  - 3. Start-up and field testing for proper operation.
  - 4. Performing field adjustments to ensure that the equipment installation and operation comply with requirements.
  - 5. Requirements are more specifically detailed herein and in individual pump specifications.
- C. Instruction of the OWNER's Personnel:
  - 1. An authorized training representative of the manufacturer shall visit the Site to instruct the OWNER's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment.
  - 2. The pump manufacturer's representative shall have at least two years' experience in training.
  - 3. Reference Section 01 75 16, Part 1.8 for additional requirements.

### **3.02 INSTALLATION**

- A. General: Pumping equipment shall be installed in accordance with the manufacturer's written recommendations.
- B. Alignment:
  - 1. All equipment shall be field tested to verify proper alignment, operation as specified and freedom from binding, scraping, vibration, shaft runout or other defects.
  - 2. Pump drive shafts shall be measured just prior to assembly to ensure correct alignment without forcing.
  - 3. Equipment shall be secure in position and neat in appearance.

C. Lubricants: Provide the necessary oil and grease for initial operation.

### 3.03 FIELD TESTS

- A. Each pump system shall be field tested after installation to demonstrate satisfactory operation without excessive noise, vibration, cavitation or overheating of bearings.
- B. Field testing methods and allowable tolerances shall comply with current version of the Hydraulics Institute standards for the type of pumps installed.
- C. The approved start-up and testing plan from Section 01 75 16 shall be followed in conducting field testing. Field testing shall include:
1. Start-up, check and operate the pump system over its entire speed range. Where vibration analysis and measurement is required, it shall be within the amplitude limits specified and recommended by the Hydraulic Institute Standards at a minimum of four pumping conditions defined by the ENGINEER.
  2. Obtain concurrent readings of motor voltage, amperage, pump suction head and pump discharge head for at least four pumping conditions at each pump rotational speed. Check each power lead to the motor for proper current balance.
  3. Electrical and instrumentation tests shall conform to the requirements of the Section under which that equipment is specified.
- D. Field testing will be witnessed by the ENGINEER. The CONTRACTOR shall furnish three days advance notice of field testing.
- E. In the event any pumping system fails to meet the test requirements, it shall be modified and retested as above until it satisfies the requirements.
- F. After each pumping system has satisfied the requirements, the CONTRACTOR shall certify in writing that it has been satisfactorily tested and that all final adjustments have been made. Certification shall include the date of the field tests, a listing of all persons present during the tests and the test data.
- G. CONTRACTOR shall bear all costs of field tests, including additional services of the manufacturer's representative required beyond those specified.

**END OF SECTION**

## SECTION 43 21 39 SUBMERSIBLE LIQUID PUMPS

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. This Section includes furnishing, start-up, testing, and operation training for submersible sewage pumps.
- B. Section includes:
  - 1. Submersible sewage sump pumps.
- C. Related Sections
  - 1. Section 01 75 16, Testing, Training & System Start-Up.
  - 2. Section 10 14 10, Identifying Devices.
  - 3. Section 26 09 00, Instrumentation and Control
  - 4. Section 40 05 13, Common Work Results for Process Piping.
  - 5. Section 43 21 00, Liquid Pumps.

#### 1.02 REFERENCE STANDARDS

- A. ASTM International:
  - 1. ASTM A48 - Standard Specification for Gray Iron Castings.
  - 2. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
- B. National Electrical Manufacturers Association:
  - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

#### 1.03 SUBMITTALS

- A. Per the requirements of Section 43 21 00, Liquid Pumps.
- B. Per the requirements of Section 01 75 16, Testing, Training & System Start-Up.
- C. Applicable material certifications and testing certificates.

#### 1.04 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

- B. Pump Supplier: Manufacturer’s installation and operation certificate. Statement that the equipment is suitable for the intended use
- C. Reference Section 01 75 16, Part 1.12(A) for submittals required for pump station start-up acceptance.

1.05 PUMP OPERATING CONDITIONS

- A. Each pump shall be capable of providing the following hydraulic conditions:

Design Flow	700 gpm
Total Dynamic Head @ Design Flow	49.2 ft
Pump Efficiency	71.3%
Motor Horsepower	15 hp
Minimum Shut-off Head	
Minimum Solid Size	N/A

- B. Liquid is raw, unscreened municipal wastewater at a maximum temperature of 104°F. This sewage may contain rags, grit, debris, fats, oil, and grease.
- C. Hydraulic conditions may vary slightly based on pump selection if an alternative product is submitted for approval. Requests for approval of an alternate product shall include the submittal documentation required under Section 43 21 00, Part 1.2(A). Variations of hydraulic conditions shall be reviewed by the Engineer to determine acceptance.

1.06 FACTORY TESTING

- A. Pump manufacturer shall provide factory tests in accordance with Section 43 21 00, Liquid Pumps.

1.07 COORDINATION

- A. Like items of equipment specified herein shall be the end product of one manufacturer.
- B. Electrical controls and motor design requirements are specified in this Section and Division 26, Electrical.
- C. Coordinate pump requirements with the pump drive manufacturer. Contractor shall be responsible for the overall pump and drive performance.

1.08 WARRANTY

- A. The pump manufacturer shall furnish the Owner with a written warranty to cover the pumps, motors, guide and lift systems, and power/control cables against defects in workmanship and material for a minimum period of five (5) years and shall meet or exceed the following warranty requirements:
  - 1. Full warranty for the first 2 years.
  - 2. Limited 50% warranty for any claim during years 3 and 4.
  - 3. Limited 25% warranty for any claim during the 5th year.
- B. Pumps repaired under full or limited warranty will be returned to the Owner freight prepaid.

**PART 2 PRODUCTS**

2.01 DESCRIPTION

- A. Manufacturers:
  - 1. Xylem, Flygt, Model NP 3153 HT 3~ 464
    - i. Motor number N3153.095 21-15-AA-W
  - 2. Approved equal.

B. Identification:

Location	Wet Well
Pump Label(s)	P-1, P-2
Quantity	2

C. Power and Motor Requirements:

Voltage	460
Phase	3
Frequency	60 Hz
Motor Speed	1,760 rpm
Motor Horsepower	15

D. Performance Requirements at Full Pump Speed, One Pump Running

Duty Point	700 gpm
Duty Point	49.2 feet TDH
Duty Point Minimum Pump Efficiency	~70%
NPSH required at Duty Point	~16.4 feet

E. Operating Conditions:

Duty	Continuous
Drive	Soft Start
Ambient Environment	Wet Well - Corrosive
Ambient Temperature	33° - 104° F
Fluid Service	Unscreened municipal wastewater
Minimum Solids Passing Capability	Flygt N-Impeller
Fluid Temperature	33° - 104° F
Fluid pH Range	5.5 to 10.0
Fluid Specific Gravity	1.0

F. Pumping System Dimensions:

Minimum Pump Discharge Size	4-inch
Base Elbow Discharge Size	4-inch
Discharge Flange Rating (ANSI)	Class 125
Minimum Submersible Cable Length	As Required

## 2.02 PUMP CONSTRUCTION

A. Pump, General:

1. Heavy-duty, vertical, submersible pump with integral drive motor, single suction, centrifugal, sewage type, suitable for a permanent-type wet well installation.

2. Major pump components shall be of gray cast iron, ASTM A48, Class 35B, with smooth surfaces devoid of blow holes or other casting irregularities.
3. All exposed nuts or bolts shall be AISI type 304 stainless steel.
4. All metal surfaces in contact with the pumped media, other than stainless steel, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

B. Impeller:

1. Hard-Iron™: ASTM A-532 (Alloy III A), 25% chrome high strength cast iron alloy.
2. The impeller shall be of semi-open, multi-vane, backswept, non-clog design.
3. Vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across spiral grooves located on the volute suction to maintain unobstructed pumping.
4. Screw-shaped leading edges of the gray-iron impeller shall be hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in raw wastewater.
5. Screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater.
6. Impeller shall be locked to the shaft, held by an impeller bolt and treated with a corrosion inhibitor.

C. Volute:

1. Single piece gray cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller.
2. Minimum inlet and discharge size shall be as specified.
3. The volute shall have a replaceable suction cover insert ring in which are cast spiral-shaped, sharp-edged groove(s).
4. The spiral groove(s) shall provide trash release pathways and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so to remain unobstructed.
5. The insert ring shall be cast of Hard-Iron™ and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

D. Shaft:

1. Pump and motor shaft shall be a solid continuous shaft.
2. The pump shaft shall be an extension of the motor shaft.
3. Couplings will not be acceptable.
4. The pump shaft shall be stainless steel ASTM A479 S43100-T.
5. The shaft shall be adequately designed to endure alternating bending stresses and to provide for minimum overhang to reduce shaft deflection and prolong bearing life.

E. Bearings:

1. The pump shaft shall rotate on at least three grease-lubricated bearings.
2. The upper bearing, provided for radial forces, shall be a single roller bearing.
3. The lower bearings shall consist of at least one roller bearing for radial forces and one or two angular contact ball bearings for axial thrust.
4. The minimum L10 bearing life shall be 50,000 hours at any point along the usable portion of the pump curve at maximum product speed.
5. The lower bearing housing shall include an independent thermal sensor to monitor the bearing temperature.

F. Mechanical Seal:

1. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies.
2. The lower seal shall be independent of the impeller hub. The seals shall operate in a lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate.
3. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring.
4. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring. Each seal interface shall be held in contact by its own spring system.
5. The seals shall not require maintenance or adjustment and shall be capable of operating in either clockwise or counterclockwise direction of rotation without



damage or loss of seal. Should both seals fail and allow fluid to enter the stator housing, a port shall be provided to direct that fluid immediately to the stator float switch to shut down the pump and activate an alarm.

6. Any intrusion of fluid shall not come into contact with the lower bearings.
7. Conventional double mechanical seals with a single or a double spring between rotating faces, or that require constant differential pressure to affect sealing and are subject to opening and penetration by pumping forces, will not be acceptable.
8. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti leak seal, shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication.
9. The motor shall be able to operate continuously while not submerged without damage while pumping under load. Seal lubricant shall be FDA approved.

#### G. Cooling System:

1. Each pump/motor unit shall be provided with an integral, self-supplying cooling system. The motor water jacket shall encircle the stator housing and shall be of cast iron, ASTM A 48, Class 35B. The water jacket shall provide heat dissipation for the motor regardless of whether the motor unit is submerged in the pumped media or surrounded by air.
2. After passing through a classifying labyrinth, the impeller back vanes shall provide the necessary circulation of the cooling liquid, a portion of the filtered pump media, through the cooling system. Two cooling liquid supply pipes, one discharging low and one discharging high within the jacket, shall supply the cooling liquid to the jacket.
3. An air evacuation tube shall be provided to facilitate air removal from within the jacket. Any piping internal to the cooling system shall be shielded from the cooling media flow allowing for unobstructed circular flow within the jacket about the stator housing. Two cooling liquid return ports shall be provided.
4. The internals to the cooling system shall be non-clogging by virtue of their dimensions. Drilled and threaded provisions for external cooling and seal flushing or air relief are to be provided.
5. The cooling jacket shall be equipped with two flanged, gasketed and bolted inspection ports of not less than 4-inch diameter located 180 degrees apart.
6. The cooling system shall provide for continuous submerged or completely non-

submerged pump operation in liquid or in air having a temperature of up to 40°C (104°F), in accordance with NEMA standards. Restrictions limiting the ambient or liquid temperatures at levels less than 40°C are not acceptable.

#### H. Mix-Flush Valve:

1. One pump shall be fitted with a mix-flush valve.
2. The valve shall be hydraulically operated to automatically close after a specified time that is integral to the pump volume.

#### I. Pump Discharge Elbow:

1. The pump discharge connection shall be the elbow type.
2. The discharge connection shall be bolted to the structure as recommended by the manufacturer and shall serve as a lower attachment for the guide rails, and as anchorage for the pump.
3. The anchorage system shall be designed to transmit all forces safely to the structure, and may incorporate intermediate supports as required.
4. The design shall be non-sparking and shall conform to UL requirements for installation in a Class 1, Division 1, Group D hazardous location.
5. When in place, the discharge connection shall cause a watertight seal between the pump and the discharge elbow, accomplished by a machined metal to metal contact only, using simple linear downward motion of the pump with the entire weight of the pumping unit guided to and pressing tightly against the discharge connections.
6. Sealing of the discharge interface with a diaphragm, O-ring, or profile gasket shall not be acceptable. No portion of the pump shall bear directly on the floor of the wet well and no rotary motion of the pump shall be required for sealing.

#### J. Dual Rail Guide System

1. The pump shall be provided with a dual rail guide system to automatically and firmly connect the pump to the discharge piping when lowered into place on the discharge elbow.
2. Once the pump has been positioned on its support fitting at the discharge elbow, the guide rail system shall not be required for pump support.
3. The guide rail system shall allow easy removal of the pump without entering the wet well or disturbing the discharge piping. Single rail systems are not acceptable.

4. All components of the guide system and pump anchorage shall be of stainless steel.

#### K. Lifting Devices:

1. Each pump shall be provided with Flygt Pump Lift Lifting System.
2. Provide minimum of 10 meters (33 ft.) of nylon line, of diameter matching weight of lifting chain required, connected to a short length (approximately ten links long) of high tensile strength proof-tested stainless-steel chain of required capacity, connected to the lifting eye or lifting bail of the submersible pump.
3. Provide a forged “grip-eye” of stainless steel, provided separately to connect to the end of the lifting cable or chain of the pump lifting device.
4. All lifting devices shall be rated as lifting devices and shall be provided with certification indicating they are rated for lifting device service.

### 2.03 MOTORS

#### A. General:

1. Each pump shall be provided with a vertically mounted electric motor that conforms to the following requirements:
  - i. Motors shall be designed to accept the total, unbalanced thrusts imposed by the pump.
  - ii. The motor and the pump shall be produced by the same manufacturer.
  - iii. The motor shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

#### B. Motor Design:

1. The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber.
2. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%.
3. The stator shall be heat-shrink fitted into the cast iron stator housing.
4. The use of multiple step dip and bake-type stator insulation process is not acceptable.
5. The use of bolts, pins or other fastening devices requiring penetration of the stator

housing is not acceptable.

6. The motor shall be specifically designed for submersible pump usage and designed for continuous duty pumping media of up to 40°C (104°F) with an 80°C temperature rise and capable of at least 30 evenly spaced starts per hour.

C. Service Factors:

1. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15.
2. The motor shall have a voltage tolerance of plus or minus 10%.
3. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C.
4. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no load characteristics.

D. Moisture Protection:

1. A mechanical float switch (FLS) shall be mounted in the junction chamber to signal if there is water intrusion.

E. High Temperature Protection:

1. Thermal switches shall be embedded in the stator end coils to monitor the temperature of each phase winding.
2. One PT-100 type temperature sensor shall be installed in the stator winding.
3. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel.
4. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals.

F. Power Cable:

1. The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices.
2. The power cable shall be of a shielded design in which an overall tinned copper shield is included and each individual phase conductor is shielded with an aluminum coated foil wrap.

3. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber.
4. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.

G. Pilot Cable:

1. The pilot cable for connection to the pump protection sensors shall be shielded, twisted pair cable integral with the power cable.

H. Cable Entry Seal:

1. The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal.
2. The cable entry shall consist of dual cylindrical elastomer grommets, flanked by washers, all having a close tolerance fit against the cable outside diameter and the cable entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function.
3. The assembly shall provide ease of changing the cable when necessary using the same entry seal.
4. The cable entry junction chamber and motor shall be sealed from each other, which shall isolate the stator housing from foreign material gaining access through the pump top.
5. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

## 2.04 PROTECTION

- A. All stators shall incorporate three bi-metal thermal switches, one for each stator phase winding, connected in series to monitor temperature of the motor winding. Should high temperature occur, the thermal switches shall open, stop the motor and activate an alarm.
- B. A float switch shall be provided in the seal leakage chamber to detect water intrusion into the stator housing. When activated, the switch will activate an alarm but not stop the motor.
- C. The thermal switches and float switch shall be connected to a Mini-CAS II unit. The Mini-CAS unit shall be designed for mounting in the control panel. Thermal switches shall be connected to the normally open over temp contact of the Mini-CAS II unit, in accordance with the wiring diagram in the Plans.

## 2.05 OTHER REQUIREMENTS

- A. The head-capacity curve shall exhibit a uniformly rising characteristic from free

discharge to shutoff. The pump motor shall be non-overloading at a flow rate equal to 125-percent of Duty Point without employing the service factor.

- B. The entire pump assembly shall be U.L. approved as Explosion Proof for operation in a Class 1, Division 1, Group D hazardous location.

## 2.06 PUMP CONTROL SYSTEM

- A. The pump control system shall include a pressure transducer for primary level control, redundant level control floats and an overflow alarm level float in the wet well as shown or specified.
- B. Pump control system shall be as shown on the drawings and specified in Division 26.

## **PART 3 EXECUTION**

### 3.01 INSPECTION

- A. Inspect pumps and fittings before installation to verify quality of material.

### 3.02 INSTALLATION

- A. Installation:
  1. Install and align pumps and fittings in accordance with the manufacturer's printed specifications and at the locations shown on the Drawings.
  2. Use anchor bolts furnished or recommended by the manufacturer.
  3. Place the pumps using equipment templates.
- B. Anchorage:
  1. Anchors for the unit shall be set in the concrete. Unit shall be mounted as instructed by the manufacturer.
  2. Anchors shall be drilled and set with epoxy.
  3. Provide 24 hours' notice prior to installing base elbows, to allow for anchor bolt inspection.
  4. The manufacturer shall supervise installation to ensure that the unit is properly aligned and leveled; that all electrical and piping connections are properly made; and that lubricants have been provided and installed.

### 3.03 START-UP AND TESTING

- A. See Section 01 75 16, Testing, Training & System Start-Up for additional requirements.

B. Pre-operational Checks:

1. Check pump and motor alignment.
2. Check for proper motor rotation.
3. Check pump and drive units for proper lubrication.

C. Manufacturer's Representative:

1. Furnish a representative of the manufacturer to perform inspection, start-up and training services.
2. The manufacturer's representative shall be experienced in the operation and maintenance of the equipment and shall instruct the Owner's personnel in the operation and maintenance of the equipment, including step-by-step troubleshooting with necessary test equipment.
3. Check pump and motor for high bearing temperature and excessive vibration.
4. The representative shall check the installation and supervise initial start-up of the equipment, and shall perform, at a minimum, the following tests on each pump:
  - i. Measure and record shutoff head and power draw at shutoff head.
  - ii. Measure and record actual operating head and power draw at actual operating head.
  - iii. Measure and record operating head and power draw at two separate partially throttled flow rates.
  - iv. Measure and record static head.
  - v. Duplicate all normal operating modes and all failure modes, including the removal and installation of pumps from the wet well using the guide rail system.
5. Testing shall include a comparison of measured installed flow and head, including shutoff head, with the manufacturer's curve value. Any discrepancy shall be resolved prior to acceptance by the Owner.
6. Manufacturer's Written Certification:

- i. The manufacturer's representative shall verify the complete assembly for proper alignment and connection, and quiet operation.
  - ii. This service shall be provided for a minimum period of one trip and one day.
  - iii. After the installation and operation of the equipment has been certified, the manufacturer's representative shall train the Owner's personnel in the proper operation and maintenance of the equipment.
- D. Verify pumps are operating at the design duty condition. Remove and replace units that do not meet the design operating criteria.
- E. For all pump tests, ensure that the force main is full of liquid during the testing. The Contractor shall provide the necessary water and other materials required for the testing as defined herein and recommended by the manufacturer. All testing shall use clean water as required by Section 01 75 16, Testing, Training & System Start-Up.
- F. Submersible Pump Lift Test:
  1. Lift each submersible pump above the access hatch and then lower the pump back down onto the discharge elbow to demonstrate adequate clearances, smooth operation of the guide rail system, and proper re-seating of the pump on the discharge elbow.
- G. A start-up report, acceptable to and approved by the Engineer, shall be completed by the manufacturer's representative before final acceptance of the pumps.

**END OF SECTION**



Part 6

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# **Supplementary Information**



## BIDDER'S CHECKLIST

- Bids are considered valid only if Bidder is listed on the City of St. Helens Official Plan Holder List. Contact the City's Administration Department at (503) 397-6272 to be placed on the Plan Holder List.
- Have you signed the bids for both the S. 1st and Strand Street Road and Utilities Extension Project and the S. 1st Street at St. Helens Street Intersection Improvements Project and included all the required bidder information?
- Have you acknowledged all issued addendums for both the S. 1st and Strand Street Road and Utilities Extension Project and the S. 1st Street at St. Helens Street Intersection Improvements Project?
- Has the Bidder information on the Bid Forms been completed?
- Are the prices on the Bid Schedules for both the S. 1st and Strand Street Road and Utilities Extension Project, and S. 1st Street at St. Helens Street Intersection Improvements Project been correctly computed? Have the prices of the Bid Schedules been stated in both written and numerical form on the Bid Forms?
- Is the amount of the Bid Bonds written in Item No. 12 of the Bid Forms?
- Have you included the required 10% Bid Bonds (Bond Surety)?
- Have you included the First-Tier Subcontractor Disclosure forms? Please note that forms must be submitted even if you do not have a first-tier subcontractor(s).
- Have you read and familiarized yourself with the Instruction to Bidders, Exhibit I of the Public Improvement Contract?

**This checklist is provided as guidance and assistance to bidders to avoid technical mistakes resulting in rejection of a bid. It is not intended to be all-inclusive and does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Bid Documents and the proper completion and submission of the bid. Bidders should not rely solely on this checklist. It is the Bidder's responsibility to review all contract bid documents, including but not limited to all contract specifications, special provisions, supplemental information, addenda, notice to contractors, etc.**

**This Check List is For Reference Only. It is Not Part of the Bid Forms and Does Not Have To Be Submitted With Your Bid.**

# GENERAL PROJECT DOCUMENTATION CHECKLIST



City of St. Helens  
Department of Public Works – Engineering Division  
265 Strand Street, St. Helens, OR 97051  
Phone: 503.397.6272 Fax: 503.366.3782

Documentation	Reference	When Required
<b>BID OPENING</b>		
Firm Offer (Bid) and Schedule of Prices and Bid Schedule	Bid Forms	At bid opening
Acknowledged Addenda	Bid Forms	At bid opening
First-Tier Subcontractor Disclosure Form	Bid Forms	Not later than 2 hours after bid opening
Bid Bond (Surety Bond)	Bid Forms	At bid opening
<b>PROJECT AWARD</b>		
Contractor Data, Certification, and Signature	Public Improvement Contract	Within 10 business days of project award
St Helens business license	Public Improvement Contract	Within 10 business days of project award
Proof of filing \$30,000 Public Works Bond with BOLI	Public Improvement Contract, Exhibit J	Within 10 business days of project award
Certificates of Insurance per Contract Requirements	Public Improvement Contract, Exhibit B	Within 10 business days of project award
Certification Statement for Corporation or Independent Contractor	Public Improvement Contract, Exhibit C	Within 10 business days of project award
Payment Bond in amount equal to 100% of awarded contract	Public Improvement Contract, Exhibit D	Within 10 business days of project award
Performance Bond in amount equal to 100% of awarded contract	Public Improvement Contract, Exhibit D	Within 10 business days of project award
<b>PRIOR TO START OF CONSTRUCTION</b>		
Construction Schedule	Special Provisions and Technical Specs	10 Days after Notice to Proceed
Designation of Superintendent / Competent Person Designation with	Special Provisions and Technical Specs	Submit at Pre-Construction Meeting
Designation of Emergency Maintenance Supervisor with 24-hour	Special Provisions and Technical Specs	Submit at Pre-Construction Meeting
Documentation to be sent to residents in project area	Special Provisions and Technical Specs	Prior to start of construction
Project Safety Plan	Special Provisions and Technical Specs	Prior to start of construction
Pre-Construction jobsite conditions (digital photo or video)	Special Provisions and Technical Specs	Prior to start of construction
Location of dump site	Special Provisions and Technical Specs	Prior to start of construction
24-Hours - 7 Day Contact Information (Contractor / Subcontractor)	Special Provisions and Technical Specs	Prior to start of construction
Product Data, including product literature, application, installation	Special Provisions and Technical Specs	Prior to start of construction
Shop drawings, schedules, and drawings	Special Provisions and Technical Specs	Prior to start of construction
MSDS on all materials to be used on site	Special Provisions and Technical Specs	Prior to start of construction
Materials and equipment list	Special Provisions and Technical Specs	Prior to start of construction
Traffic Control Plan	Special Provisions and Technical Specs	Prior to start of construction
Other required submittals as stated elsewhere in Contract Document	Special Provisions and Technical Specs	Prior to start of construction
<b>DURING CONSTRUCTION</b>		
Updated Construction Schedule, as required	Special Provisions and Technical Specs	Whenever schedule falls behind by 10+ Days
Required Testing	Special Provisions and Technical Specs	During construction, as required
<b>WEEKLY BASIS</b>		
Weekly certified payroll	Special Provisions and Technical Specs	Submit Before or with Pay Requests
<b>MONTHLY BASIS</b>		
Pay Requests	Special Provisions and Technical Specs	Submit on a monthly basis at a maximum
<b>AT SUBSTANTIAL COMPLETION</b>		
Exhibit E - Certificate of Substantial Completion	Exhibit E	*
<b>PRIOR TO FINAL ACCEPTANCE</b>		
Maintain and submit redline drawings showing all changes	Special Provisions and Technical Specs	Before Final Completion
Exhibit F - Certificate of Compliance submitted by Contractor	Exhibit F	After punchlist items are completed
Exhibit G - Release of Liens & Claims	Exhibit G	After punchlist items are completed
Exhibit H - Certificate of Final Completion issued by City	Exhibit H	After all documentation have been submitted & punchlist items are complete

*This project submittal list may be incomplete and may or may not list all submittals required on this project. This list shall be considered minimum and may be expanded during the course of the work at the direction of the Engineer. \*Work is considered substantially complete when, in accordance with the Contract Documents, the Owner can occupy or utilize the work for its intended use.*

Part 7

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# **Construction Drawings**

**(Separately Bound)**

**S. 1ST STREET AT ST. HELENS STREET  
INTERSECTION IMPROVEMENTS**

**PROJECT NO. R-685**

## INTRODUCTION AND TABLE OF CONTENTS

Contract Documents are listed below. Documents are either attached or bound separately and available from the Project Manager. All documents bound separately are incorporated into the Contract Documents and have the same force and effect as though set forth in full herein.

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EXHIBIT J	OREGON PREVAILING WAGE RATES

**PART 3: 2021 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION**

..... Available online  
Bound

**PART 4: CITY OF ST. HELENS ENGINEERING STANDARDS MANUAL**

..... Available online

In the event of a conflict, Supplementary Conditions control over all Standard Specifications and other Contract Documents. To the extent Standard Specifications and other Contract Documents conflict, the more restrictive requirement or provision shall control, except where otherwise noted in the Contract Documents, addenda, or amendment.

**PART 5: TECHNICAL SPECIFICATIONS & SPECIAL PROVISIONS**

.....See Technical Specifications Table of Contents

**PART 6: SUPPLEMENTARY INFORMATION**

Bidder’s Checklist  
Project Documentation Checklist

**PART 7: CONSTRUCTION DRAWINGS**

..... Separately Bound

Part 1

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# **Bid Documents**



**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
PROJECT NO. R-685  
FIRM OFFER (BID) AND SCHEDULE OF PRICES**

TO FURNISH ALL PERMITS, LABOR, TOOLS, MACHINERY, MATERIALS, TRANSPORTATION, EQUIPMENT AND SERVICES OF ALL KINDS REQUIRED FOR THE CONSTRUCTION OF THIS PROJECT FOR THE CITY OF ST. HELENS, COLUMBIA COUNTY, OREGON, AS STATED IN THE COMPLETED SCHEDULE OF PRICES, ALL IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, PLANS, SPECIFICATIONS, AND DRAWINGS WHICH ARE ON FILE AT THE CITY OF ST. HELENS, CITY HALL, 265 STRAND STREET, ST. HELENS, OREGON 97051.

<b>NAME OF BIDDER:</b> _____
<b>CONTACT:</b> _____
<b>ADDRESS:</b> _____
<b>CITY</b> _____ <b>STATE</b> _____ <b>ZIP</b> _____
<b>TELEPHONE NO.:</b> _____
<b>FAX NO.:</b> _____
<b>EMAIL ADDRESS:</b> _____

To the Honorable Mayor and City Council  
City Hall  
City of St. Helens  
265 Strand Street  
St. Helens, Oregon 97051

In response to competitive bidding, this FIRM OFFER is submitted as an offer by the undersigned to enter into a contract with the City of St. Helens for furnishing all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, the construction of this Project for the City of St. Helens, Oregon, as shown in the Contract Documents on file at City Hall, 265 Strand Street, St. Helens, Oregon, and which are a condition of this Offer as though they were attached. This offer is subject to the following declarations as to the acts, intentions and understandings of the undersigned and the agreement of the City of St. Helens to the terms and prices herein submitted.

1. The undersigned has familiarized themselves with the nature and extent of the Contract Documents, project Work, site, locality, general nature of Work to be performed by City or others at the site that relates to the project Work required by the Contract Documents, local conditions, and federal state, and local Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the project Work.
2. The undersigned has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) examinations, investigation, exploration, tests, and studies which pertain to the conditions (subsurface or physical) at or contiguous to the site or otherwise and which may affect the cost, progress, performance, or furnishing of the project Work as Contractor deems necessary for the performance and furnishing of the project Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents; and no additional or supplementary examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by Contractor for such purposes.
3. All of the Contract Documents, including all plans, specifications, and drawings have been examined and an examination of the site of the proposed Work, together with such investigations as are necessary to determine the conditions to be encountered have been made by the undersigned and the terms and conditions of the Contract and solicitation documents are hereby accepted, and that if this Offer is accepted, the undersigned will contract with the City of St. Helens, Oregon, using the form attached and agrees to be bound to the terms and conditions of said Contract and solicitation documents.
4. It is understood that the contract drawings may be supplemented by additional drawings and specifications in explanation and elaboration thereof and, if they are not in conflict with those referred to in paragraph 1 above, they

shall have the same force and effect as though they were attached and they shall be accepted as part of the Contract when issued.

5. The undersigned agrees that upon written acceptance of this bid s/he/it will, within ten working days, of receipt of such notice, execute a formal contract agreement with the City. The undersigned further agrees that s/he/it will provide the following in order to execute the Contract:
  - Performance Bond and Payment Bond, both in the amount equal to 100% of the awarded Contract;
  - Proof of filing of a Public Works Bond in the required statutory amount with BOLI
  - Certificates of Insurance for all required insurance coverages;
  - Certificates of Coverage for Workman Compensation and unemployment insurance; and
  - All other bonds, permits, licenses, etc. as required in the Contract Documents.
6. The quantities stated in the Schedule of Prices are approximate only and payment will be made at the unit prices stated for the actual quantities incorporated in the completed Work. If there is an increase in the total payment for an item covered by a lump sum price, it shall be computed on the basis of extra work for which an increase in payment will have been earned; and if there is a decrease in a lump sum payment for any such items, it shall be made only as the result of negotiation between the undersigned and the City.

**R-685 BID SCHEDULE OF PRICES FORM CAN BE FOUND SEPARATELY  
ON THE PROJECT WEBSITE**

The following **base bid** of \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_) is proposed for the project as described in the Contract Documents.

7. All items in the Schedule of Prices have been completed in full by showing a unit or lump sum price or prices for each and every item thereof. The price per item shall be clearly shown in the space provided. The pricing shall be extended to show the total when required.
8. The undersigned submits the unit prices as those at which he will perform the Work involved. The extensions of the column headed "ITEM TOTAL" are made for the sole purpose of facilitating bid comparisons and if there are any discrepancies between the unit prices and the total amount shown, the unit prices shall govern.
9. The undersigned agrees to furnish labor, tools, machinery, materials, transportations, equipment and services of all kinds required for, necessary for, or reasonably incidental to, construction of this Project with all appurtenant Work as required by the plans and specifications of this Offer for the unit or lump sum prices in the "SCHEDULE OF PRICES".
10. In stating prices, it is understood that the prices include all materials and Work required to complete the Contract in accordance with the plans and specifications. If any material, item or service required by the plans and specifications has not been mentioned specifically in the "SCHEDULE OF PRICES", the same shall be furnished and placed with the understanding that the full cost to the City has been merged with the several prices stated in the "SCHEDULE OF PRICES".
11. The undersigned shall furnish bonds required by the specifications and comply with the laws of the State of Oregon which are pertinent to construction contracts of this nature even though such laws may not have been quoted or referred to in the specifications.
12. Accompanying this Offer is a certified check, cashier's check or a bid bond, in the sum of \$ \_\_\_\_\_, payable to the City of St. Helens, Oregon, this being an amount for ten percent (10%) of the total bid based upon the estimate of quantities at the above price according to the conditions of the advertisement. If this Offer is accepted by the City and the undersigned fails to execute a satisfactory contract and bonds as stated in the Advertisement within ten (10) working days from

the date of notification, then the City may, at its option, determine that the undersigned has abandoned the contract and there upon this Offer shall be considered null and void, and the bid security accompanying this Offer shall be forfeited to and become the property of the City of St. Helens. If bid is not accepted, bid security accompanying this Offer shall be returned to the undersigned.

13. The undersigned agrees to be bound by and will comply with the provisions of ORS 279C.838 or 279C.840 or 40 U.S.C. 3141 to 3148, the Oregon Prevailing Wage law or the Federal Davis Bacon Act, as applicable.
14. The undersigned certifies that the undersigned Contractor is not ineligible to receive a contract for a public work pursuant to ORS 279C.860. Bidder further agrees, if awarded a contract, that every subcontractor will be eligible to receive a contract for a public work pursuant to ORS 279C.860.
15. The undersigned certifies that he undersigned Contractor has not discriminated against minority, women or emerging small businesses enterprises in obtaining any required subcontracts. The bidder understands and acknowledges that it may be disqualified from bidding on this public improvement project as set forth in OAR 137-049-0370, including but not limited to City discovery a misrepresentation or sham regarding a subcontract or that the Bidder has violated any requirement of ORS 279A.110 or the administrative rules implementing the Statute.
16. The undersigned agrees that the time of completion shall be defined in the specifications, and further, the undersigned agrees to initiate and complete this Project by the date stated below.  
The Work shall be commenced within five working days after receipt of the written Notice to Proceed.  
The Work shall be completed in all respects within 680 calendar days following issuance of the Notice to Proceed and shall be completed no later than September 15, 2024.
17. The undersigned bidder is licensed by the Oregon Construction Contractors Board, the registration is current and valid, and the bidder's registration number is stated below.
18. If applicable, the undersigned bidder is licensed by the State Landscape Contractors Board, the license is current and valid, and the bidder's registration number is stated below.
19. The undersigned acknowledges that, in determining the lowest responsible bidder, City shall, for the purpose of awarding the Contract, add a percent increase to each out-of-state bidder's bid price which is equal to the percent of preference given to local bidders in the bidder's home state, as set forth in the chart located at [www.oregon.gov/DAS/EGS/ps/Pages/RecipPref/detail\\_a\\_main\\_page.aspx](http://www.oregon.gov/DAS/EGS/ps/Pages/RecipPref/detail_a_main_page.aspx). "Resident bidder" of Oregon means a bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid that the bidder is a "resident bidder" of the State of Oregon. The undersigned represents him/her/it in this bid to be either a Resident or a Nonresident bidder by completing the appropriate blank below.
20. The undersigned hereby represents that no Commissioner, officer, agency or employee of the City of St. Helens is personally interested directly or indirectly in this Contract or the compensation to be paid hereunder and that no representation, statement or statements, oral or in writing, of the City, its Councilors, officers, agents or employees had induced him/her to enter into this Contract, and the documents made a part of its terms.
21. The undersigned has not directly or indirectly induced or solicited any person to submit a false or sham bid or refrain from bidding. The undersigned certifies that this bid has been arrived at independently and submitted without connection with any person, firm or corporation making a bid for the same project and is, in all respects, fair and without collusion or fraud.
22. The undersigned confirms that this firm has a Qualified Drug Testing Program for employees in place and will demonstrate this prior to award of Contract.
23. The undersigned confirms that if this Contract involves asbestos abatement or removal, the bidder is licensed under ORS 468A.710 for asbestos removal. Asbestos abatement is not implicated in this Contract.

- 24. The City of St. Helens may waive minor informalities, reject any bid not in compliance with all prescribed public bidding procedures and requirements, and may reject for good cause any or all bids upon a finding that it is in the public interest to do so.
- 25. The undersigned confirms that this offer is not contingent upon City's acceptance of any terms and conditions other than those contained in the Solicitation and Contract Documents.
- 26. The bidder acknowledges that the Addendum(s) listed below have been reviewed online or a copy obtained and considered as part of the submittal of this Offer and Schedule of Prices.

**ADDENDA NUMBERED [REDACTED] THROUGH [REDACTED] HAVE BEEN REVIEWED.**

- 27. Bidder information and signature.

---

**NAME OF BIDDER**

**BIDDER IS A RESIDENT OF THE STATE OF**

(See ORS 279A.120)

**CONSTRUCTION CONTRACTORS BOARD LICENSE NO**

---

**SIGNATURE OF BIDDER'S AUTHORIZED REPRESENTATIVE**

---

**OFFICIAL TITLE OF BIDDER'S AUTHORIZED REPRESENTATIVE**

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**DATE BID IS SIGNED**

**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS**

**Project No. R-685**

**City of St. Helens, Oregon**

Person designated to receive form: John Walsh, City Administrator Phone #: 503-397-6272

**BID SUBMISSION DEADLINE** Date: August 2, 2022 Time: 2:00pm AM PM

If the bid is more than \$100,000 this form must be submitted at the location specified in the Invitation to Bid on the advertised bid submission deadline and within two (2) working hours after the advertised bid submission deadline.

List below the Name, Dollar Value and Category of Work of each subcontractor that will be furnishing labor or labor and materials and that is required to be disclosed, the dollar value of the subcontract and the category of work that the subcontractor will be performing. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED).

SUBCONTRACTOR NAME	DOLLAR VALUE	CATEGORY OF WORK

The above listed first-tier subcontractor(s) are providing labor or labor and materials with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, or \$15,000 whichever is greater (including all alternates). If the Dollar Value is less than \$15,000 do not list the subcontractor above; or
- b) \$350,000 regardless of the percentage of the total Contract Price.

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award. THIS DOCUMENT SHALL NOT BE FAXED. IT IS THE RESPONSIBILITY OF BIDDERS TO SUBMIT THIS DISCLOSURE FORM AND ANY ADDITIONAL SHEETS BY THE DEADLINE. SEE INSTRUCTIONS TO BIDDERS.

Deliver form to: City Administrator  
City Hall, City of St. Helens  
265 Strand Street  
St. Helens, OR 97051

Form Submitted by (Bidder Name): \_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

## FIRST TIER SUBCONTRACTORS

Each first-tier subcontractor must disclose the following information before the Notice To Proceed shall be issued:

(Make additional copies as needed for each subcontractor)

**Subcontractor/Address:** \_\_\_\_\_

For: \_\_\_\_\_

\$ \_\_\_\_\_

Builders Board No. \_\_\_\_\_ Expires \_\_\_\_\_

Worker's Comp. Verified:       Yes       No

Insurance Company \_\_\_\_\_ Policy No. \_\_\_\_\_ Expires \_\_\_\_\_

City of St Helens Business License \_\_\_\_\_

**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT CONTRACT  
BID BOND SURETY**

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as "PRINCIPAL", and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as "SURETY",

hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (OBLIGEE) the sum of:  
(\$ \_\_\_\_\_)

\_\_\_\_\_ Dollars.

The condition of the obligation of this bond, is that the PRINCIPAL herein has in response to City's *Notice to Contractors and Invitation to Bid*, submitted its Offer for the **S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS PROJECT NO. R-685**, which Offer is incorporated herein and made a part hereof by this reference, and Principal is required to furnish bid security in an amount equal to ten (10%) percent of the total amount of the bid pursuant to ORS 279C.365 and the City's public contracting rules and contract documents.

NOW THEREFORE, if the Offer, submitted by PRINCIPAL, is accepted, and if the Contract pursuant to the Offer is awarded to the PRINCIPAL, and if the PRINCIPAL executes such Contract and furnishes such good and sufficient Performance and Payment Bonds as required by the Bidding and Contract Documents within the time specified and fixed by the Documents, then this obligation shall be void; otherwise it shall remain in full force and effect. If the PRINCIPAL shall fail to execute the proposed Contract and to furnish the Performance and Payment Bonds, the SURETY hereby agrees to pay the OBLIGEE the surety bond sum as liquidated damages within ten (10) days of such failure.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Surety

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

By: \_\_\_\_\_  
[A certified copy of the Agent's Power of Attorney must be attached hereto.]

By: \_\_\_\_\_ Attorney-in-Fact

Part 2

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# Contract Documents





**CITY OF ST. HELENS, OREGON  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT**

**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS**

**Project No. R-685**

This Contract is between the CITY OF ST. HELENS, a municipal corporation of the State of Oregon (City) and \_\_\_\_\_ (Contractor). The City's Project Manager for this Contract is Mouhamad Zaher.

**1. Effective Date and Duration**

This Contract is effective on \_\_\_\_\_, 20\_\_\_\_, or on the date at which every party has signed this Contract, whichever is later. The Work under this Contract shall, unless otherwise terminated or extended, be completed on or before September 15, 2024.

**2. Statement of Work**

The General Character of the Work includes but is not limited to intersection improvements at the S 1st Street - St. Helens Street intersections and includes new curb extensions, pedestrian crossings, signing, paving, striping, site furnishings, and landscaping.

The Work is fully described in the Contract Documents, which are hereby incorporated herein and made a part hereof by this reference. The statement of work, including the delivery schedule for the Work, is contained in **Exhibit A**. Contractor shall, at its own risk and expense, perform the Work described in the Contract Documents and furnish all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, performance of the Work, that is, the construction of this Project for the City of St. Helens, Oregon, as shown in the Contract Documents. Contractor shall secure all Municipal, County, State, or Federal Permits or licenses including but not limited to payment of permit fees, license fees and royalties necessary or incident to performance of the Work on this Contract. The risk of loss for such Work shall not shift to the City until written acceptance of the Work by the City.

**3. Consideration**

- a. City agrees to pay Contractor, at the times and in the manner provided in the Contract Documents, the sum of \_\_\_\_\_ (\$ \_\_\_\_\_) for accomplishing all the Work required by this Contract and the Contract Documents.
- b. Any progress payments to Contractor shall be made only in accordance with the schedule and requirements in **Exhibit A**, if applicable, and Section 21 of the Standard Terms and Conditions for Public Improvement Contracts.
- c. City certifies that sufficient funds have been appropriated to make payments required by this Contract during the current fiscal year. Payment for Work performed after June 30 of any given year is subject to funds being appropriated by the St. Helens City Council. If funds are not appropriated, the City may terminate this Contract for convenience by notice to the Contractor.

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**CONTRACTOR DATA, CERTIFICATION, AND SIGNATURE**

Business Name (Please Print): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Address: \_\_\_\_\_

Social Security #: \_\_\_\_\_ St. Helens Business License #: \_\_\_\_\_

Federal Tax ID#: \_\_\_\_\_ State Tax ID #: \_\_\_\_\_

Construction Contractors Board #: \_\_\_\_\_

Citizenship: Nonresident Alien  Yes  No

Business Designation (check one):  Individual  Sole Proprietorship  Partnership  
 Corporation  Government/Nonprofit

The above information must be provided prior to contract approval. Payment information will be reported to the Internal Revenue Service (IRS) under the name and taxpayer I.D. number provided above. (See IRS 1099 for additional instructions regarding taxpayer ID numbers.) Information not matching IRS records could subject you to withholding.

I, the undersigned, understand that the Standard Terms and Conditions For Public Improvement Contracts and Exhibits A through J together with all other Contract Documents as described in Section 5 of the Standard Terms and Conditions For Public Improvement Contracts, and the separately bound 2021 Oregon Standard Specifications for Construction, and the City Public Facilities Construction Standards Manual, are an integral part of this Contract and agree to perform the Work described in the Contract Documents, including but not limited to Exhibit A, in accordance with the terms and conditions of this Contract. I further understand the City is prohibited from entering into a contract when the contractor has neglected or refused to file any return, pay any tax, or properly contest a tax, pursuant to ORS305.385; I hereby certify, under penalty of perjury and false swearing, that I/my business am/is not in violation of any Oregon Tax Laws; I further certify that I am an independent contractor as defined in ORS 670.600.

Signed by Contractor:

\_\_\_\_\_  
Signature/Title Date

*NOTICE TO CONTRACTOR: This Contract does not bind the City of St. Helens unless and until it has been executed by the Mayor after authorization by the City Council at a public meeting.*

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**CITY OF ST. HELENS SIGNATURE**

Approved: \_\_\_\_\_  
Mayor Rick Scholl Date  
Authorized by the full Council on \_\_\_\_\_

Attest: \_\_\_\_\_  
City Recorder Date

Reviewed: \_\_\_\_\_  
City Attorney Date

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**CITY OF ST. HELENS**  
**STANDARD TERMS AND CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS**

**1. Contractor is Independent Contractor**

- a. Contractor shall perform the Work required by this Contract as an independent contractor. Although the City reserves the right (i) to specify the desired results; (ii) to determine (and modify) the delivery schedule for the Work to be performed; and (iii) to evaluate the quality of the completed performance, the City cannot and will not control the means, methods or manner of the Contractor's performance. The Contractor is responsible for determining the appropriate means, methods and manner of performing the Work.
- b. The Contractor represents and warrants that Contractor (i) is not currently an employee of the federal government or the State of Oregon, and (ii) meets the specific independent contractor standards of ORS 670.600, as certified on the Independent Contractor Certification Statement attached as Exhibit C.
- c. Contractor will be responsible for any federal, state or local taxes applicable to any compensation or payment paid to Contractor under this Contract.
- d. Contractor is not eligible for any federal Social Security, unemployment insurance, state Public Employees' Retirement System, or workers' compensation benefits from compensation or payments to Contractor under this Contract.

**2. Subcontracts and Assignment**

Contractor shall not subcontract any of the Work required by this contract, or assign, sell, dispose of, or transfer any of its interest in this contract, nor delegate duties under the contract, either in whole or in part, without the prior written consent of the City. Such consent, if provided, shall not relieve the Contractor of any of the obligations under the contract. Any assignee or transferee shall be considered the agent of the Contractor and be bound to abide by all provisions of the Contract. Contractor agrees that if subcontractors are employed in the performance of this contract, the Contractor and its subcontractors are subject to the requirements and sanction of ORS Chapter 656, Workers' Compensation.

Use of Subcontractors, material suppliers or equipment suppliers shall in no way release Contractor from any obligations of the Contract with City. Contractor will provide in all subcontract agreements that the Subcontractor, material supplier and equipment supplier will be bound by the terms and conditions of this Contract to the extent that they relate to the Subcontractor's work, material or equipment. All subcontracts are assignable to the City at City's option, in the event this agreement is terminated for default of Contractor.

**3. No Third Party Beneficiaries**

City and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

**4. Successors in Interest**

The provisions of this Contract shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and approved assigns, if any.

**5. Contract Documents**

The Contract Documents, which comprise the entire Contract between the City and Contractor, include all sections or parts of the bid package however denominated, including all documents and plans attached or referenced therein, the Notice to Contractors - Invitation to Bid, Offer, First-Tier Subcontractors Disclosure Form, Surety Bid Bond, Public Improvement Contract, Contract Standard Terms and Conditions and Exhibits thereto, Performance Bond, Payment Bond, Special Provisions, Plans entitled **S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS PROJECT NO. R-685**, Construction Drawings, Standard Drawings, and Contract Addendums, all attached hereto, and incorporated herein by this reference, together with the Prevailing Wage (BOLI) if applicable AND any other separately bound reference, 2021 Oregon Standard Specifications for Construction, the City of St. Helens Engineering Department

Public Facilities Construction Standards Manual Appendix to St. Helens Community Development Code, incorporated herein by this reference. All exhibits, schedules and lists attached to the Contract Documents, or delivered pursuant to the Contract Documents, shall be deemed a part of the Contract Documents and incorporated herein, where applicable, as if fully set forth herein.

#### **6. Contractor's Representations**

By executing this Contract, the Contractor hereby certifies that the representations made by the Contractor in the Contract Documents, including specifically the Offer, are true and correct and are incorporated herein by this reference. Contractor further certifies that Contractor has given the City written notice of conflicts, errors, ambiguities, or discrepancies that it has discovered in the Contract Documents, and the written resolution thereof by the City is acceptable to the Contractor, and the Contract Documents are generally sufficient to indicate and convey understanding of terms and conditions for performing and furnishing the Project Work.

#### **7. Drug Testing**

Contractor shall demonstrate to the City that it has a drug-testing program in place.

#### **8. Notice to Proceed**

Written Notice to Proceed will be given by the City after the Contract has been executed and the performance bond, payment bond, public works bond and all required insurance documents approved, and a pre-construction meeting has been held with the Contractor's and City's key personnel. Notice to proceed shall not be unreasonably delayed and shall generally occur within thirty (30) days of the Contract Date. Reasonable delay may be occasioned by the need to obtain necessary permits or easements or utility relocation. The Contractor shall commence the project Work within five (5) days of the date of the written Notice to Proceed. Contractor is not to commence Work under the Contract prior to such written notice.

#### **9. Suspension of the Work**

The City, and its authorized representatives, may suspend portions or all of the project Work due to causes including, but not limited to:

- a. Failure of the Contractor to correct unsafe conditions;
- b. Failure of the Contractor to carry out any provision of the Contract;
- c. Failure of the Contractor to carry out orders;
- d. Conditions, in the opinion of the City, which are unsuitable for performing the project Work;
- e. Allowance of time required to investigate differing site conditions;
- f. Any reason considered to be in the public interest.

The Contract Time will not be extended, nor will the Contractor be entitled to any additional compensation, if the Work is suspended pursuant to subsections (a), (b) or (c). If the Project Work is suspended pursuant to subsection (f), the Contractor is entitled to a reasonable extension of the contract time and reasonable compensation for all verified costs resulting from the suspension plus a reasonable allowance for overhead with respect to such costs. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such suspension. The foregoing provision concerning compensation in the event of a suspension of Work of this Contract shall not apply if such suspension occurs as a result of the Contractor's violation of any Federal, State, or Local statutes, ordinances, rules or regulations, or as a result of any violation by the Contractor of the terms of this Contract, including a determination by the City that the Contractor has not progressed satisfactorily with the Work in accordance with specifications.

#### **10. Early Termination**

The City and the Contractor, by mutual written agreement, may terminate this Contract at any time.

The City may terminate this Contract, in whole or in part, at any time for any reason considered by the City, in the exercise of its sole discretion, to be in the public interest. The City will provide the Contractor, and the Contractor's surety, seven (7) days prior written notice of a termination for convenience.

The City may terminate this Contract in the event of a material breach of the Contract by the Contractor. Prior to such default termination, however, the City shall give to the Contractor written notice of the breach and the intent to terminate for default. If the Party has not cured the breach within 15 days of the date of the notice (or if the breach cannot be cured in 15 days, Contractor has provided a cure plan that has been accepted by City and is making substantial progress in curing), then the City may terminate the Contract for default by giving a written notice of termination for default.

Any termination for default that is found to be improper for any reason shall be converted to a termination for convenience and Contractor's remedies shall be limited as if the termination had been one for convenience at inception.

#### **11. Payment on Early Termination**

- a. If this Contract is terminated by mutual agreement, the City shall pay the Contractor for Work performed in accordance with the Contract prior to the termination date in an amount agreed to by the parties as part of the termination agreement. Contractor shall not be entitled to any amount for overhead or profit on uncompleted Work.
- b. If this Contract is terminated by the City for convenience, City shall pay the Contractor for Work properly completed before the termination for convenience, along with costs incurred by Contractor due to the termination. Contractor shall not be entitled to any amount for overhead or profit on uncompleted Work. Contractor shall remain liable for Work performed prior to the termination for convenience.
- c. If this Contract is terminated by the City for default due to a material, uncured breach by the Contractor, then the City shall pay the Contractor, if applicable, as provided Section 12, Remedies for Default. Contractor shall remain liable for Work performed prior to the termination for default.

#### **12. Remedies for Default**

In the event of a termination for default by City due to a material, uncured breach by the Contractor, payment to Contractor will be immediately suspended. The City may proceed to complete the Work either itself, by agreement with another contractor, or by a combination thereof. In the event the cost of completing the Work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then the Contractor shall pay to the City the amount of the excess procurement costs within 14 days of written demand. To the extent that the procurement costs are lower than the remaining unpaid balance under this Contract, the City shall pay such difference to Contractor. After notice of termination for default, the Contractor and the Contractor's surety shall provide the City with immediate and peaceful possession of the Project site and premises, and materials located on and off the Project site and premises for which the Contractor received progress payment.

The remedies provided to the City under this Contract for a material, uncured breach by the Contractor shall not be exclusive. The City also shall be entitled to any other contractual, equitable or legal remedies that are available.

#### **13. Access to Records**

Contractor shall maintain and the City and its authorized representatives shall have access to all books, documents, papers and records of Contractor which relate to this Contract for the purpose of making audit, examination, excerpts, and transcripts for a period of ten years after final payment. Contractor shall follow generally accepted accounting principles. Copies of applicable records shall be made available upon request at no charge to City. Failure to keep records for the required period shall be deemed a spoliation of evidence.

#### **14. Ownership of Work Product**

All work products of the Contractor that result from this Contract, including but not limited to background data, documentation and staff work that is preliminary to final reports, are the property of City. Draft documents and preliminary work submitted to the City for review and comment shall not be considered as owned, used or retained by the City until the final document is submitted.

The City shall own all proprietary rights, including but not limited to copyrights, trade secrets, patents and all other intellectual or other property rights in and to such work products. Preexisting trade secrets of the Contractor shall be noted as such and shall not be considered as a work product of this Contract. All such work products shall be considered "works made for hire" under the provisions of the United States Copyright Act and all other equivalent laws.

Use of any work product of the Contractor by the City for any purpose other than the use intended by this contract is at the risk of the City. Use of any work product by Contractor for other than this Project is prohibited without the written consent of the City.

### **15. Compliance with Applicable Law**

Contractor shall comply and require all Subcontractors to comply with all federal, state, and local laws and ordinances, and City contracting rules applicable to the work under this contract, including without limitation ORS Chapter 279A-C and specifically ORS 279A.110, 279A.120, 279A.125, 279C.365, 279C.370, 279C.375, 279C.380, 279C.505, 279C.510, 279C.515, 279C.520, 279C.525, 279C.527, 279C.528, 279C.530, 279C.540, 279C.545, 279C.555, 279C.560, 279C.565, 279C.570, 279C.580, 279C.585, 279C.600 to 279C.625, 279C.650 to 279C.670, and ORS 279C.800 to 279C.870, if applicable.

- a. Contractor shall:
  - 1) Make payment promptly, as due, to all persons supplying to the Contractor labor or material for the performance of the Work provided for in the Contract;
  - 2) Pay all contributions or amounts due the Industrial Accident Fund from the Contractor or subcontractor incurred in the performance of the Contract;
  - 3) Not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished;
  - 4) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167;
  - 5) Demonstrate that an employee drug testing program is in place;
  - 6) To the extent the Work includes demolition, salvage or recycle construction and demolition debris, if feasible and cost-effective;
  - 7) To the extent the Work includes lawn and landscape maintenance, compost or mulch yard waste material at an approved site, if feasible and cost-effective.
- b. If the Contractor fails, neglects or refuses to pay promptly a person's claim for labor or services that the person provides to the contractor or a subcontractor in connection with the Contract as the claim becomes due, City may pay the amount of the claim to the person that provides the labor or services and charge the amount of the payment against funds due or to become due the Contractor by reason of the Contract.
- c. If the Contractor or its subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the Contract within 30 days after receiving payment from City, Contractor or its subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period within which payment is due under ORS 279C.580 (4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.
- d. If Contractor or its subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
- e. Paying a claim in the manner authorized (b) through (d) above does not relieve the Contractor or the Contractor's surety from obligation with respect to an unpaid claim .
- f. No person may not be employed for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires it, and in such cases the employee shall be paid at least time and a half pay:
  - 1)
    - i. For all overtime in excess of eight hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or

- ii. For all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
- 2) For all work performed on Saturday and on any legal holiday specified in ORS 279C.540.
- g. Contractor shall give notice in writing to employees who work on Work covered by the Contract, either at the time of hire or before commencement of work on the Contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work.
- h. Contractor shall promptly, as due, make payment to any person, copartnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums that the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.
- i. Contractor shall comply with ORS 656.017 unless exempt under ORS 656.126.
- j. The withholding of retainage by Contractor and its subcontractors shall be in accordance with ORS 701.420.
- k. In accordance with ORS 279C.560, unless City finds in writing that accepting a bond, security or other instrument poses an extraordinary risk that is not typically associated with the bond, security or other instrument, City will approve the Contractor's written request to deposit bonds, securities or other instruments with the City or in a custodial account or other account satisfactory to City with an approved bank or trust company, to be held instead of cash retainage for the benefit of City. In such event, City will reduce the cash retainage by an amount equal to the value of the bonds, securities and other instruments. Interest or earnings on the bonds, securities and other instruments shall accrue to the Contractor. Bonds, securities and other instruments deposited instead of cash retainage shall be assigned to or made payable to City and shall be of a kind approved by the Director of the Oregon Department of Administrative Services, including but not limited to: Bills, certificates, notes or bonds of the United States; Other obligations of the United States or agencies of the United States; Obligations of a corporation wholly owned by the federal government; Indebtedness of the Federal National Mortgage Association; General obligation bonds of the State of Oregon or a political subdivision of the State of Oregon; or Irrevocable letters of credit issued by an insured institution, as defined in ORS 706.008. The Contractor shall execute and provide such documentation and instructions respecting the bonds, securities and other instruments as City may require to protect its interests. When City determines that all requirements for the protection of City's interest have been fulfilled, the bonds and securities deposited instead of cash retainage will be released to the Contractor. If City accepts a surety bond from Contractor in lieu of retainage, Contractor shall accept like bonds from its subcontractors or suppliers from which Contractor has retainage. Contractor shall then reduce the moneys Contractor holds as retainage in an amount equal to the value of the bond and pay the amount of the reduction to the subcontractor or supplier.
- l. City shall make progress payments on the Contract monthly as work progresses. Payments shall be based upon estimates of work completed that are approved by City. A progress payment is not considered acceptance or approval of any work or waiver of any defects therein. City shall pay to Contractor interest on the progress payment, not including retainage, due the Contractor. The interest shall commence 30 days after receipt of the invoice from the Contractor or 15 days after the payment is approved by City, whichever is the earlier date. The rate of interest charged to City on the amount due shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is 30 days after receipt of the invoice from Contractor or 15 days after the payment is approved by City, whichever is the earlier date, but the rate of interest may not exceed 30 percent. Interest shall be paid automatically when payments become overdue. City shall document, calculate and pay any interest due when payment is made on the principal. Interest payments shall accompany payment of net due on the Contract. City will not require Contractor to petition, invoice, bill or wait additional days to receive interest due. When an invoice is filled out incorrectly, when there is any defect or impropriety in any submitted invoice or when there is a good faith dispute, City shall so notify Contractor within 15 days stating the reason or reasons the invoice is defective or improper or the

reasons for the dispute. A defective or improper invoice, if corrected by Contractor within seven days of being notified by City, may not cause a payment to be made later than specified in this section unless interest is also paid. If requested in writing by a subcontractor, Contractor, within 10 days after receiving the request, shall send to the subcontractor a copy of that portion of any invoice, request for payment submitted to City or pay document provided by City to Contractor specifically related to any labor or materials supplied by the subcontractor. Payment of interest may be postponed when payment on the principal is delayed because of disagreement between City and Contractor.

- m. City will reserve as retainage from all progress payment five percent (5%) of the payment. As work progresses, City may (but is not required) reduce the amount of the retainage and City may (but is not required) eliminate retainage on any remaining monthly contract payments after 50 percent of the Work under the Contract is completed if, in City's opinion, such work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by Contractor, and the application shall include written approval of Contractor's surety. However, when the contract work is 97.5 percent completed, City may, at the City's sole discretion and without application by Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of a written application by Contractor, the City shall respond in writing within a reasonable time. The retainage held by City shall be included in and paid to Contractor as part of the final payment of the Contract Price. City shall pay to Contractor interest at the rate of 1.5 percent per month on the final payment due Contractor, interest to commence 30 days after the work under the Agreement has been completed and accepted and to run until the date when the final payment is tendered to Contractor. Contractor shall notify City in writing when the contractor considers the work complete and Owner shall, within 15 days after receiving the written notice, either accept the work or notify Contractor of work yet to be performed on the Contract. If City does not, within the time allowed, notify Contractor of work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run 30 days after the end of the 15-day period.
- n. Contractor shall include in each subcontract for property or services the Contractor enters into with a subcontractor, including a material supplier, for the purpose of performing this Contract:
  - 1) A payment clause that obligates Contractor to pay subcontractor for satisfactory performance under the subcontract within 10 days out of amounts the City pays to Contractor under the Contract.
  - 2) A clause that requires Contractor to provide subcontractor with a standard form that the subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from Contractor.
  - 3) A clause that requires Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. Contractor may change the form or the regular administrative procedures Contractor uses for processing payments if Contractor: (i) Notifies the subcontractor in writing at least 45 days before the date on which the contractor makes the change; and (ii) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.
  - 4) An interest penalty clause that obligates Contractor, if the Contractor does not pay the subcontractor within 30 days after receiving payment from City, to pay subcontractor an interest penalty on amounts due in each payment Contractor does not make in accordance with the payment clause included in the subcontract under paragraph 1) of this subsection. Contractor or subcontractor is not obligated to pay an interest penalty if the only reason that Contractor or subcontractor did not make payment when payment was due is that Contractor or subcontractor did not receive payment from City or Contractor when payment was due. The interest penalty: (i) Applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and (ii) Is computed at the rate specified in ORS 279C.515 (2).
- o. Contractor shall, in each of the Contractor's subcontracts, require the first-tier subcontractor to include a payment clause and an interest penalty clause that conforms to the standards of subsection (n) of this section in each of the first-tier subcontractor's subcontracts and to require each of the first-tier subcontractor's subcontractors to include such clauses in the first-tier subcontractors' subcontracts with each lower-tier subcontractor or supplier.



The requirements applicable to contractors set forth in these sections are all incorporated into this contract by this reference as though set forth herein in their entirety. Contractor also expressly agrees to comply with: (i) Title VI of the Civil Rights Act of 1964; (ii) Section V of the Rehabilitation Act of 1973; (iii) the Americans with Disabilities Act of 1990, as amended (iv) ORS 659A.142, (v) all regulations and administrative rules established pursuant to those laws; and (vi) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. In addition, Contractor expressly agrees to comply with all federal and state tax laws. A condition or clause required by law to be in this contract shall be considered included and incorporated into the Contract and made a part as if set forth herein in its entirety.

#### **16. Licensing with Construction Contractor's Board**

The Contractor hereby certifies that the Contractor is licensed with the Construction Contractors Board in accordance with ORS 701.021 to 701.042 and, further, that all subcontractors performing work under this contract, unless exempt, shall also be licensed with the Construction Contractors Board before the subcontractors commence work under the contract.

#### **17. Prevailing Wages**

Contractor expressly agrees to be bound by and comply with prevailing rate of wage laws applicable to Contractor's Work in accordance with ORS 279C.800 et seq. The prevailing wage rates in effect when this Project was first advertised are hereby expressly incorporated into this Agreement by reference. Information on BOLI Prevailing Wage Rates may be obtained at the following site: [www.oregon.gov/BOLI/WHDPWR/pwr\\_state.shtml](http://www.oregon.gov/BOLI/WHDPWR/pwr_state.shtml). A copy of these rates may be requested by calling the Bureau of Labor and Industries directly (Bureau of Labor and Industries – (971) 673-0838). Information on the Federal Davis-Bacon Act rates may be obtained at the following site: [www.oregon.gov/ODOT/HWY/SPECS/wages.shtml](http://www.oregon.gov/ODOT/HWY/SPECS/wages.shtml). Contractor's workers must be paid not less than the specified minimum hourly rate of wage in accordance with ORS 279C.838 and 279C.840.

Contractor shall have a public works bond filed with the Construction Contractors Board and shall provide Owner with a copy of such bond before starting work unless Contractor is exempt under ORS 279C.836(4), (7), (8) or (9). Contractor shall include a similar provision in any subcontract.

Contractor shall keep the prevailing rates of wage for Project posted in a conspicuous and accessible place in or about the Project and, if it provides a health and welfare plan or pension plan or both, shall post a notice describing the plan, including information on how and where to make claims and where to obtain further information, in a conspicuous and accessible place in or about the Project.

Contractor shall furnish to City a weekly affidavit with supporting detailed exhibits in a form that complies with the certified statement requirements of ORS 279C.845, certifying wages paid and to whom during each proceeding weekly payroll period, for itself and all subcontractor who are required to submit such certified statements under ORS 279C.845. If Contractor has failed to timely submit a required certified statement, City, pursuant to ORS 279C.845(8), shall withhold twenty-five percent (25%) from any amount owed to Contractor until Contractor provides the required certified statement.

#### **18. Change Orders/Extra Work**

The Contractor agrees to complete this Contract in accordance with the attached specifications and requirements, including any change orders. A change order submitted by the City must be agreed upon by the Contractor and the City, and in the event of failure to so agree, the City may then proceed with any additional work in any manner the City may choose. A decision by the City to proceed to have work done by another party shall in no way relieve either the Contractor or City of this Contract and neither will such action be cause for collection of damages by either party to the contract, one from the other. Only the City Council or designated Contracting Officer with delegated contracting authority can authorize extra (and/or changed) work and compensation. Such authorization must be in writing. The parties expressly recognize that City personnel are not authorized to order extra (and/or) changed work or to waive contract requirements or authorize additional compensation. Failure of the Contractor to secure City authorization for extra work shall constitute a waiver of any and all claims or rights to adjustment in the Contract Price or Contract Time due to such unauthorized extra work and thereafter Contractor shall be entitled to no compensation whatsoever for the performance of such work. Contractor further expressly waives any and all right or remedy by way of restitution and quantum meruit for any and all extra work performed by Contractor without express and prior authorization of the City.

If Contractor proposes an alternative material, process or system to City, or supplies City with specifications or plans for use in the Project, Contractor warrants to City that such alternative material, process or system is adequate, accurate, complete, fit for its intended purpose, and, if accepted by City, that an acceptable result will be achieved. Contractor, at its own cost, will remedy, any Work that violates this warranty until an acceptable result is achieved.

#### **19. Inspection and Acceptance**

Inspection and acceptance of all work required under this contract shall be performed by the City. The Contractor shall be advised of the acceptance or of any deficiencies in the deliverable items.

#### **20. Liquidated Damages**

City and Contractor recognize that time is of the essence of this Contract and that City will suffer substantial financial loss if the project work is not completed within the timeframe specified in Section (1) of the Public Improvement Contract. City and Contractor also recognize the difficulties involved in proving in a legal or other dispute resolution preceding the actual loss suffered by City if the project work is not completed on time. Accordingly, instead of requiring any such proof, City and Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay the City three hundred dollars per day (\$300/day) for each and every day that elapses in excess of the Contract Time. This amount is a genuine pre-estimation of the damages expected because of a delay in the completion of this project.

Any sums due as liquidated damages shall be deducted from any money due or which may become due to the Contractor under this Contract. Payment of liquidated damages shall not release the Contractor from obligations in respect to the fulfillment of the entire contract, nor shall the payment of such liquidated damages constitute a waiver of the City's right to collect any additional damages which may be sustained by failure of the Contractor to complete the work on time. Permitting the Contractor to continue and finish the project work or any part thereof after the Contract Time has expired shall in no way operate as a waiver on the part of the City or any of its rights under this Contract. The City may in its discretion grant the Contractor an extension of time upon a showing made by the Contractor that the work has been unavoidably delayed by conditions beyond the control of Contractor.

#### **21. Liability, Indemnity and Hold Harmless**

Contractor warrants that all its work will be performed in accordance with the Contract Documents, in accordance with generally accepted practices and standards, as well as in accordance with the requirements of applicable federal, state, and local laws. Acceptance of Contractor's work by City shall not operate as a waiver or release.

The Contractor shall hold harmless, indemnify, and defend City, its officers, agents, and employees from any and all liability, actions, claims, losses, damages or other costs of whatsoever nature, including attorney's fees and witness costs (at both trial and appeal level, whether or not a trial or appeal ever takes place) that may be asserted by any person or entity arising from, during or in connection with the performance of the Work, actions or failure to perform actions, and other activities of Contractor or its officers, employees, subcontractors or agents, under this Contract, including the negligent professional acts, errors, or omissions of Contractor or its officers, employees, subcontractors, or agents. Such indemnification shall also cover claims brought against City under state or federal workers compensation laws. This indemnity provision excludes liability arising out of the sole negligence of the City and its employees.

The Contractor shall assume all responsibility for the work and shall bear all losses and damages directly or indirectly resulting to the Contractor, to the City, to the Engineer, and to their officers, agents, and employees on account of (a) the character or performance of the work, (b) unforeseen difficulties, (c) accidents, or (d) any other cause whatsoever. The Contractor shall assume this responsibility even if (a) fault is the basis of the claim, and (b) any act, omission or conduct of the City connected with the Contract is a condition or contributory cause of the claim, loss, damage or injury.

Contractor waives any and all statutory or common law rights of defense and indemnification by the City.

Contractor shall also defend and indemnify City from all loss or damage that may result from Contractor's wrongful or unauthorized use of any patented article or process.

If any aspect of the above indemnities shall be found to be illegal or invalid for any reason whatsoever, such illegality or invalidity shall be stricken to the extent illegal or invalid, with the remaining terms continuing to be valid, and such shall not affect the validity of the remainder of this indemnification.

Any specific duty or liability imposed or assumed by the Contractor as may be otherwise set forth in the Contract documents shall not be construed as a limitation or restriction of the general liability or duty imposed upon the Contractor by this section.

In the event any such action or claim is brought against the City, the Contractor shall, if the City so elects and upon tender by the City, defend the same at the Contractor's sole cost and expense, promptly satisfy any judgment adverse to the City or to the City and the Contractor jointly, and reimburse the City for any loss, cost, damage, or expense, including attorney fees, suffered or incurred by the City.

## **22. Insurance**

The Contractor shall provide and maintain during the life of this Contract the insurance coverage as described in Exhibit B. All costs for such insurance shall be borne by the Contractor and shall be included in the Contract Price. In case of the breach of any provision of this section, the City may elect to take out and maintain at the expense of the Contractor such insurance as the City may deem proper. The City may deduct the cost of such insurance from any monies that may be due or become due the Contractor under this Contract. Failure to maintain insurance as provided is a material breach and cause for default termination of the Contract. Contractor shall furnish City certificates of insurance acceptable to City prior to execution by the City and before Contractor or any subcontractor commences work under this Contract. The certificate shall show the name of the insurance carrier, coverage, type, amount (or limits), policy numbers, effective and expiration dates and a description of operations covered. The certificate will include the deductible or retention level and required endorsements. Insuring companies or entities are subject to City's acceptance. If requested, copies of insurance policies shall be provided to the City. Contractor shall be responsible for all deductibles, self-insured retention's, and/or self-insurance. Approval of the insurance shall not relieve or decrease the liability of the Contractor hereunder.

## **23. Bonds / Notice of Bond Claims**

At the time of execution of the Contract, the Contractor shall furnish Performance and Payment Bonds written by a corporate surety or other financial assurance in an amount equal to the amount of the Contract Price based upon the estimate of quantities or lump sum as set forth in the Contract. The bonds shall be continuous in effect and shall remain in full force and effect until compliance with and fulfillment of all terms and provisions of the Contract, including the warranty obligation of Section 24, all applicable laws and the prompt payment of all persons supplying labor and/or material for prosecution of the work. The bonds or other financial assurance is subject to approval by the City.

## **24. Two-Year Warranty**

- a. In addition to and not in lieu of any other warranties required under the Contract, Contractor shall make all necessary repairs and replacements to remedy, in a manner satisfactory to the City and at no cost to the City, any and all defects, breaks or failures of the Work occurring within two years following the date of final completion due to faulty or inadequate materials or workmanship. Contractor shall also repair any damage or disturbances to other improvements under, within, or adjacent to the Work, whether or not caused by settling, washing, or slipping, when such damage or disturbance is caused, in whole or in part, from activities of the Contractor in performing its duties and obligations under this Contract when such defects or damage occur within the warranty period. The two-year warranty period shall, with relation to such required repair, be extended two years from the date of completion of such repair.
- b. If Contractor, after written notice, fails within ten days to proceed to comply with the terms of this section, City may have the defects corrected, and the Contractor and Contractor's surety shall be liable for all expense incurred. If Contractor, after two attempts, fails to make all necessary repairs and replacements to remedy, in a manner satisfactory to the City, any identified defect, break or failure of the Work, Contractor will be deemed to be in breach of warranty and City may have the defects corrected, and the Contractor and Contractor's surety shall be liable for all expense incurred. In case of an emergency where, in the opinion of the City, delay would cause serious loss or damage, repairs may be made without notice being given to Contractor and Contractor or Surety shall pay the cost of repairs. Failure of the City to act in case of an emergency shall not relieve Contractor or Surety from liability and payment of all such costs.

**25. Nondiscrimination in Labor**

Contractor shall comply with provisions of City's Equal Opportunity Policy and comply with ORS Chapter 659 and ORS Chapter 659A relating to unlawful employment practices and discrimination by employers against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, national origin, marital status or age if the individual is 18 years of age or older, or because of the race, color, religion, sex, sexual orientation, national origin, marital status or age of any other person with whom the individual associates, or because of an individual's juvenile record that has been expunged pursuant to ORS 419A.260 and 419A.262 or to refuse to hire or employ or to bar or discharge from employment such individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment.

**26. Environmental Regulations**

- a. Pursuant to ORS 279C.525(1), the following is a list of federal, state and local agencies which have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the Contract.

**Federal Agencies:**

- Agriculture, Department of Forest Service, Soil Conservation Service
- Defense, Department of Army Corps of Engineers Energy, Department of
- Federal Energy Regulatory Commission Environmental Protection Agency
- Health and Human Services, Department of
- Housing and Urban Development, Department of
- Solar Energy and Energy Conservation Bank
- Interior, Department of
- Bureau of Land Management, Bureau of Indian Affairs , Bureau of Mines , Bureau of Reclamation
- Geological Survey, Minerals Management Service
- U.S. Fish and Wildlife Service
- Labor, Department of Mine Safety and Health Administration Occupational Safety and Health Administration
- Transportation, Department of Coast Guard
- Federal Highway Administration
- Water Resources Council

**State Agencies:**

- Administrative Services, Department of
- Agriculture, Department of Columbia River Gorge
- Commission Consumer & Business Services, Department of
- Oregon Occupational Safety & Health Division
- Energy, Department of Environmental Quality, Department of Fish and Wildlife, Department of
- Forestry, Department of
- Geology and Mineral Industries, Department of
- Human Resources, Department of
- Land Conservation and Development Commission
- Parks and Recreation, Department of
- Soil and Water Conservation Commission
- State Engineer
- State Land Board (Lands, Division of State)
- Water Resources Department

**Local Agencies:**

- City of St. Helens City Council
- City Councils
  - County Courts
  - County Commissioners of Columbia County
  - Port Districts
  - County Service Districts
  - Sanitary Districts
  - Water Districts
  - Fire Protection Districts
  - Historical Preservation Commissions
  - Planning Commissions

If the Contractor awarded the project is delayed or must undertake additional Work by reason of the enactment of new statutes, ordinances, rules or regulations relating to the prevention of environmental pollution and the preservation of natural resources or the amendment of existing statutes, ordinances, rules or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the submission of the successful bid, the City may:

- i. Terminate the contract;
  - ii. Complete the work itself;
  - iii. Use non-city forces already under contract with the City;
  - iv. Require that the underlying property owner be responsible for cleanup;
  - v. Solicit bids for a new contractor to provide the necessary services; or
  - vi. Issue the Contractor a change order setting forth the additional work that must be undertaken.
- b. The solicitation documents make specific reference to known conditions at the construction site that may require the Contractor to comply with the ordinances, rules or regulations identified above. If Contractor encounters a condition not referred to in the solicitation documents, not caused by the Contractor and not discoverable by a reasonable pre-bid visual site inspection, and the condition requires compliance with the ordinances, rules or regulations enacted by the governmental entities identified above, Contractor shall immediately give written notice of the condition to the City. Except in the case of an emergency and except as may otherwise be required by any environmental or natural resource ordinance, rule or regulation, the Contractor shall not commence work nor incur any additional job site costs in regard to the condition encountered and described in this section without written direction from City. Upon request by the City, the Contractor shall estimate the emergency or regulatory compliance costs as well as the anticipated delay and costs resulting from the encountered condition. This cost estimate shall be promptly delivered to the City for resolution. Within a reasonable period of time following delivery of an estimate of this section, the City may:
- i. Terminate the contract;
  - ii. Complete the work itself;
  - iii. Use non-city forces already under contract with the City;
  - iv. Require that the underlying property owner be responsible for cleanup;
  - v. Solicit bids for a new contractor to provide the necessary services; or
  - vi. Issue the Contractor a change order setting forth the additional work that must be undertaken.
- c. If the City chooses to terminate the contract under this section, the termination shall be treated as a termination for convenience with Contractor's remedies so limited. If the contracting agency causes work to be done by another contractor, Contractor may not be held liable for actions or omissions of the other contractor. If a change order is issued, the change order shall include an appropriate extension of Contract Time and compensate the Contractor for additional costs reasonably incurred as a result of complying with the applicable statutes, ordinances, rules or regulations. The City shall have access to the Contractor's bid documents when making the contracting agency's determination of any additional compensation due to the Contractor.

Notwithstanding the above, the City has allocated all or a portion of the known environmental and natural resource risks to a Contractor by listing such environmental and natural resource risks with specificity in the solicitation documents.

## **27. Waiver**

The failure of the City to enforce any provision of this contract shall not constitute a waiver by the City of that or any other provision. City shall not be precluded or estopped by any measurement, estimate or certificate made either before or after completion and acceptance of work or payment therefore, from showing the true amount and character of work performed and materials furnished by the Contractor, or from showing that any such measurement, estimate or certificate is untrue or incorrectly made, or that Work or materials do not conform in fact to the Contract Documents. City shall not be precluded or estopped, notwithstanding any such measurement, estimate or certificate, or payment in accordance therewith, from recovering from the Contractor and their Sureties such damages as it may sustain by reason of their failure to comply with terms of the Contract, or from enforcing compliance with the Contract. Neither acceptance by City, or by any representative or agent of the City, of the whole or any part of the work, nor any extension of time, nor any possession taken by City, nor any payment for all or any part of the project, shall operate as a

waiver of any portion of the Contract or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other breach. All waivers by City must be in writing and signed by City.

**28. Errors**

The Contractor shall perform such additional work as may be necessary to correct its errors in the Work without undue delays and without additional cost.

**29. Governing Law**

The provisions of this Contract shall be construed in accordance with the laws of the State of Oregon and ordinances of the City of St. Helens, Oregon. Any action or suits involving any question arising under this Contract must be brought in the appropriate court in Columbia County, Oregon. If the claim must be brought in a federal forum, then it shall be brought and conducted in the United States District Court for the District of Oregon (Portland).

**30. Severability**

If any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular term or provision held invalid.

**31. Attorney's Fees**

If a suit or action is filed to enforce any of the terms of this Contract, the prevailing party shall be entitled to recover from the other party, in addition to costs and disbursements provided by statute, its reasonable attorney's fees and expert expenses.

**32. Business License**

The Contractor shall obtain a City of St. Helens business license as required by City Ordinance prior to beginning work under this Contract. The Contractor shall provide a business license number in the space provided on page one herein.

**33. Notices/Bills/Payments**

All notices, bills, and payments shall be made in writing and may be given by personal delivery or by mail. Notices, bills, and payments sent by mail should be addressed as follows:

City: City Administrator  
City of St. Helens  
265 Strand Street  
St. Helens, OR 97051  
(503) 397-6272

Contractor:


And when so addressed, shall be deemed received three (3) days after deposit in the United States Mail, postage prepaid. In all other instances, notices, bills, and payments shall be deemed given at the time of actual delivery. Changes may be made in the names and addresses of the person to whom notices, bills, and payments are to be given by giving notice pursuant to this paragraph.

**34. Conflict of Interest**

Contractor covenants that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its services. The Contractor further covenants that in the performance of this Contract no person having any such interest shall be employed.

**35. Merger Clause**

THIS CONTRACT AND ATTACHED EXHIBITS CONSTITUTE THE ENTIRE AGREEMENT BETWEEN THE PARTIES. NO WAIVER, CONSENT, MODIFICATION OR CHANGE OF TERMS OF THIS CONTRACT SHALL BIND EITHER PARTY UNLESS IN WRITING AND SIGNED BY BOTH PARTIES. SUCH WAIVER, CONSENT, MODIFICATION OR CHANGE, IF MADE, SHALL BE EFFECTIVE ONLY IN THE SPECIFIC INSTANCE AND FOR THE SPECIFIC PURPOSE GIVEN. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, OR REPRESENTATIONS, ORAL OR WRITTEN, NOT SPECIFIED HEREIN REGARDING THIS CONTRACT. BY ITS SIGNATURE, CONTRACTOR ACKNOWLEDGES IT HAS READ AND UNDERSTANDS THIS CONTRACT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS.



**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
PROJECT NO. R-685**

**LIST OF EXHIBITS**

<b>EXHIBIT A</b>	STATEMENT OF WORK, COMPENSATION, AND PAYMENT SCHEDULE
<b>EXHIBIT B</b>	PUBLIC IMPROVEMENT CONTRACT INSURANCE REQUIREMENTS
<b>EXHIBIT C</b>	CERTIFICATION STATEMENT FOR CORPORATION OR INDEPENDENT CONTRACTOR
<b>EXHIBIT D</b>	BONDS (PAYMENT AND PERFORMANCE)
<b>EXHIBIT E</b>	CERTIFICATE OF SUBSTANTIAL COMPLETION
<b>EXHIBIT F</b>	CERTIFICATE OF COMPLIANCE
<b>EXHIBIT G</b>	CONTRACTOR'S RELEASE OF LIENS AND CLAIMS
<b>EXHIBIT H</b>	CERTIFICATE OF FINAL COMPLETION
<b>EXHIBIT I</b>	INSTRUCTIONS TO BIDDERS
<b>EXHIBIT J</b>	OREGON PREVAILING WAGE RATES



# **EXHIBIT A**

## **STATEMENT OF WORK, COMPENSATION and PAYMENT SCHEDULE**



**See Plans and Specifications titled**

**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
PROJECT NO. R-685**

# EXHIBIT B

## PUBLIC IMPROVEMENT CONTRACT INSURANCE REQUIREMENTS

To: Insurance Agent. Please provide Certificates of Insurance to the Project Manager. During the term of the Contract, please provide Certificates of Insurance prior to each renewal. Insurance shall be without prejudice to coverage otherwise existing. During the term of this Contract, Contractor shall maintain in force at its own expense all insurance noted below:

**Workers Compensation** insurance in compliance with ORS 656.017. All employers, including Contractor and any subcontractors, that employ subject workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.

The Contractor shall defend, indemnify and hold harmless, the City and the City's officers, agents, and employees against any liability that may be imposed upon them by reason of the Contractor's or subcontractor's failure to provide workers' compensation and employers liability coverage.

**Commercial General Liability** insurance on an occurrence basis, with a combined single limit of not less than  \$1,000,000 or  \$3,000,000 for each occurrence of bodily injury, personal injury and property damage. It shall include coverage for broad form contractual liability; broad form property damage; personal and advertising injury; owners and contractor protective; premises/operations; and products/completed operations. Coverage shall not exclude excavation, collapse, underground, or explosion hazards. Aggregate limits shall apply on a per-project basis.

Required by City  Not required by City  
(Mayor signature required)

By: P.M. \_\_\_\_\_

Mayor \_\_\_\_\_

**Commercial Automobile Liability** insurance with a combined single limit, or the equivalent of not less than  \$1,000,000 or  \$3,000,000 for each accident for Bodily Injury and Property Damage, including coverage for owned, hired and non-owned vehicles. "Symbol One" coverage shall be designated.

Required by City  Not required by City  
(Mayor signature required)

By: P.M. \_\_\_\_\_

Mayor \_\_\_\_\_

Builders Risk (*Check here if required*) insurance during construction to the extent of 100 percent of the value of the Work for the benefit of the parties to the Contract as their interest may appear. Coverage shall also include: (1) formwork in place; (2) form lumber on site; (3) temporary structures; (4) equipment; and (5) supplies related to the work while at the site.

**Notice of Cancellation or Change.** There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without 30 days written notice from the Contractor or its insurer(s) to the City. This notice provision shall be by endorsement physically attached to the certificate of insurance.

**Additional Insured.** For general liability insurance and automobile liability insurance the City, and its agents, officers, and employees will be Additional Insureds, but only with respect to Contractor's services to be provided under this Contract. This coverage shall be by endorsement physically attached to the certificate of insurance.

**Certificates of Insurance.** Contractor shall furnish insurance certificates acceptable to City prior to commencing Work. The certificate will include the deductible or retention level and required endorsements. Insuring companies or entities are subject to City approval. If requested, copies of insurance policies shall be provided to the City. Contractor shall be responsible for all deductibles, self-insured retention's, and/or self-insurance.

# EXHIBIT C

## CERTIFICATION STATEMENT FOR CORPORATION OR INDEPENDENT CONTRACTOR

### A. CONTRACTOR IS A CORPORATION

**CORPORATION CERTIFICATION:** I am authorized to act on behalf of the entity named below, and certify under penalty of perjury that it is a corporation.

Entity	Signature	Date
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### B. CONTRACTOR IS INDEPENDENT

**Independent Contractor Standards.** As used in various provisions of ORS Chapters including but not limited to 316, 656, 657, and 701, an individual or business entity that performs labor or services for remuneration shall be considered to perform the labor or services as an “independent contractor” if the standards of ORS 670.600 are met.

Contractor and Project Manager certify that the Contractor meets the following standards:

1. Contractor is free from direction and control over the means and manner of providing the labor or services, subject only to the specifications of the desired results.
2. Contractor is responsible for obtaining all assumed business registrations or professional occupation licenses required by state law or local ordinances.
3. Contractor furnishes the tools or equipment necessary for the contracted labor or services.
4. Contractor has the authority to hire and fire employees to perform the labor or services.
5. Payment to the Contractor is made upon completion of the performance or is made on the basis of a periodic retainer.
6. Contractor is licensed under ORS chapter 701, if the Contractor provides labor or services for which such license is required.
7. Contractor has filed federal and state income tax returns in the name of the business or a business Schedule C as part of the personal income tax return, for the previous year, for labor or services performed as an independent contractor in the previous year.
8. Contractor represents to the public that the labor or services are to be provided by an independently established business as four or more of the following circumstances exist.

(Check all of the following that apply (must be a minimum of four):)

- The labor or services are primarily carried out at a location that is separate from Contractors residence or is primarily carried out in a specific portion of Contractors residence, which is set aside as the location of the business.
- Commercial advertising or business cards are purchased for the business, or Contractor has a trade association membership.
- Telephone listing is used for the business that is separate from the personal residence listing.
- Labor or services are performed only pursuant to written contracts.
- Labor or services are performed for two or more different persons within a period of one year.

Contractor assumes financial responsibility for defective workmanship or for service not provided as evidenced by the ownership of performance bonds, warranties, errors and omissions insurance or liability insurance relating to the labor or services to be provided.

**If any action is taken by a person or enforcement agency relating to Contractor's independent contractor status in connection with this contract, Contractor shall defend, hold harmless and indemnify the City of St. Helens, its elected and appointed officials, employees, volunteers and agents from any such action, claim, judgment, fine, penalty, or order to pay. Contractor shall pay any additional costs incurred by the City in defending such action or incurred as a result of such action. This indemnification is in addition to any indemnification otherwise in this agreement.**

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Contractor Signature \_\_\_\_\_ Date \_\_\_\_\_

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Project Manager Signature \_\_\_\_\_ Date \_\_\_\_\_

# EXHIBIT D

## BONDS





**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT PAYMENT BOND**

Bond No.:

Project Name S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
and No.: PROJECT NO. R-685

	(Surety)	Bond Amount	\$
	(Surety)	Bond Amount	\$

**Total Penal Sum of Bond**    \$ \_\_\_\_\_

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as **"PRINCIPAL,"** and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact surety business in the State of Oregon, as **"SURETY,"** and,

We, the above named Principal and Surety(ies), hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (**OBLIGEE**) the sum of (\$ \_\_\_\_\_) ( \_\_\_\_\_ ) dollars, lawful money of the United States. [Provided, we the Sureties bind ourselves in such sum "Jointly and Severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety above), and

WHEREAS, the Principal has entered into a Contract with the City of St. Helens, the specifications, terms and conditions of which are contained in the Contract Documents for the above identified Project; and

WHEREAS, the terms and conditions of the Contract Documents, as defined in the Contract, are made a part of this performance bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans, specifications, and schedule of contract prices which are set forth in the contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the

sureties, including the requirements of ORS Chapter 279A-C, including specifically the conditions in ORS 279C.500 to 279C.530, and shall indemnify and save harmless the City of St. Helens, Oregon, its officers, employees, agents and assigns, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the Work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractor in connection with the performance of the Contract; and shall pay over to the Oregon Department of Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the City on account of any labor or materials furnished; and shall do all things required of the Contractor by the laws of this State, and the laws of the City of St. Helens, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of St. Helens be obligated for the payment of any premiums.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dates this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

---

Surety

By: \_\_\_\_\_  
(Attorney-in-Fact) (Address) (Telephone)

---

Principal

By: \_\_\_\_\_  
(Address) (Telephone)



**CITY OF ST. HELENS  
STANDARD PUBLIC IMPROVEMENT  
CONTRACT PERFORMANCE BOND**

Bond No.:

Project Name **S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS**  
and No.: **PROJECT NO. R-685**

_____ (Surety)	Bond Amount	\$ _____
_____ (Surety)	Bond Amount	\$ _____

**Total Bond Amount** \$ \_\_\_\_\_

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact business in the State of Oregon, as **"PRINCIPAL,"** and,

We, \_\_\_\_\_, a corporation or partnership duly organized under the laws of the State of \_\_\_\_\_, and authorized to transact surety business in the State of Oregon, as **"SURETY,"** and,

We, the above named Principal and Surety(ies), hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the City of St. Helens, Oregon, (**OBLIGEE**) the sum of (\$ \_\_\_\_\_) ( \_\_\_\_\_ ) dollars, lawful money of the United States. [Provided, we the Sureties bind ourselves in such sum "Jointly and Severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety above), and

WHEREAS, the Principal has entered into a Contract with the City of St. Helens, the specifications, terms and conditions of which are contained in the Contract Documents for the above identified Project; and

WHEREAS, the terms and conditions of the Contract Documents, as defined in the Contract, are made a part of this performance bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans, specifications, and schedule of contract prices which are set forth in the contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the



sureties, including the requirements of ORS Chapter 279A-C, including specifically the conditions in ORS 279C.500 to 279C.530, and shall indemnify and save harmless the City of St. Helens, Oregon, its officers, employees, agents and assigns, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall in all respects perform said Contract, and shall permit no lien nor claim to be filed or prosecuted against the City on account of any labor or materials furnished; and shall do all things required of the Contractor by the laws of this State, and the laws of the City of St. Helens, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the City of St. Helens be obligated for the payment of any premiums.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dates this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Surety

By: \_\_\_\_\_  
(Attorney-in-Fact) (Address) (Telephone)

\_\_\_\_\_  
Principal

By: \_\_\_\_\_  
(Address) (Telephone)



# EXHIBIT E

## CERTIFICATE OF SUBSTANTIAL COMPLETION

CITY'S Project No. R-685 ENGINEER'S Project No. N/A

S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS

CONTRACTOR: \_\_\_\_\_

Contract For: \_\_\_\_\_ Contract Date \_\_\_\_\_

This Certificate of Substantial Completion applies to:

- All Work under the Contract Documents, or
- To the following specified parts thereof:

The Work to which this Certificate applies has been inspected by authorized representatives of CITY, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

\_\_\_\_\_ DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within \_\_\_\_\_ Days of the above date of Substantial Completion.

The following documents are attached to and made a part of this Certificate:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Effective as of the last date set forth below, the responsibilities between CITY and CONTRACTOR shall be as follows:

- |             |  |  |
|-------------|--|--|
| Security    | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |
| Operation   | <input checked="" type="checkbox"/> City | <input type="checkbox"/> Contractor            |
| Safety      | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |
| Maintenance | <input checked="" type="checkbox"/> City | <input type="checkbox"/> Contractor            |
| Heat        | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Utilities   | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Insurance   | <input type="checkbox"/> City            | <input type="checkbox"/> Contractor            |
| Warranties  | <input type="checkbox"/> City            | <input checked="" type="checkbox"/> Contractor |

Other Responsibilities:

City		Contractor

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of CONTRACTOR'S obligation to complete the Work in accordance with the Contract Documents.

CONTRACTOR accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_\_

By: \_\_\_\_\_

CITY accepts this Certificate of Substantial Completion on \_\_\_\_\_, 20\_\_\_\_\_

By: \_\_\_\_\_

File:



**EXHIBIT F**  
**CERTIFICATE OF COMPLIANCE**

**S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS**

---

CIP Number: Project No. R-685

Contractor: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, (We) hereby certify that all Work has been performed and materials supplied in accordance with the plans, specifications and Contract Documents for the above Project, and that:

1. Not less than the prevailing rates of wages have been paid to laborers, workmen and mechanics employed on this work.
2. There have been no unauthorized substitutions of materials; substitutions or assignment of subcontractors; nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the City prior to the start of such subcontracted work.
3. All claims and indebtedness for material and labor and other service performed in connection with these specifications have been paid.
4. All moneys due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Department of Revenue (ORS 316.162 to 316.212) hospital associations and/or others (ORS 279C.530) have been paid.
5. All private property and easement areas have been satisfactorily restored in accordance with the Contract.
6. If Contractor is not domiciled in or registered to business in the State of Oregon, Contractor has reported to the Oregon Department of Revenue such information and in the manner as required by ORS 279A.120(3).

Contractor: \_\_\_\_\_

By: \_\_\_\_\_ Date \_\_\_\_\_

Title: \_\_\_\_\_



# EXHIBIT G

## CONTRACTOR'S RELEASE OF LIENS AND CLAIMS [PREREQUISITE TO CERTIFICATE OF FINAL COMPLETION]

To: City of St. Helens  
265 Strand Street  
St. Helens, OR 97051

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT: S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS  
PROJECT NO: R-685

In connection with our request for final payment for the above Project, I, \_\_\_\_\_, hereby state that:

- all subcontractors and suppliers on this Project have been paid in full, all obligations on the Project have been satisfied,
- all monetary claims and indebtedness on this Project have been paid, and all disputes with property owners have been resolved.
- There are no liens or claims of any kind outstanding or threatened against the Project.

Furthermore, I agree to indemnify and hold harmless City of St. Helens from any and all claims for labor or materials furnished under the Contract for the above Project.

### SWORN STATEMENT

**I hereby certify, under penalty of perjury and false swearing, that the foregoing statements are true and correct as I verily believe.**

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Contractor:  
By: \_\_\_\_\_  
Title: \_\_\_\_\_

STATE OF OREGON

\_\_\_\_\_) )  
\_\_\_\_\_) ) ss  
County of \_\_\_\_\_)

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, before me personally appeared

\_\_\_\_\_,  
\_\_\_\_\_ Whom I know personally  
\_\_\_\_\_ Whose identity proved on the basis of  
\_\_\_\_\_  
\_\_\_\_\_ Whose identity I proved on the oath/affirmation of  
\_\_\_\_\_, a credible witness to be the signer of the above document, and he/she  
acknowledged that he/she executed the same under oath/affirmation.

\_\_\_\_\_  
Notary Public for Oregon



# EXHIBIT H

## CERTIFICATE OF FINAL COMPLETION

Project Number: R-685

Project: S. 1ST STREET AT ST. HELENS STREET INTERSECTION IMPROVEMENTS

Contractor: \_\_\_\_\_

Contract Signed: \_\_\_\_\_ Contract Expires: \_\_\_\_\_

Contract Completed: \_\_\_\_\_ Delinquent: \_\_\_\_\_

I hereby certify that I have completed my Contract, furnished the materials, and performed the Work as shown by the final estimate, according to the Contract Documents.

\_\_\_\_\_  
*Contractor* Title Date

The City has determined the Project is 100% complete in compliance with all Contract Documents.

\_\_\_\_\_  
*Inspector/Supervisor* Date

\_\_\_\_\_  
*Project Engineer* Date

\_\_\_\_\_  
*City of St. Helens* City Administrator Title Date

Unless otherwise provided as a Special Provision, when City accepts the Certificate of Final Completion, the date the Contractor signs the Certificate of Final Completion shall be the date the City accepts ownership of the work and the start date of the warranty period.



# EXHIBIT I

## INSTRUCTION TO BIDDERS

The provisions of Oregon Administrative Rules Chapter 137, Divisions 46 and 49, apply to all bids and contracts which incorporate the Public Works Standards of the City of St. Helens into the contract documents of a project. The OAR provisions control over any conflicting language in the Public Works Standards and the OAR provisions are incorporated herein by this reference.

### 1. SCOPE OF WORK

The work contemplated under this contract includes all permits, labor, tools, machinery, materials, transportation, equipment and services of all kinds required for, necessary for, or reasonable incidental to, the completion of all the work in connection with the project described in the contract documents, including the general conditions, all applicable special conditions, plans, specifications, or any supplemental documents.

### 2. EEO AFFIRMATIVE ACTION

Bidders must comply with the City of St. Helens Equal Opportunity Policy for Contractors. The policy is included in and made a part of these Contract Documents and is attached hereto and made a part hereof as Attachment A. Contractor shall not discriminate against minorities, women or emerging small business enterprises in the awarding of subcontracts.

### 3. BID PROVISIONS

- a. Each bid must contain a completed Bid including the following:
  - A. A Bid and Schedule of Prices.
  - B. Acknowledgement that the bidder has received and reviewed all Addenda for the bid.
  - C. A statement that all applicable provisions of ORS Chapters 279A-C, including ORS 279C.800 to 279C.870 (Contracting and Prevailing Wages) shall be complied with.
  - D. A statement by the bidder, as part of their bid, that the bidder agrees to be bound by and will comply with the provisions of ORS 279C.838 or 279C.840 or 40 U.S.C. 3141 to 3148, as applicable.
  - E. A statement as to whether the bidder is a resident bidder as defined in ORS 279A.120.
  - F. A statement as to whether or not the bidder is licensed under ORS 468A.720 for asbestos removal if applicable.
  - G. A statement that the bidder has a current and valid license with the Construction Contractor's Board and/or the State Landscape Contractors Board as required by ORS 671.530.
  - H. A statement confirming that the bidder has a Qualified Drug-testing Program for employees in place.
  - I. First Tier Subcontractor form for the project on the City form (physically received by City within 2 working hours of the bid submission deadline).
  - J. A Surety Bond, Cashier's check or Certified check in the amount of 10 percent of the submitted bid.
  - K. Certification: Non-discrimination
  - L. Certification: No Conflict of Interest
  - M. Certification: Not ineligible for Public Works Contracts
- b. The City will not mail notice of addenda but will publish notice of any addenda on City's website and post the notice of addenda at City Hall at <https://www.ci.st-helens.or.us/rfps>. The addenda may be downloaded or picked up at City Hall. Check the website and City Hall bulletin board frequently until the bid submission deadline.
- c. No bid will be received or considered by the City of St. Helens unless the bid contains a statement by the bidder as a part of its bid that the Contractor shall be bound by and will comply with the provisions of ORS 279C.838, 279C.840 or 40 U.S.C. 3141 to 3148. The statement shall be included in the Bid form. The existing prevailing rate of wage in the form of a BOLI document is included in the bid documents.

- d. Each Bidder must identify in the Bid whether the Bidder is a “resident bidder” as defined in ORS 279A.120.
- e. Unless specified in the ITB, and Contract Special Provisions, the bidder or subcontractor need not be licensed under ORS 468A.720 relating to asbestos abatement.
- f. No bid for a construction contract shall be received or considered by the City of St. Helens unless the bidder is licensed with the Construction Contractors Board or licensed by the State Landscape Contractors Board as required by ORS 671.530.
- g. Each Bidder must demonstrate that its firm has a Qualified Drug Testing Program for employees in place and demonstrate compliance prior to award.
- h. Instructions for First-Tier Subcontractors Disclosure. Bidders are required to disclose information about certain first-tier subcontractors when the contract value for a Public Improvement is greater than \$100,000.

Specifically, when the contact amount of a first-tier subcontractor furnishing labor or labor and materials would be greater than or equal to (i) 5% of the project bid, but at least \$15,000, or (ii) \$350,000 regardless of the percentage, the bidder must disclose the following information about that subcontract in its bid submission or within two (2) working hours after bid submission deadline:

- A. The subcontractor’s name,
- B. The dollar value of the subcontract, and
- C. The category of work that the subcontractor would be performing.

If the bidder will not be using any subcontractors that are subject to the above disclosure requirements, the bidder is required to indicate “NONE” on the accompanying form. Disclosure forms will be available for public inspection after the opening of the bids.

**THE CITY OF ST. HELENS MUST REJECT A BID AS NON-RESPONSIVE IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THE REQUIRED INFORMATION BY THE STATED DEADLINE.**

- i. Bid Security. No bid will be received or considered unless the Bid is accompanied by a certified check, cashier's check, (payable to the City of St. Helens), surety bond (in approved form)(f/k/a/ bid bond), or irrevocable letter of credit issued by an insured institution (in an approved form) in an amount equal to ten percent (10%) of the total amount bid. The successful bidder will be required to furnish a faithful performance bond and a labor and material payment bond each in the amount of one hundred percent (100%) of the amount of the contract. Said security shall be irrevocable for 60 days, unless specified otherwise. The bid security shall be forfeited, at the City’s option, as fixed and liquidated damages, if the bidder fails or neglects to furnish the required performance bond, the insurance, or to execute the contract within 10 working days after receiving the contract from the City for execution. When a bond is used for bid security, the bond shall be executed by a surety company authorized to transact business in the State of Oregon. **THE BIDDER SHALL HAVE THE SURETY USE THE SURETY BOND FORM PROVIDED HEREIN. IF THIS FORM IS NOT USED, THE BID WILL BE DEEMED NON-RESPONSIVE AND SHALL BE REJECTED.**

All such certified checks or surety bonds will be returned to the respective bidders within 10 working days after the bids are opened, except those of the two low bidders. The bid security of the two low bidders will be held by the City until the selected bidder has accomplished the following:

- A. Executed a formal contract;
- B. Executed and delivered to the City a Performance Bond and Payment Bond, both in the amount equal to 100% of the Contract Price;
- C. Furnish proof of public works bond filed with BOLI; and



D. Furnish the required Certificates of Insurance.

Upon the execution and delivery to the City of St. Helens of the Contract and Performance Bond and Payment Bond and furnishing proof of a public works bond filed with BOLI by the successful bidder, the bid security shall be returned to the bidder. The bidder who has been awarded a contract and who fails or neglects to promptly and properly execute the contract or bonds shall forfeit the bid security that accompanied the bid. It is hereby specially provided that a forfeiture of said bid security be declared by the Council if the contract and performance bond and payment bond are not executed and delivered to the City within ten (10) working days of the day of the receipt by the successful bidder of the prepared contract. The Council, at its option, may determine that the bidder has abandoned the submitted accepted bid, in which case the bid security shall become the sole property of the City and shall be considered as liquidated damages and not as a penalty for failure of the bidder to execute the contract and bond. The security of unsuccessful bidders shall be returned to them after the contract has been awarded and duly signed.

- j. A Bidder submitting a bid thereby certifies that no officer, agent, or employee of the City who has a pecuniary interest in this bid has participated in the contract negotiations on the part of the City, that the Bid is made in good faith without fraud, collusion, or connection of any kind with any other Bidder for the same call for bids, and that the Bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.
- k. The Bidder, in submitting the bid, certifies that the Bidder has not been disqualified and is eligible to receive a contract for a public work pursuant to ORS 279C.860 as well as the disqualification provisions of ORS 279C.440 and OAR 137-049-0370. Bidder agrees, if awarded a contract, that every subcontractor will not be ineligible to receive a contract for a public work pursuant to ORS 279C.860 and will otherwise not be disqualified under ORS 279C.440 and OAR 137-049-0370.

**4. PREOFFER CONFERENCE AND PREQUALIFICATION OF BIDDERS**

If a pre-bid conference is scheduled, notice will be provided in accordance with OAR 137-049-0200(1)(a)(B). If prequalification will be required it will be specifically stated in the Notice to Contractors and Invitation to Bid, including the date prequalification applications must be filed under ORS 279C.430 and the class or classes of work for which bidders must be pre-qualified. For example, the requirement for ODOT Prequalification reads as follows:

Bidders must be pre-qualified with the Oregon Department of Transportation or General Service per ORS 279C.435 to perform the type and size of work contemplated herein and shall submit, to the City upon request. The City will investigate and determine the qualifications for the apparent low bidder prior to awarding the contract.

Applications submitted without being designated for a project advertised for bid by the City will be considered as a general prequalification application and processed pursuant to ORS 279C.430 to 279C.450, and notice of prequalification status will be given within thirty (30) days of the receipt of the application. A notice of disqualification can be given orally. An oral disqualification notice will be followed by written notice and bear the date of the oral notice. (NOTE: No person may engage in any business within the City without first obtaining a City Business License and paying the fee prescribed pursuant to City of St. Helens Ordinance 1392 as amended.)

**5. FORM OF BID**

- a. Bids shall be submitted in sealed envelopes to:  
City Administrator  
City of St. Helens  
265 Strand Street  
St. Helens, Oregon 97051  
Attention: John Walsh

The outside of the transmittal envelope shall bear the following information:

- Name of Bidder
- Address and telephone number of Bidder
- Title of Project
- Date of opening
- The words "Sealed Bid"

If the sealed bid is forwarded by mail or messenger service, the sealed envelope containing the bid, and marked as above, must be enclosed in another envelope addressed as noted above. Facsimile and Electronic Data Interchange bids shall not be accepted unless otherwise specified in the Special Provisions. No bid will be received or considered by the City unless the bid contains all the Required Bid Documents and Certifications.

- b. All bids must be clearly and distinctly typed or written with ink or indelible pencil and be on the Bid form furnished by Owner. The bid must be signed by the Contractor or a duly authorized agent. If erasures or other changes appear on the form, they shall be initialed in ink by the person who signs the bid. The bidder shall not alter, modify or change the Bid forms except as directed by addendum. All applicable blanks giving general information must be completed, in addition to necessary unit price items and total prices in the column of totals to make a complete bid. The Bid is the bidder's offer to enter into a contract which, if the Bid is accepted for award, binds the bidder to a contract and the terms and conditions contained in the Bid, as well as the Solicitation Documents. A bidder shall not make the Bid contingent upon the City's acceptance of specifications or contract terms which conflict with or are in addition to those advertised in the Notice to Contractors and Invitation to Bid. Any statement accompanying and tending to qualify a bid may cause rejection of such bid, unless such statement is required in a bid embracing alternative bids.
- c. Unless otherwise specified, Bidders shall bid on all bid items included in the bid and the low Bidder shall be determined. Except as provided herein, bids which are incomplete, or fail to reply to all items required in the bid may be rejected.
- d. Bidders shall state whether business is being done as an individual, a co-partnership, a corporation, or a combination thereof, and if incorporated, in what state, and if a co-partnership, state names of all partners. The person signing on behalf of a corporation, a co-partnership or combination thereof shall state their position with the firm or corporation, and state whether the corporation is licensed to do business in the State of Oregon.

#### **6. LATE BIDS**

Bids received after the scheduled bid submission deadline set forth in the invitation for bids will be rejected. Bids will be time and date stamped by City Hall personnel upon receipt. Such time and date stamps will govern the determination of on-time submission of bids. Bids received after the time so fixed are late bids. Late bids will be time and date stamped at the time of receipt by City personnel, marked as "Rejected as Late Bid" and will be returned, unopened, to the submitted.

#### **7. INTERPRETATION OF CONTRACT AND ADDENDA**

If a bidder finds error, discrepancies in, or omissions from the plans, specifications or contract documents, or has doubt as to their interpretation or meaning, the bidder shall at once notify the City Contact Person. The City will investigate and determine if an addendum will be issued.

If it should appear to a Bidder that the work to be done or matters relative thereto are not sufficiently described or explained in the Contract Documents or that Contract Documents are not definite and clear, or the Bidder needs additional information or an interpretation of the contract, the Bidder may make written inquiry regarding same to the Engineer at least ten (10) days, unless otherwise specified, before the scheduled bid submission deadline for submission of bids.

If, in the opinion of the Engineer, additional information or interpretation is required, an addendum will be issued to all known specification holders.

Any addendum or addenda issued by the City which may include changes, corrections, additions, interpretations or information, and issued seventy-two (72) hours or more before the scheduled bid submission deadline for submission of bids, Saturday, Sunday and legal holidays not included, shall be binding upon the Bidder. City shall supply copies of such Addenda will not be mailed but will be posted on the website and available at City Hall; failure of the Contractor to receive or obtain such addenda shall not excuse them from compliance therewith if they are awarded the contract.

**ORAL INSTRUCTIONS OR INFORMATION CONCERNING THE CONTRACT OR THE PROJECT GIVEN OUT BY OFFICERS, EMPLOYEES OR AGENTS OF THE CITY TO PROSPECTIVE BIDDERS SHALL NOT BIND THE CITY.**

**8. EXAMINATION OF CONTRACT, SITE OF WORK AND SUBSURFACE DATA**

- a. Prior to submitting a bid, it is the responsibility of each Bidder to:
  - A. Examine the plans, specifications and contract documents thoroughly.
  - B. Become fully informed as to the quality and quantity of materials and the character of the work required.
  - C. Visit the site to become familiar with local conditions that may affect cost, progress, or performance of the work and sources and supply of materials.
  - D. Consider all federal, state and local laws, ordinances, rules and regulations that may affect cost, progress, or performance of the work, including environmental and natural resource ordinance and regulations
  - E. Consider identified site conditions and conduct pre-bid inspection to address environmental and natural resource laws implicated by the project.
  - F. Study and correlate the Bidder's observations, especially as regards site conditions with the Contract Documents.
  - G. Notify the Contact Person of all conflicts, errors, ambiguities or discrepancies discovered in the Contract Documents.
  
- b. Bidders shall determine for themselves all the conditions and circumstances affecting the project or the cost of the proposed work, including without limitation utility interferences, by personal examination of the site, careful review of the Contract and by such other means as the Bidder feels may be necessary. It is understood and agreed that information regarding subsurface or other conditions, or obstructions indicated in the Contract Documents, is provided by Owner only for the convenience of Bidders and may not be complete or accurate and such information is not expressly or tacitly warranted to accurately represent actual conditions. Bidder's use of such information shall be at Bidder's sole risk, and Bidder is responsible to confirm any information provided from such independent sources as Bidder feels may be necessary.
  
- c. Logs of test holes, test pits, soils reports, ground-water levels and other supplementary subsurface information are offered as information of underlying materials and conditions at the locations actually tested. Owner will not be liable for any loss sustained by the Bidder as a result of any variance between conditions contained in or interpretations of test reports and the actual conditions encountered during progress of the work.
  
- d. The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the site subsurface conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract.
  
- e. The City will not pay any costs incurred by any Bidder in the submission of a Bid, or in making necessary studies or designs for the preparation thereof, or for procuring or contracting for the items to be furnished under the invitation to bid. When submitting a bid, the Bidder agrees that consideration has been given to the requirements and conditions contained throughout these bid documents.
  
- f. Notice: It is further understood that a bid awarded hereunder is subject to the City being able to comply with all zoning and land development ordinances or obtain rezoning of the property where necessary, and comply with local building code restrictions and conditions for structures contemplated in the project, any or all of which conditions may be contained in the contract or contract Special Provisions and if such conditions are not satisfied may result in termination of the contract.

**9. FAMILIARITY WITH LAWS AND ORDINANCES**

- a. The Bidder is presumed to be familiar with all Federal, State, and local laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials or equipment used in the proposed construction, or which in any way affect the conduct of the work. If the Bidder, or Contractor, shall discover any provision in the Contract which is contrary to or inconsistent with any law, ordinance or regulation, it shall immediately be reported to the Owner in writing.

- b. No person may engage in any business within the City without first obtaining a City business license and paying the fee prescribed pursuant to City of St. Helens Ordinance. The Contractor and their subcontractors shall obtain a City of St. Helens business license prior to beginning any work within the City of St. Helens.

**10. UNIT BIDS**

- a. The estimate of quantities of work to be done under unit price bids is approximate and is given only as a basis of calculation for comparison of bids and award of the Contract. The City does not warrant that the actual amount of work will correspond to the amount as shown or estimated. Payment will be made at unit prices under a contract, only for work actually performed or materials actually furnished according to actual measurement that were necessary to complete the work.
- b. Bidders must include in their bid prices the entire cost of each item of work set forth in the bid, and when, in the opinion of the City, the prices in any bid are obviously unbalanced, such bid may be rejected.
- c. The unit contract prices for the various bid items of the contract shall be full compensation for all labor, materials, supplies, equipment, tools and all things of whatsoever nature are required for the complete incorporation of the item into the work the same as though the item were to read "In Place."

**11. WITHDRAWAL, MODIFICATION OR ALTERATION OF BID**

- a. Bids may be withdrawn on written request received from the bidders prior to the time fixed for opening. The request shall be executed by the bidder or a duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Negligence on the part of the bidder in preparing the bid confers no right for the withdrawal of the bid after it has been opened. The bid will be irrevocable until such time as the City:
  - A. Specifically rejects the bid, and
  - B. Awards the contract to another bidder and said contract is properly executed.

All bids shall remain subject to acceptance by the City for sixty (60) days after the date of the bid opening.

- b. Prior to Bid Opening, changes may be made provided the change is initialed by the Bidder or the Bidder's agent. If the intent of the Bidder is not clearly identifiable, the interpretation most advantageous to Owner will prevail.
- c. No Bidder may withdraw a bid after bid opening unless sixty (60) days have elapsed and the City has not awarded a contract.

**12. MISTAKES IN BIDS**

- a. To protect the integrity of the competitive solicitation process and to assure fair treatment of Bidders, City will carefully consider whether to permit waiver, correction or withdrawal for certain mistakes.
- b. Treatment of Mistakes. City shall not allow a Bidder to correct or withdraw a Bid for an error in judgment. If the City discovers certain mistakes in a Bid after Opening, but before award of the Contract, the City may take the following action:
  - A. City may waive, or permit a Bidder to correct, a minor informality. A minor informality is a matter of form rather than substance that is evident on the face of the Bid, or an insignificant mistake that can be waived or corrected without prejudice to other Bidders. Examples of minor informalities include a Bidder's failure to:
    - 1) Return the correct number of Signed Bids or the correct number of other documents required by the Solicitation Document;
    - 2) Sign the Bid in the designated block, provided a Signature appears elsewhere in the Bid, evidencing an intent to be bound; and

- 3) Acknowledge receipt of an Addendum to the Solicitation Document, provided: it is clear on the face of the Bid that the Bidder received the Addendum and intended to be bound by its terms; and the Addendum involved did not affect price, quantity or delivery.
- B. City may correct a clerical error if the error is evident on the face of the Bid, or other documents submitted with the Bid, and the Bidder confirms the City's correction in Writing. A clerical error is a Bidder's error in transcribing its Bid. Examples include typographical mistakes, errors in extending unit prices, transposition errors, arithmetical errors, instances in which the intended correct unit or amount is evident by simple arithmetic calculations (for example a missing unit price may be established by dividing the total price for the units by the quantity of units for that item or a missing, or incorrect total price for an item may be established by multiplying the unit price by the quantity when those figures are available in the Bid). In the event of a discrepancy, unit prices shall prevail over extended prices.
  - C. City may permit a Bidder to withdraw a Bid based on one or more clerical errors in the Bid only if the Bidder shows with objective proof and by clear and convincing evidence:
    - 1) The nature of the error;
    - 2) That the error is not a minor informality under this subsection or an error in judgment;
    - 3) That the error cannot be corrected or waived under subparagraph B of this subsection;
    - 4) That the Bidder acted in good faith in submitting a Bid that contained the claimed error and in claiming that the alleged error in the Bid exists;
    - 5) That the Bidder acted without gross negligence in submitting a Bid that contained a claimed error;
    - 6) That the Bidder will suffer substantial detriment if the City does not grant it permission to withdraw the Bid;
    - 7) That the City's or the public's status has not changed so significantly that relief from the forfeiture will work a substantial hardship on the City or the public it represents; and
    - 8) That the Bidder promptly gave notice of the claimed error to the City.
  - D. The criteria in subsection C above shall determine whether a City will permit a Bidder to withdraw its Bid after the bid submission deadline. These criteria also shall apply to the question whether an City will permit a Bidder to withdraw its Bid without forfeiture of its bid bond (or other bid security), or without liability to the City based on the difference between the amount of the Bidder's Bid and the amount of the contract actually awarded by the City, whether by award to the next lowest Responsive and Responsible Bidder or the best Responsive and Responsible Proposer, or by resort to a new solicitation.
  - E. The City shall reject any Bid in which a mistake is evident on the face of the Bid and the intended correct Bid is not evident or cannot be substantiated from documents accompanying the Bid, i.e., documents submitted with the Bid.

### 13. REJECTION OF BIDS

- a. The City may reject any bid upon a finding that the Bid meets the criteria specified in OAR 137-049-0440(1)(a) or (b) or has not provided the certification required under OAR 137-049-0440(3). The City shall reject a Bid from a Bidder who meets the criteria specified in OAR 137-049-0440(1)(c). The City may, for good cause, reject any or all bids upon a finding it is in the public interest to do so. In any case where competitive bids are required and all bids are rejected, and the proposed contract is not abandoned, new bids may be called for as in the first instance. The City may, at its own discretion, waive minor informalities.
- b. This invitation to bid does not commit the City to pay any costs incurred by any Bidder in the submission of a Bid, or in making necessary studies, subsurface investigations or designs for the preparation of a Bid, or for procuring or contracting for the items to be furnished pursuant to the Contract Documents.

- c. The City reserves the right to reject any or all bids when such rejection is in the best interest of the City of St. Helens. Bids may be rejected if they show any alteration of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.
- d. When Bids are signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf, or a member of a partnership, a "Power of Attorney" must be submitted with the Bid or on file with the City Administrator prior to opening of bids; otherwise, the Bid will be rejected as irregular.
- e. More than one Bid from an individual, firm, partnership, corporation, or combination thereof with an interest in more than one bid, for the items bid, will be cause for the rejection of all Bids in which such individual, firm, partnership, corporation, or combination thereof, is interested.
- f. **If there is reason to believe that collusion exists among bidders, none of the bids of the participants in such collusion will be considered, and all involved bids shall be rejected. Bids in which prices are obviously unbalanced may be rejected.**

**14. BID PROTEST.**

Bidders may, in writing protest or request changes of any specifications or contract terms in accordance with adopted City contracting rules. The written protest or request for changes must be received by the City no later than ten (10) calendar days prior to the Bid Submission Deadline. The written protest or request shall include the reasons for the protest or request, and any proposed changes to the bid specifications or contract terms and a description of the prejudice to the bidder. Envelopes containing bid protests shall be marked "Contract Provision Protects or Request" with the Bid Number and Bid Submission Deadline. No protest against award, owing to the content of the bid specifications or contract terms shall be considered after the deadline established for submitting protests of bid specifications or contract terms.

**15. ORS 654.150 SANITARY FACILITIES AT CONSTRUCTION PROJECTS STANDARDS, EXEMPTIONS**

If the contract price is estimated (itemized bid) or bid (lump sum) by Contractor at \$1,000,000 or more, Contractor shall be responsible for all costs (which costs shall be included in the bid whether or not a specific bid item is provided therefore) that may be incurred in complying with or securing exemption or partial exemption from the requirements of ORS 654.150 (Sanitary facilities at construction projects; standards, exemptions) and the rules adopted pursuant thereto. Determination of applicability of ORS 654.150 to the project is the sole responsibility of the Contractor.



## EXHIBIT J

### OREGON PREVAILING WAGE RATES

#### S. 1ST AND STRAND STREET ROAD AND UTILITIES EXTENSION PROJECT NO. P-525

- i. Workers must be paid not less than the applicable state prevailing rate of wage. ORS 279C.830(1)(c); OAR 839-025-0020(3)(a)
- ii. If the Contractor fails to pay for labor and services, the City can pay for them and withhold these amounts from payments to the contractor. ORS 279C.515; OAR 839-025-0020(2)(a)
- iii. The Contractor must pay daily, weekly, weekend and holiday overtime as required in ORS 279C.540. ORS 279C.520(1); OAR 839-025-0020(2)(b)
- iv. The employer must give written notice to the workers of the number of hours per day and days per week they may be required to work. ORS 279C.520(2); OAR 839-025-0020(2)(c)
- v. The Contractor must make prompt payment for all medical services for which the Contractor has agreed to pay, and for all amounts for which the contractor collects or deducts from the worker's wages. ORS 279C.530; OAR 839-025-0020(2)(d)
- vi. The Contractor is required to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2)(a); OAR 839-025-0020(2)(e)(A)
- vii. The Contractor is required to include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2)(b); OAR 839-025-0020(2)(e)(B)

Applicable Oregon prevailing wage rates are contained in the publication, Prevailing Wage Rates for Public Works Contracts in Oregon effective as of the date the Bidding Documents are first advertised.

See Oregon Bureau of Labor and Industries website links at:  
<http://www.oregon.gov/BOLI/WHD/PWR/pages/index.aspx>

# **PWR REQUIRED POSTINGS ALL CONTRACTORS AND SUBCONTRACTORS**

## **PREVAILING WAGE RATES**

Each and every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in a conspicuous place at the work site, so workers have ready access to the information. ORS 279C.840(4); OAR 839-025-0033(1).

## **DETAILS OF FRINGE BENEFIT PROGRAMS**

When a contractor or subcontractor provides for or contributes to a health and welfare plan or a pension plan, or both, for the contractor or subcontractor's employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the work site. The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in a conspicuous place at the work site in the same location as the prevailing wage rates (see above). ORS 279C.840(5); OAR 839-025-0033(2)

## **WORK SCHEDULE**

Contractors and subcontractors must give workers the regular work schedule (days of the week and number of hours per day) in writing, before beginning work on the project. Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information. If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements. ORS 279C.540(2); OAR 839-025-0034.



## PUBLIC WORKS BONDS

EVERY CONTRACTOR AND SUBCONTRACTOR who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a **\$30,000 “PUBLIC WORKS BOND”** with the Construction Contractor’s Board (CCB). (ORS 279C.836) This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

- This bond is to be USED EXCLUSIVELY FOR UNPAID WAGES determined to be due by the Bureau of Labor and Industries (BOLI).
- The bond MUST be filed BEFORE STARTING WORK on a prevailing wage rate project.
- The bond is in effect CONTINUOUSLY (do not have to have one per project).
- BEFORE PERMITTING A SUBCONTRACTOR TO START WORK on a public works project, CONTRACTORS MUST VERIFY their subcontractors have either filed the bond, or have elected not to file a public works bond due to a bona fide exemption.
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

### Exemptions:

- Allowed for a disadvantaged business enterprise, a minority-owned business, woman-owned business, a business that a service-disabled veteran owns or an emerging small business certified under ORS 200.055, for the first FOUR years of certification;
  - Exempt contractor must still file written verification of certification with the CCB, and give the CCB written notice that they elect not to file a bond.
  - The prime contractor must give written notice to the public agency that they elect not to file a public works bond.
  - Subcontractors must give written notice to the prime contractor that they elect not to file a public works bond.
  - For projects with a total project cost of \$100,000 or less, a public works bond is not required. (Note this is the total project cost, not an individual contract amount.)
  - Emergency projects, as defined in ORS 279A.010(f).

### **ORS 279C.830(2) requires:**

That the specifications for every contract for public works shall contain a provision stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.

Every contract awarded by a contracting agency shall contain a provision requiring the contractor:

- To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt;
- To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt.

Every subcontract that a contractor or subcontractor awards in connection with a public works contract must require any subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the public works project, unless otherwise exempt.

Part 3

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# **2021 Oregon Standard Specifications for Construction**

**[https://www.oregon.gov/odot/Business/Pages/Standard Specifications.aspx](https://www.oregon.gov/odot/Business/Pages/Standard_Specifications.aspx)**

Part 4

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**City of St. Helens  
Engineering Standards  
Manual Municipal  
Code Title 18**

<https://www.codepublishing.com/OR/StHelens/>

Part 5

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# **Special Provisions & Technical Specifications**

Project # R-685

S. 1<sup>ST</sup> & St. HELENS INTERSECTION PROJECT

TECHNICAL SPECIFICATIONS TABLE OF CONTENTS

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APPLICABLE SPECIFICATIONS

The following St. Helens Technical Specifications are applicable to the Work on this Project, as modified herein, and included in the project-specific Contract Documents.

These Specifications take precedence over the CSI specifications for the pump station construction and the 2021 Oregon Standard Specifications for Construction (OSSC), as modified by Special Provision for this Project. Where a conflict arises, the St. Helens Technical Specification shall prevail.

## SECTION 0110

### SUMMARY OF WORK

#### 1.1 GENERAL

These general requirements, special provisions, and technical specifications supplement and amplify certain sections of the Standard Terms and Conditions for Public Improvement Contracts, and Supplementary General Conditions. Work shall be in accordance with the 2021 or most current version of the Oregon Standard Specifications for Construction (OSSC), including all revisions at date of bid opening except as may be modified herein. These specifications shall apply in all particulars insofar as they are applicable to this project. In the case of discrepancy, unless noted herein, the more restrictive provisions shall apply.

#### 1.2 SCOPE OF WORK

INTERSECTION IMPROVEMENTS at the existing S. 1<sup>st</sup>/St. Helens intersection will be replaced with curb extensions and full concrete intersection. The construction will include site furnishings, illumination, ADA ramps, stormwater and stormwater planters.

The general outline of the principal features of the work does not in any way limit the responsibility of the Contractor to perform all work and furnish all equipment, labor, and materials necessary to successfully complete the work required by the Contract Documents. The Contractor shall not change any material, design values, or procedural matters stated or approved herein, without informing the Engineer and receiving written approval of the change. Unapproved changes shall be considered unauthorized work and shall result in rejection and removal of work done with the unapproved materials or with an unapproved process at no cost to the City.

#### 1.3 LOCATION OF WORK

Work on this project is located within the city limits of St. Helens, Oregon as shown on the vicinity map on Sheet 1 of the project plans.

#### 1.4 INTENT OF WORK

The intent of the Work is to produce a complete and finished work, which the Contractor undertakes to do in full compliance with the Contract Documents, properly installed public utilities and other public improvements which meet all specifications as described in these Contract Documents. It is not intended to mention every item of work in the specifications that can be adequately shown on the drawings nor to show on the drawings all items of work described or required by the specifications. All materials or labor for work shown on the drawings or reasonably inferable therefrom as being necessary to produce a finished job shall be provided by the Contractor whether not it is expressly covered in the specifications. The Contractor shall do all work as provided in the plans, specifications, special provisions, bid and contract, and shall do such additional extra work as may be considered necessary to complete the work in a satisfactory manner acceptable to the City.

## SECTION 0112

### DEFINITIONS AND REGULATORY REQUIREMENTS

#### 1.1 DEFINITIONS

In addition to the words and terms defined herein, the following shall be understood to have the meanings given:

- Owner/City City of St. Helens
- Engineer Kittelson & Associates
- Landscape Architect Greenworks
- Project Manager City of St. Helens
- Construction Inspector City of St. Helens
- County Columbia County
- Sewer District City of St. Helens
- Water District City of St. Helens
- Gas Company Northwest Natural Gas
- Power Company Columbia River PUD
- Telephone Company Century Link/Lumen
- Cable Company Comcast Cable
- Fire Department Columbia River Fire & Rescue

#### 1.2 ABBREVIATIONS

- AASHTO American Association of State Highway and Transportation Officials
- ACI American Concrete Institute
- ADA Americans with Disabilities Act
- ANSI American National Standards Institute
- ASTM American Society for Testing and Materials
- AWWA American Water Works Association
- BOLI Oregon Bureau of Labor & Industries
- DEQ Department of Environmental Quality, State of Oregon
- EPA U.S. Environmental Protection Agency
- IBC International Building Code
- MUTCD Manual on Uniform Traffic Control Devices
- NACWA National Association of Clean Water Agencies
- NASSCO National Association of Sewer service Companies
- NEC National Electrical Code
- NESC National Electrical Safety Code
- OAR Oregon Administrative Rules
- ODOT Oregon Department of Transportation
- OR-OSHA Oregon Occupational Safety & Health Administration
- ORS Oregon Revised Statutes
- OSSC Oregon Standard Specifications for Construction
- UBC Uniform Building Code (as adopted by the State of Oregon)
- UMC Uniform Mechanical Code
- UPC Uniform Plumbing Code (as adopted by the State of Oregon)

### 1.3 CODE REQUIREMENTS

All work shall be done in strict compliance with the requirements and current revisions, as applicable, of:

- Oregon Standard Specifications for Construction (OSSC)
- Oregon Department of Transportation (ODOT)
- Uniform Plumbing Code
- Uniform Mechanical Code
- National Electric Code
- National Electric Safety Code
- City of St. Helens Engineering Standards Manual (Municipal Code Title 18)
- City of St. Helens Development Code
- State of Oregon Bureau of Labor and Industries (BOLI)
- Oregon Department of Environmental Quality (DEQ)
- Manual of Uniform Traffic Control Devices (MUTCD)
- American National Standards Institute (ANSI)
- American Water Works Association (AWWA)

In case of disagreement between these codes or specifications, the more restrictive shall prevail.

### 1.4 PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS

Prevailing wage rates apply for public works construction projects costing over \$50,000. If a project begins with a total project cost under \$50,000, but change orders increase the project cost to more than \$50,000, the entire project will be subject to the prevailing wage rate law, including all work already performed on the project. OAR 839-025-0100(1)(a).

For each labor classification, the Contractor shall abide by the requirements of the prevailing wage rates for the State of Oregon Bureau of Labor and Industries (BOLI), as required. Applicable Oregon prevailing wage rates are contained in the publication, Prevailing Wage Rates for Public Works Contracts in Oregon. Effective January 1, 2022. ORS 279C.830(1)(a). The Contractor and every subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2); OAR 839-025-0020(4).

### 1.5 PERMITS, FEES, AND LICENSES

Unless provided for otherwise in these Contract Documents, all permits, licenses, and fees shall be obtained by the Contractor and all costs shall be borne by the Contractor. Contractor shall be responsible for compliance with all permit provisions and shall accommodate all special inspections required thereof, all at no additional expense to the City beyond prices as bid. Contractor and Subcontractors shall obtain required business licenses from the City of St. Helens. Contractor shall stay fully informed of all permits required by various jurisdictions having authority over the Work and shall also bear all costs of fines or claims arising from, or based on, the violation of permit requirements.

There will be no measurement of work performed under this section and all permit requirements will be considered incidental to the work and no separate payment will be made.

### 1.6 US MAIL SERVICE

Contractor shall comply and cooperate fully with the requirements of the local authority of the U.S. Postal Service to maintain mailboxes and uninterrupted mail service during construction.



## SECTION 0120

### PROJECT MEETINGS

#### 1.1 PRE-BID CONFERENCE

A mandatory pre-bid conference and walk-through of the site is scheduled for this project and for the S. 1<sup>st</sup> Street and Strand Street Road and Utilities Project. The meetings for both projects will be held concurrently. Bidders are strongly encouraged to visit the project site at any time during the bidding phase of the project at their convenience.

#### 1.2 PRE-CONSTRUCTION CONFERENCE

Prior to Contractor mobilization, a mandatory Pre-Construction Conference will be scheduled by the City's Project Manager. Representatives of the City, Contractor, subcontractors, and appropriate utility representatives shall attend. The purpose of this meeting will be to review and discuss the proposed methods and practices for accomplishing the required work, job site procedures, roles and responsibilities, schedule, and other requirements of the Contract. Contractor shall submit a detailed construction schedule, list of emergency contacts, and list of subcontractors, and other required documentation listed on the Project Documentation Checklist of the Supplementary section of these Contract Documents before or at the meeting for discussion.

#### 1.3 CONSTRUCTION PROGRESS MEETINGS

Regular project progress meetings may be scheduled by the City's Project Manager. Project progress meetings shall be attended by representatives of the City, the Contractor's project manager and jobsite superintendent. Progress meetings may, at a minimum, be held every 30 days after the start of construction and at a maximum be held every two weeks. The Project Manager may adjust frequency and location of meetings, as necessary. In general, progress meetings shall review work progress, discuss field observations, problems and conflicts, construction schedule, and other project business.

#### 1.4 PROJECT WALKTHROUGH

When the project is nearing completion, the City's Project Manager will schedule a walkthrough to be attended by representatives of the City and Contractor. A final project punch list will be developed from the walkthrough in the form of a list of tasks or items that need to be fixed or completed before Final Acceptance.

#### 1.5 PROJECT CLOSEOUT MEETING

The project closeout meeting will generally be held virtually and shall be attended by representatives of the City and Contractor. The purpose of the project closeout meeting is for the City and Contractor to review the project i.e., what went well, what were the challenges, and to identify the lessons learned and establish recommended future actions for future projects.

## SECTION 0121

### ROLES & RESPONSIBILITIES

#### 1.1 OWNER'S AUTHORITY AND RESPONSIBILITIES

The City has full authority over the Work and shall identify a representative or representatives to act on its behalf with respect to the project.

##### A. The Engineer

The Engineer has full authority over the Work and its suspension. The Contractor shall perform all Work to the complete satisfaction of the Engineer. The Engineer's determination shall be final on all matters, including, but not limited to, the following:

- Quality and acceptability of materials and workmanship
- Measurement of unit price Work
- Timely and proper prosecution of the Work
- Interpretation of Contract Documents
- Payments due under the Contract

Work performed under the Contract will not be considered complete until it has passed Final Inspection by the Engineer and has been accepted in writing by the City. Interim approvals issued by the Engineer will not discharge the Contractor from responsibility for errors in prosecution of the Work, for improper fabrication, for failure to comply with Contract requirements, or for other deficiencies, the nature of which are within the Contractor's control.

The Engineer's decisions will be final and binding. The Engineer may pursue actions against the Contractor, including but not limited to the withholding of estimates and suspending the work for noncompliance of the Contract. The Engineer may suspend the work without suspending working day charges for noncompliance of the Contract.

Engineer's decisions and estimates shall be final.

##### B. Project Manager

The Project Manager, as the Engineer's representative, has the authority to enforce the provisions of the Contract. The Contractor shall direct all requests for clarification or interpretation of the Contract, in writing, to the Project Manager. Contract clarification or interpretation obtained from persons other than the Project Manager will not be binding on the City. The Project Manager shall have the authority to appoint inspectors and other personnel as required to assist in the administration of the Contract, to observe, test, inspect, approve, accept or reject work, and answer all questions arising under the terms of the Contract.

The Project Manager manages all aspects of the project, including reviewing and approving construction plans, changes in construction, submittals, shop drawings and supporting calculations, and ensuring project compliance with all codes and ordinances and established engineering standards. The Project Manager manages the project's bid process, holds bid conferences, pre-construction conferences, project meetings, evaluates bids, makes bid award recommendations, and reviews contractor pay requests, coordinates work with Contractor and other agencies, resolves construction

difficulties and problems and makes adjustments in original designs as needed; performs inspections, and oversees all aspects of project closeout.

### C. Project Construction Inspector

The City Project Construction Inspector is authorized to represent the Engineer and Project Manager to perform the following:

- Inspect Work performed and materials furnished, including, without limitation, the preparation, fabrication, or manufacture of materials to be used
- Verbally reject defective materials and to confirm such rejection in writing
- By verbal order, temporarily suspend the Work for improper prosecution pending the Engineer's or Project manager's decision
- Monitoring both work progress and performance testing results
- Inform the city engineer of all proposed plan changes, material changes, stop work orders, or errors or omissions in the approved plans or specifications as soon as practical. Any revision to approved plans must be under the direction of the engineer. It shall be at the discretion of the city's project inspector as to whether the revision is significant enough to warrant review by the city engineering plan review/permits unit.

Project Construction Inspector is not authorized to:

- Accept Work or materials that do not conform to the Contract Documents
- Alter or waive provisions of the Contract
- Give instructions or advice inconsistent with the Contract Documents

## 1.2 CONTRACTOR'S AUTHORITY AND RESPONSIBILITIES

The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall ensure the completed work complies with the Contract Documents and shall supervise, direct, and control the work competently and efficiently. Contractor shall devote such attention thereto and applying such skill and expertise as necessary to perform the work in accordance with the Contract Documents and shall provide competent, qualified personnel to survey and lay out the work and to perform construction as required by the Contract Documents.

The Contractor shall do all work and furnish all labor, materials, equipment, tools, and machines necessary for the performance and completion of the project in accordance with Contract Documents within the specified time. Materials and construction details of forms, shoring, false work, and other structures built by the Contractor but not a part of the permanent project, shall meet approval of the Engineer, but such approval shall not relieve the Contractor from responsibility for their safety and efficiency.

The City shall not be liable or responsible for any accident, loss, or damage happening to work referred to in the Contract Documents prior to completion and acceptance thereof.

Contractor shall at all times maintain good discipline and order at the site. At the written request of the Engineer, the Contractor shall immediately remove from the project any employee or representative of the Contractor or a subcontractor who, in the opinion of the Engineer, does not perform work in a proper and skillful manner or who is disrespectful, intemperate, disorderly, uncooperative, or otherwise objectionable. Such person shall not be employed again on the work. The Contractor, acting through an approved designated superintendent, shall give personal attention to and shall manage the work to the end that it

shall be prosecuted faithfully. When the superintendent is not personally present at the job site, an alternate previously designated representative shall be available and shall have the authority to act on the Contract. The Contractor alone shall at all times be responsible for the safety of his and his subcontractor's employees.

### 1.3 COMPETENT PERSON DESIGNATION

The Contractor shall designate, in writing, a qualified and experienced competent superintendent at the site whose duties and responsibilities shall include the enforcement of Oregon - OSHA regulations regarding excavations, the prevention of accidents, and the maintenance and supervision of construction site safety precautions and programs. The Superintendent must be experienced with the work being performed and capable of reading and understanding the Contract. The Contractor shall ensure the Superintendent is available at all times and able to receive instructions from the Engineer or authorized representatives and to act for the Contractor. The Engineer may suspend work without suspending working day charges if a Superintendent is not available or does not meet the above criteria. The designated superintendent shall not be replaced without written notice to Engineer except under extraordinary circumstances. An alternate representative may be designated. The alternate representative shall be present at the site whenever Work is in progress. Any order or communication given to this representative shall be deemed delivered to the Contractor.

In the absence of the Superintendent or his designated representative, necessary or desirable directions or instructions may be given by the Engineer to the superintendent or foreman having charge of the specific Work to which the order applies. Such order shall be complied with promptly and referred to the Contractor or his representative. The designated Superintendent will act as the Contractor's representative and shall have the authority to act in all matters relating to this Contract. The superintendent shall have full authority to carry out all the provisions of the Contract and to supply materials, equipment, tools and labor without delay.

### 1.4 EMERGENCY MAINTENANCE SUPERVISOR

The Contractor shall submit to the Engineer the names, addresses and telephone numbers of at least three employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated, in writing by the Contractor, to act as its representatives and shall have full authority to act on its behalf. At least one of the designated employees shall be available for a telephone call any time an emergency arises with a maximum of one hour allowed to return phone call.

The Contractor will be responsible for reimbursing the City for all costs incurred by the City for performing emergency maintenance and repairs when the Contractor does not respond to the emergency calls or does not complete the emergency maintenance or repair.

## SECTION 0122

### COORDINATION OF WORK

#### 1.1 COORDINATION OF CONTRACT DOCUMENTS

Drawings and specifications are intended to describe and provide for a complete work. Any requirement in one is as binding as if stated in all. The Contractor shall provide any work or materials clearly implied in the Contract Documents even if the Contract Documents do not mention it specifically. If there is a conflict within the Contract Documents, it will be resolved by the following order of precedence:

- Contract change orders
- Addenda to Contract Documents
- St. Helens Technical Specifications, as included in project-specific Contract Documents
- OSSC Special Provisions
- CSI Specifications for pump station construction
- Bidding Rules and Contract Documents
- Plan drawings specifically applicable to the Project and bearing the Project title
- Contractor's Approved Proposal
- Outside agencies permits/requirements as may be required by law or loan agreements
- General and Supplementary Conditions of the Contract
- Standard Drawings
- Oregon Standard Specifications for Construction (most current version at bid opening)
- Reference Specifications

Change Orders, supplemental agreements, and approved revisions to Contract Drawings and specifications will take precedence over documents listed above. Detailed plans shall have precedence over general plans. Dimensions shown on Contract Drawings of that which can be computed shall take precedence over scaled dimensions. Notes on drawings are part of the drawings and govern in the order described above. Notes on drawings shall take precedence over drawing details. The intent of the drawings and specifications is to prescribe the details for the construction and completion of the work which the Contractor undertakes to perform according to the terms of the Contract.

Where the drawings or specifications describe portions of the work in general terms, but details are incomplete or silent, it is understood that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment, and incidentals, and do all the work involved in executing the Contract in a manner satisfactory to the City.

Contract Drawings for the project are designated by general title, sheet number and sheet title. The specific titles of each sheet are contained on Sheet 1A in of the Contract Drawings. When reference is made to the drawings, the "Sheet Number" of the drawing will be used. Each drawing bears the general title, S. 1st & St. Helens Intersection Improvements, R-685.

#### 1.2 CONFORMITY WITH PLANS, SPECIFICATIONS, AND SPECIAL PROVISIONS

Contractor shall furnish materials and perform work in reasonably close conformity with the lines, grades, cross-sections, dimensions, details, gradations, physical and chemical characteristics of materials, and other requirements shown in the Contract. Reasonably close conformity limits will be as defined in the

respective items of the Contract or, if not defined, as determined by the Engineer. Contractor shall obtain approval before deviating from the plans and approved working drawings. The Contractor shall not perform work beyond the lines and grades shown on the plans or any extra work without prior approval from the Engineer. Work performed beyond the lines and grades shown on the plans or any extra work performed without prior approval from the Engineer is considered unauthorized and shall be excluded from pay consideration. The City will not pay for materials rejected due to improper fabrication, excess quantity, or any other reason within the Contractor's control.

### 1.3 NOTIFICATION OF UTILITIES AND AGENCIES

Utility locations shown on Contract Drawings are approximated. Contractor shall secure utility locates and pothole all known utility locations to determine utility depths prior to the commencement of any construction as needed. Before starting any site work, Contractor shall call One Call at 1-800-332-2444 for utility locates and to notify utility agencies. The Contractor is responsible for verifying the locations of all existing utilities prior to work. All excavators performing work on this project must comply with all the provisions of ORS 757.541 to 757.571, including notification of all owners of underground utilities at least forty-eight (48) business day-hours, but not more than ten (10) business days before commencing an excavation. Existing utilities, even if not specifically shown on the Contract Drawings or addressed in this document, that are damaged or disturbed by construction shall be restored and/or replaced to the original condition and up to the satisfaction of the utility owner at the Contractor's expense. In the event of damage to power, gas, telephone or any other underground utility system, the Contractor shall make available to the utility owner any manpower or equipment that will facilitate the repair and the continuation of scheduled work. All cost of repairs shall be the responsibility of the Contractor.

Before exposing any utility, the utility having jurisdiction shall grant permission and be provided the opportunity to oversee the operation, with advance notice provided as the individual utility requires. Should service of any utility be interrupted due to the Contractor's operation, the proper authority shall be notified immediately. It is of the utmost importance that the Contractor cooperates with the said authority in restoring the service as promptly as possible. Any costs shall be borne by the Contractor.

Utilities which may be impacted include the following:

- Streets City of St. Helens
- Watermain City of St. Helens
- Storm Sewer City of St. Helens
- Sanitary Sewer City of St. Helens
- Natural Gas Northwest Natural Gas
- Power/Electricity Columbia River PUD
- Telephone Century Link/Lumen
- Cable Company Comcast

Contractor shall be responsible for the scheduling and coordination of the construction activities necessary to support the resolution of any utility conflicts with the appropriate utility agency. The City will not incur any financial responsibility for any construction delays related to the relocation of any utilities. If the Contractor fails to locate any known utility that interferes with construction, the cost of correcting the conflict shall be borne by the Contractor. Contractor shall be responsible for prompt notification to the City and the appropriate utility agencies of any known utility conflicts. Contractor shall give at least five (5) business days' notice to the City or utility agency if a conflict arises and relocation of an existing utility is necessary. In areas where the Contractor's operations are adjacent to or near a utility and such operations may cause

damage which might result in significant expense, loss and inconvenience, the operations shall be suspended until all arrangements necessary for the protection thereof have been made by the Contractor.

There will be no separate payment made for the verification of utility depths or maintenance of utility markings and the costs thereof shall be considered incidental to construction.

#### 1.4 COORDINATION WITH UTILITIES AND OTHER CONTRACTORS

It is the Contractor’s responsibility to coordinate work with utility owners. The Contractor shall use established safety practices when working near utilities and shall consult with the appropriate utilities before beginning work. Contractor shall notify the Engineer immediately of utility conflicts. The Engineer will decide whether to adjust utilities or adjust the work to eliminate or lessen the conflict. Unless otherwise shown on the plans, the Contractor will make necessary arrangements with the utility owner when utility adjustments are required. Contractor shall use work procedures that protect utilities or appurtenances that remain in place during construction, cooperate with utilities to remove and rearrange utilities to avoid service interruption or duplicate work by the utilities, and allow utilities access to the right of way. Contractor shall immediately notify the appropriate utility of service interruptions resulting from damage due to construction activities.

The following table lists the utility contacts during the period of the Contract. This information is subject to change at any time without prior notification:

Utility	Owner	Utility Contact Person
Water, Sewer, & Storm	City of St. Helens	Dave Elder 984 Oregon St St. Helens, OR 97051 <a href="mailto:delder@sthelensoregon.gov">delder@sthelensoregon.gov</a> 503-936-8523
Natural Gas	Northwest Natural Gas	Rich Girard 220 NW Second Ave Portland, OR 97209 <a href="mailto:r2g@nwnatural.com">r2g@nwnatural.com</a> 503-226-4211 ext 2967
Power	Columbia River PUD	Karl Webster / Brooke Sisco PO Box 1193, St. Helens, OR 97051 <a href="mailto:kwebster@crpud.org">kwebster@crpud.org</a> 503-397-8154
Telephone	Century Link	Scott Miller / Marco Galas 8021 SW Capitol Hill Rd Portland, OR 97219 <a href="mailto:scott.miller4@centurylink.com">scott.miller4@centurylink.com</a> 503-242-4144
Telephone	Lumen	Masood Zeerak 1025 Eldorado Blvd. Broomfield, CO 80021 <a href="mailto:masood.zeerak@lumen.com">masood.zeerak@lumen.com</a> 720-888-8568
Cable	Comcast	Ken Parris Construction Dept

Utility	Owner	Utility Contact Person
		445 Port Ave Suite 1 St Helens, OR 97051 <a href="mailto:Kenneth.Parris@cable.comcast.com">Kenneth.Parris@cable.comcast.com</a> 503-366-9717

## 1.5 SITE INVESTIGATION AND PHYSICAL DATA

The Contractor acknowledges that it is satisfied as to the nature and location of the work and the general and local conditions, including but not limited to those bearing upon transportation, disposal, handling, and storage of materials. The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify the Engineer of all errors, omissions, conflicts, and discrepancies found therein. The Contractor shall assume all responsibility for making estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract. Any failure by the Contractor to become acquainted with the available information and existing conditions will not be a basis for relief from successfully performing the work and will not constitute justification for additional compensation. The Contractor shall verify the locations existing of structures, pipelines, grades, and utilities as needed, prior to construction. The City assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available. Information and data furnished or referred to herein is furnished for information only.

## 1.6 MEANS AND METHODS OF CONSTRUCTION

Unless otherwise expressly provided in the Contract Documents, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Engineer's right to prohibit means and methods proposed by the Contractor which in the Engineer's judgment:

- shall constitute a hazard to the work, or to persons or property, or shall violate express requirements of applicable laws or ordinances; or
- shall cause unnecessary or unreasonable inconvenience to the public; or
- shall not produce finished work in accordance with the requirements of the Contract documents; or
- shall not assure the work to be completed within the time allowed by the Contract.

The Engineer's approval of the Contractor's means or methods of construction, or the Engineer's failure to exercise Engineer's right to prohibit such means or methods, shall not relieve the Contractor of its responsibility for the work or of its obligation to accomplish the result intended by the Contract Documents; nor shall the exercise or non-exercise of such rights to prohibit create a cause of action for damages or provide a basis for any claim by the Contractor against the City. Where the Contract Documents do not require the use of specific means or methods for the Work, the Contractor shall submit its proposed means and methods of construction to the Engineer sufficiently in advance of the work affected to permit a reasonable time for review and comments. The means and methods of construction must be approved in advance by the Engineer before construction begins. Failure to submit the proposed plan within a reasonable time shall not create a claim for damages for resulting delay in the work or for damages, nor shall it be a cause for extension of working time to complete the work. Contractor further agrees to defend and indemnify City for any claim or cause of action brought by any third party against the City.



## SECTION 0123

### ACCESS TO WORK

#### 1.1 ACCESS TO WORK

The City, Engineer, their consultants and other representatives and personnel of the City, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

#### 1.2 ACCESSIBILITY OF PRIVATE ROADS AND DRIVEWAYS

Entrances to properties shall be provided and maintained. No private road or driveway may be closed without prior written permission by the affected property owner. Driveways shall be left open and ready for use at the end of the work shift. All expenses involved in providing for construction, maintenance, and use of private roads or driveways, shall be borne by the Contractor and the amount thereof absorbed in the unit prices of the Contractor's bid.

#### 1.3 CONSTRUCTION WITHIN PUBLIC RIGHTS-OF-WAY

When the work contemplated is wholly or partly within the right-of-way of a public agency such as a city, county or state, the Contractor will obtain from these agencies any right-of-way and street opening permits and all other necessary permit(s) required for the work. The Contractor shall abide by all regulations and conditions stipulated in the permit(s). Such conditions and requirements are hereby made a part of these specifications, as fully and completely as though the same were fully set forth herein. The Contractor shall examine the permit(s) granted to the Owner by any city, county, state and federal agencies. Failure to do so will not relieve the Contractor from compliance with the requirements stated therein. The Contractor shall obtain all construction permits and pay all fees or charges and furnish any bonds and insurance coverages as necessary to ensure that all requirements of the city, county, state or federal agencies will be observed and roadways and ditches are restored to their original condition or one equally satisfactory. A copy of all permits shall be kept on the work site for use of the Engineer.

#### 1.4 CONSTRUCTION WITHIN EASEMENTS ON PRIVATE PROPERTY

No work is planned for outside of public right-of-way (ROW).

Utility service connections shall be completed under separate contract.

## SECTION 0130

### CONSTRUCTION DOCUMENTATION

#### 1.1 DOCUMENTATION

The following is a general list of documentation the Contractor shall provide to the Project Manager at various phases of the project. The Contractor is responsible for providing all materials, labor, and transportation for required construction documentation on this project.

##### A. Door Hangers

The Contractor is required to notify all residences and businesses in the project area of the Work at least 48-hours prior. The Contractor shall prepare and submit to the Project Manager a sample of their 48-Hour Notice of Construction door hanger template for approval prior to distribution. 48-Hour Notices shall have listed, at a minimum,

- The Contractor's 24-hour contact person's name and number
- The name of the project
- And the expected date of the work

The contact number on the notice shall remain unchanged throughout the duration of project. Notifications shall be distributed to all properties in the construction zone. A list of property owners and addresses for the properties in the construction zone will be provided to the successful Contractor, upon request.

##### B. Pre-Construction and Post-Construction Site Documentation

The Contractor shall perform pre-construction inspection video recordings and photographs of the existing surface and property conditions prior to the commencement of any work on site, including project staging, mobilization, and demolition. The pre-construction site video and photos shall be submitted to the Project Manager not less than ten days following the notice to proceed.

Upon completion of the project construction, the Contractor shall perform post-construction video recordings and photographs consistent with the pre-construction inspection video recordings and photographs, showing same catalog of surface items, locations, and surface and property conditions within project limits and submit to the Project Manager prior to submitting Exhibit F, Certificate of Compliance.

The areas to document will generally include,

- Road surface conditions
- Private Driveways
- Paved walkways
- Trees, shrubs, flower beds
- Fences and gates
- Retaining walls
- House foundations
- Parked vehicles

- Outdoor fixtures (sheds, lights, furniture, etc.)
- Any visible pre-existing conditions such as broken sidewalks, fences, etc.
- Unpaved ground conditions (lawn conditions, etc.)

Recorded video media for site documentation shall be submitted on a flash drive and viewable as standard MP4 file format. Photos shall be submitted in JPEG format. There will be no separate payment made for construction documentation and the costs thereof shall be considered incidental to "Mobilization".

## SECTION 0131

### PROJECT SCHEDULE AND TIMELINE

#### 1.1 NOTICE TO PROCEED

The Notice to Proceed with construction will be issued to the Contractor after the Contractor submits the signed Contract, Bonds, and Insurance Certificates to the City and those documents have been approved as to form and executed by the City. Generally, work shall begin within five days following issuance of the Notice to Proceed.

The Contractor shall be liable for any actions taken that delay, suspend, or retard the progress of work without the express written permission on the City and no additional Contract Time or Price shall be granted if the Engineer decides the cause of delay was solely caused by Contractor's actions. Contractor shall prosecute the work continuously to completion within the working days specified. Unless otherwise shown on the plans, work may be prosecuted in concurrent phases. The Contractor shall notify the Project Manager at least 24 hours before beginning work or before beginning any new operation.

#### 1.2 TIME OF COMPLETION

The Contractor shall complete all work shown and specified within the time limits stated in the Agreement. All work on the Base Contract and Add 1, if included, within this project shall be completed by September 15, 2024. Once started, the Work on each phase shall continue uninterrupted except by weekends, authorized holidays and events, severe weather, or by written agreement with the City for an agreed upon time.

#### 1.3 WORKING HOURS, OVERTIME, AND HOLIDAY WORK

Work shall be performed during normal working hours in St. Helens:

Mon – Fri: 8:00 A.M. – 4:30 P.M.

Sun – Sat – Holidays: None

The Contractor is limited to these working hours unless permission is requested in writing and pre-approved by the Engineer. The Contractor will not be allowed to work during the hours of 10:00 P.M. to 7:00 A.M. as set by City of St. Helens Municipal Code Noise Regulations 8.16. The number of working days provided in the Contract is considered to be sufficient time to complete the project. There will be no separate payment made for working outside of normal work hours and the costs thereof shall be considered incidental to construction.

#### 1.4 PROJECT SCHEDULE

Project Schedule -- Contractor shall prepare and submit a practicable Gantt chart schedule to the Engineer within ten (10) days after the Notice to Proceed. The schedule shall show at a minimum:

- Critical path
- Dates on which important features of the work will start
- Order in which Contractor proposes to carry out the work
- Estimated dates for completion of tasks

Schedule is to be updated whenever the Contractor's progress deviates from the previously approved schedule by more than 10 percent.

## 1.5 CONSTRUCTION DELAYS AND EXTENSION OF TIME

The Contractor shall notify the Project Manager immediately upon encountering any condition that the Contractor believes may cause a claim for a time extension. The Contractor shall be entitled to an extension of working time under this Contract only when claim for such extension is submitted to the City in writing by the Contractor within fourteen (14) days from and after the time when any alleged cause of delay shall occur, and then only when such time is approved by the City in writing.

In adjusting the Contract Time for the completion of the project, unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to inability to obtain supplies and materials when orders for such supplies and materials were timely made and materials are not available from other sources, naturally occurring inevitable unavoidable accidents, or public enemy acts, acts of the City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather conditions, ozone alerts as determined by the National Weather Bureau or other authorized agency, or delays of subcontractors due to such causes beyond their control shall be taken into consideration. If the satisfactory execution and completion of the Contract should require work and materials in greater amounts or quantities than those set forth in the Contract, requiring more time for completion than the anticipated time, then the Contract time shall be increased, but not more than in the same proportion as the cost of the additional work bears to the cost of the original work contracted for.

No allowances shall be made for delays or suspension of the performance of the work due to the fault of the Contractor. No adjustment of the Contract time shall be made if, concurrently with the cause for delay, hindrance, disruption, force majeure, impact or interference, there existed a cause for delay due to the fault or negligence of the Contractor or Contractor's agents, employees, or subcontractors. Notwithstanding any other provisions of the Contract Documents, including the General and Special Provisions, no adjustment shall be made to the Contract price and the Contractor shall not be entitled to claim or receive any additional compensation as a result of or arising out of any delay, hindrance, disruption, force majeure, impact or interference, foreseen or unforeseen, resulting in adjustment of the Contract time to complete the project, including but not limited to those caused in whole or in part by the acts, omissions, failures, negligence or fault of the City, its officers, officials, agents, Engineer, Consulting Engineer or employees. This provision is intended to cover all delays except as prohibited by law.

## 1.6 LIQUIDATED DAMAGES

The City will sustain damage if the work is not completed within the specified Contract Time. Not as a penalty but as liquidated damages, the Contractor agrees to pay to the City the amount specified in the Standard Terms and Conditions for Public Improvement Contracts section in this Contract for each Calendar Day the Contractor expends performing the Contract in excess of the Contract Time or adjusted Contract Time.

Payment by the Contractor of liquidated damages does not release the Contractor from its obligation to fully and timely perform the Contract according to its terms. Nor does acceptance of liquidated damages by the City constitute a waiver of the City's right to collect any additional damages it may sustain by reason of the Contractor's failure to fully perform the Contract according to its terms. The liquidated damages shall constitute payment in full only of damages incurred by the City due to the Contractor's failure to complete the Work on time. Liquidated damage payment to the City in the event the Contractor does not complete the work in the specified Contract Time shall be in the amount of Three Hundred Dollars (\$300)

assessed for each calendar day of delay, including holidays and weekends, and shall run continuously until the work is substantially complete.

## SECTION 0132

### QUALITY CONTROL

#### 1.1 WORKMANSHIP

The work shall be performed in accordance with the best modern practice with materials and workmanship of the highest quality and suitable for their purpose. The Engineer shall judge and determine the Contractor's compliance with these requirements. The Contractor shall ensure all work is of good quality, free from faults, defects, inferior materials, or equipment, will be performed by experienced knowledgeable personnel, and be in conformance with the Contract Documents. All work not conforming to these requirements, including substitutions not properly approved or authorized, shall be considered defective unless specifically accepted by the City.

#### 1.2 INSPECTION OF WORK

It is the intent of the City to inspect all work on this project. The Contractor must pay for all testing needed to determine acceptability for any work done without inspection, as directed by the Engineer. The Contractor shall furnish the City with every reasonable facility for ascertaining whether the work performed was in accordance with the requirements and intent of the plans and specifications. Contractor shall provide safe access to all parts of the work and provide information and assistance to the Engineer to allow a complete and detailed inspection. Contractor shall give the Inspector or the Engineer sufficient notice to inspect the work. Work performed without suitable inspection, as determined by the Engineer, may be ordered removed and replaced at Contractor's expense. The Contractor shall remove or uncover portions of finished work as directed, and once inspected, restore work to Contract requirements. The City will provide general construction inspection services of the project. The City will not provide any special inspections services for the project.

#### 1.3 QUALITY OF MATERIALS

The Contractor shall incorporate into the Work only materials conforming to the specifications and approved by the Engineer. The Contractor shall incorporate into the Work only manufactured products made of new materials unless otherwise specified in the Contract. The City may require additional testing or retesting to determine whether the materials or manufactured products meet specifications. Materials or manufactured products not meeting the specifications at the time they are to be used are unacceptable and must be removed immediately from the Project Site, unless otherwise directed by the Engineer.

#### 1.4 "OR EQUAL" CLAUSE

To establish a basis of quality, certain processes, types of machinery and equipment or kinds of material may be specified on the drawings or herein by designating a manufacturer's name and referring to its brand or product designation. It is not the intent of these specifications to exclude other processes, equipment or materials of a type and quality equal to those designated. When a manufacturer's name, brand or item designation is given, it shall be understood that the words "or equal" follow such name or designation, whether in fact they do so or not.

If the Contractor desires to furnish items by manufacturers other than those specified, he shall secure the approval of the Engineer prior to placing a purchase order. No extras will be allowed the Contractor for any changes required to adopt the substitute equipment, materials, or processes. Therefore, the Contractor's proposal for an alternate shall include all costs for any modifications to the drawings, such as additional

pipng or changes in pipng, or other modifications which may be necessary or required for approval and adoption of the proposed alternate equipment.

#### 1.5 MATERIALS AND EQUIPMENT

The Contractor warrants to the City that all materials and equipment furnished under this Contract shall be new unless otherwise specified in the Contract and that same shall be of good quality and workmanship, free from faults and defects and in conformance with the Contract documents. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the City. No material shall be delivered to the work without prior approval of the City. All materials and equipment not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective and shall be promptly repaired or replaced by the Contractor at the Contractor's sole cost upon demand of the City. If required by the City, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

#### 1.6 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

All work which has been rejected or condemned shall be repaired. If it cannot be repaired satisfactorily, it shall be removed and replaced at the Contractor's expense. Defective materials shall be immediately removed from the site of the work. Work done without line and grade having been given, work done beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided, work done without written authority and prior agreement in writing as to process, shall be done at the Contractor's risk and considered unauthorized and at the option of the Engineer may not be measured and paid for and may be ordered removed at the Contractor's expense.

Upon failure of the Contractor to repair satisfactorily or to remove and replace, if so directed, rejected, unauthorized or condemned work or materials immediately after receiving notice from the City, the Engineer shall, after giving written notice to the Contractor, have the authority to cause defective work to be remedied or removed and replaced, or to cause unauthorized work to be removed and to deduct the cost thereof from any monies due or to become due the Contractor. Alternatively, the City may, at its option, declare the Contractor in default, in which event the performance bond surety shall complete the Contract.



## SECTION 0133

### TESTING

#### 1.1 MATERIALS AND COMPACTION TESTING

The Contractor shall provide the services of a licensed, independent agency to perform materials and compaction testing for this project, as required. The name of the agency must be submitted and approved by the Engineer.

All required testing of work and/or materials shall be conducted in the presence of the Engineer. The Contractor shall provide forty-eight (48) hour notification to the City and Engineer prior to conducting any and all quality assurance testing.

Materials and compaction tests will be required to show that specified densities of compacted backfill, crushed rock, asphaltic concrete surfacing are being achieved by the Contractor's compaction methods. Concrete compressive strength testing will be required to show that the requirements of the Contract Documents are being met.

The Contractor shall provide the Engineer with copies of Proctor tests performed for the project backfill and paving material in addition to copies of compaction tests performed in the field. After the Engineer is satisfied that the Contractor's method of compaction consistently meets specified compaction requirements, the testing frequency may be reduced. The Engineer may direct testing at a higher frequency upon failure to obtain specified densities or if the Contractor changes compaction equipment or methods of compaction.

Concrete compressive strength testing shall follow Section 00440 of the Oregon Standard Specifications for Commercial Grade Concrete. Concrete compressive strength shall be a minimum of 3,000 psi at 28 Days. Contractor will supply the Engineer with test results.

All test locations shall be determined by the Engineer. Materials and compaction testing is considered incidental to the Contract and no separate payment shall be made.

The Contractor shall be responsible for the cost of all testing as specified in the Contract Documents. Additional testing requirements may be required elsewhere in these Contract Documents. The City or Engineer reserves the right to complete additional testing. In such cases, the Contractor shall provide safe access for the City or Engineer and their inspectors to adequately inspect the quality of work and the conformance with project specifications.

#### 1.2 TESTING AND OPERATION OF FACILITIES

It is the intent of the City to have a complete and operable facility. All the work under this Contract will be fully tested and inspected in accordance with the specifications. Upon completion of the work, the Contractor shall operate the completed facilities as required to test the equipment under the direction of the Engineer. During this period of operation by the Contractor, the new facilities will be tested thoroughly to determine their acceptance.

#### 1.3 TESTING AND LABORATORY SERVICES

Contractor shall perform all testing services of materials, equipment, and workmanship required by the Contract Documents. All materials and equipment used in the performance of work under are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. Unless otherwise stipulated in the Contract Documents, initial testing of all materials, construction items or products incorporated in the work shall be performed at the direction and expense of the Contractor and deemed necessary by the Engineer. In the event materials, construction items or products incorporated in the work fail to satisfy the minimum requirements of the initial test, appropriate prove out test shall be made as directed by the Engineer to determine the extent of the failure and to verify that the corrective measures have brought the item up to specification requirements.

The cost of all testing necessary to determine the extent of the failure and the adequacy of the corrective measures shall be the responsibility of the Contractor. The failure of the City to make any tests of materials shall in no way relieve the Contractor of its responsibility of furnishing materials conforming to the Contract Documents. Tests, unless otherwise specified, shall be made in accordance with the latest methods of the applicable ASTM regulation.

The Contractor shall provide such facilities as the City may require for collecting and forwarding samples and shall not use the materials represented by the samples until tests have been made. The Contractor shall furnish adequate samples without charge. Test materials and samples shall be stored so as to ensure the preservation of their quality and fitness for the Work. The Contractor shall furnish without additional cost to the City such materials for testing as may be reasonably necessary. Retesting after failure to pass tests shall be at the expense of the Contractor. Should the percentage of rejected material or equipment be unreasonably large, the additional cost of such inspection and tests resulting therefrom shall be borne by the Contractor. The Engineer shall determine what extra inspection is and shall determine the additional cost incurred thereby and payable by the Contractor and such determination shall be final. The City may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the City shall be allowed on account of such testing and certification.

## SECTION 0140

### CLARIFICATION AND MODIFICATION OF WORK

#### 1.1 CLARIFICATION OF WORK AND CONTRACT MODIFICATIONS

The Contractor expressly agrees that it shall not consider any order, instruction, clarification, response to a Request for Information or any other communication either written or oral given intentionally or unintentionally by any other person to do work that would cause a change in Contract Time or Price unless it is in the form of a Change Order from the City.

#### 1.2 INTERPRETATION AND MINOR CHANGES

The City has the authority to order minor changes in the Work including interpretations which are consistent with the intent of the Contract Documents, excluding:

- a change in Contract Price, or
- a change in the Contract Time, or
- a change in the means, methods, techniques, or sequence of work

If the Contractor considers that a minor change so ordered causes a Change in Contract Price or Contract Time, the Contractor shall notify the City in writing within 15 days of receipt of the order and shall not proceed with the work except in the case of an emergency endangering persons or property. If, after reviewing the Contractor's objection to a minor change, the City determines the work is required by the Contract Documents and does not involve a change in Price or Time, the City may direct the Contractor, in writing, to proceed with the work. If so directed, the Contractor may (1) accept the City's determination and proceed with the work or (2) give the City written notice 5 days in advance of beginning work stating that it intends to make a claim.

#### 1.3 REQUESTS FOR INFORMATION

If the Contractor does not clearly understand the plans and specifications or is not sure of their meaning, the Contractor shall make a written request to the Engineer in the form of a RFI (Request for Information). The Engineer's written explanation and interpretation of the Contract Documents shall be final.

#### 1.4 REQUESTS FOR QUOTATION

If a change involving Contract Price and/or Time or a new bid item is being considered, the Engineer will issue a Request for Quotation describing the proposed change. The Contractor shall submit a quotation promptly so not to delay or interfere with the progress of the Work, in accordance with the requirements for determining the cost of changes described in the Oregon Standard Specifications Construction.

#### 1.5 CHANGES REQUESTS

The Engineer may, at the Contractor's request, authorize in writing changes in the Project Plans or specifications to facilitate or expedite the work of the Contractor, provided such changes are not detrimental to the work or to the best interests of the City. Requests for such changes shall be submitted in writing to the Engineer. Such changes, as are authorized under this provision, shall be made without

additional cost to the City, and the City reserves the right to receive an equitable adjustment in the Contract Price or Contract Time as a consideration for authorizing any such change. The Contractor shall maintain sole responsibility for assuring these changes meet all the requirements of the Contract.

## 1.6 CHANGE DIRECTIVES

When a change of work involves an addition, deletion, or adjustment of work or Contract Time which can be covered by Contract bid items and the estimated increase or decrease in Contract cost does not exceed \$5,000, a Change Directive will be issued. A change directive may be issued in the field by the Project Manager and the Contractor shall then proceed with the work without delay. Verbal change directives will be confirmed by written change directives and signed by the Contractor and the Engineer thereby adding, deleting, modifying work, increasing, or decreasing Contract bid items.

## 1.7 CHANGE ORDERS

If the City and the Contractor agree on a change in Contract Price and/or Time for a proposed change, a Change Order will be issued and signed by the Engineer and Contractor. An executed Change Order shall be conclusive and final settlement of the change in Contract Time and Price for the work covered by the Change Order including the effect of the change on all other portions of the work completed or not and shall include compensation for all related claims for disruption, impact, delay or extended overhead, if any, that may result from the change. Implied in every Change Order, unless expressly reserved by the City or Contractor, is a waiver of all known and unknown claims arising out of the Change Order. The City reserves the right to have changed work performed by a separate contractor or its own workers.

## 1.8 CHANGED OR UNFORESEEN CONDITIONS

During the progress of the work, if the Contractor should encounter conditions materially different from those shown on the Project Plans or indicated in the Project Specifications, or unknown conditions of a nature differing materially from those ordinarily encountered and generally recognized as being inherent in work of the character being performed, the Contractor shall, before proceeding further with work affecting or affected by such conditions, immediately notify the City which will promptly make an investigation. If the City determines conditions do materially differ and the Contractor could not reasonably have been expected to ascertain in advance the true nature of the existing conditions, a Change Order will be issued to provide for any increase or decrease in cost and difference in Contract Time resulting from any such condition.

## 1.9 EXTRA WORK

The Engineer shall have the right to require, and the Contractor agrees to do, extra work over and above that which is indicated by the Contract Documents and covered by the unit prices of the Contract or negotiated price or prices, which logically forms a part of the Contract, arising from reasonably unforeseeable conditions, changed requirements or new information. Such additional work shall be undertaken only upon written instructions from the Engineer. Payment for extra work will be made pursuant to Section 00197 of the Oregon Standard Specifications for Construction.

Extra Work performed on a Force Account Basis shall be used to equitably and uniformly compensate the Contractor for Extra Work when a negotiated price cannot be reached. Extra Work is defined as work that is significantly different from the Work included in the original or modified Contract, yet necessary for completing the Project. The Contractor shall maintain records in such a manner as to provide a clear distinction between direct cost of extra work paid for on force account basis and cost of other operations performed in connection with the Contract Documents.

Force Account procedures shall only be used as a last resort when an agreement cannot be reached on the price of a new Work item or when the extent of the Work is unknown or of such character that a price cannot be determined to a reasonable degree of accuracy. When the City orders Extra Work to be performed via Force Account, the Engineer will discuss the proposed work with the Contractor and will seek the Contractor's comments and advice concerning the formulation of Force Account Work specifications. The Engineer is not bound by the Contractor's comments and advice and has final authority to: determine and direct the materials, equipment and labor to be used on the approved Force Account Work; and determine the time of the Contractor's performance of the ordered Force Account Work.

Before Extra Work to be performed on a Force Account Basis is authorized, the Project Manager will make the determination that Extra Work is necessary. Only work not included in the Contract as awarded or in executed Change Orders but deemed by the Project Manager to be necessary to complete the Project will be paid as Extra Work per Section 00197 of the Oregon Standard Specifications for Construction.

The following steps shall be followed to perform Extra Work:

- A. The Project Manager will discuss the Extra Work with the Contractor, define the scope of work, and discuss the options, means and methods for completing the Extra Work.
- B. The Project Manager shall attempt to negotiate a Contract Change Order with the Contractor to perform the Extra Work if the unable to successfully negotiate a Change Order, the Extra Work will be completed on a Force Account Basis.
- C. Extra Work shall not proceed on a Force Account Basis without a written and approved Extra Work Order prepared by the Project Manager, which shall be signed by the Contractor and the Project Manager. The Extra Work order will determine when, how, and with what Equipment and labor the Extra Work will be completed.

For each day Extra Work is performed, the City's Project Inspector shall complete a Daily Force Account Record which shall be signed by both the Inspector and the Contractor's authorized representative at the end of the day. These signatures indicate agreement on the accuracy and completeness of the information recorded on the Daily Force Account Record.

The Daily Force Account Record will be the basis for payment. Contractor shall not proceed with Extra Work without daily agreement on the Daily Force Account Record.

## SECTION 0150

### SUBMITTALS

#### 1.1 GENERAL REQUIREMENTS

The Contractor shall provide the following submittals found listed in this section. There may be other submittals required elsewhere in these Specifications that are not included or mentioned in this section. Direct submittals from suppliers will not be allowed. Digital submittals are preferred to paper copies.

Technical submittals covered by these specifications include manufacturer's information, shop drawings, test procedures, test results, samples, request for substitutions and miscellaneous work-related submittals. The Contractor shall furnish all drawings, specifications, descriptive data, certifications, samples, tests, methods, schedules and manufacturers installation and other instructions as required by the Contract Documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the contract documents.

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements.

Submittals shall coordinate with the work so that work will not be delayed. Coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals.

The Contractor shall not proceed with work related to a submittal until the submittal process is complete.

#### 1.2 REQUIRED SUBMITTALS

The following listing shall be considered minimum and may be expanded during the course of the work at the direction of the Engineer,

- A. Project Schedule. Refer to Section 0131 PROJECT SCHEDULE & TIMELINE for details.
- B. Shop Drawings, Schedules and Drawings: The Contractor shall provide shop drawings, schedules and such other drawings and information as may be necessary for the prosecution of the work in the shop and in the field as required by the Contract Documents and/or Engineer's instruction. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings. Include the following information:
  - Dimensions
  - Identification of products and materials included
  - Compliance with specified standards
  - Notation of coordination requirements
  - Notation of dimensions established by field measurement.

- C. Product Data: Submit manufacturer's product literature and application, installation requirements, recommended repair requirements, technical data sheet on each product to be used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.
- D. Material Safety Data Sheets
- E. Erosion and Sedimentation Control Plan, as required
- F. Materials and equipment list
- G. Contractor and Subcontractor 24 Hour – 7-day Emergency Contact List
- H. Traffic Control and Protection Plan, as required
- I. Pre-construction documentation of sites, submit 14 days after NTP issued
- J. Post-construction documentation of site(s), submit with Exhibit F, Certificate of Compliance, and Exhibit G, Contractor's Release of Liens and Claims
- K. Documentation to be sent to property owners regarding the project
- L. Site Specific Health and Safety Plan, as required
- M. Utility Rupture Response Plan, As required
- N. Location of dump site for excavated and removed material
- O. Copies of all licenses and permits
- P. Certified Payroll
- Q. Miscellaneous materials and other submittals required elsewhere in the Contract Documents

### 1.3 REQUEST FOR SUBSTITUTION

Requests for substitution for product specified by manufacturer or manufacturer's model number as specified throughout the Contract Documents shall be in writing and be accompanied with sufficient information to allow the Engineer to identify the nature and scope of the request. Please refer to Section 0132.1.4 "OR EQUAL" CLAUSE.

Information to be provided shall include,

- A. All submittal information required for the specified product, including all deviations from the specified requirements necessitated by the proposed substitution.
- B. Materials of construction, including material specifications and references.
- C. Performance data.

- D. Dimensional drawings, showing required access and clearances, including any changes to the work required to accommodate the proposed substitution.
- E. Information and performance characteristics for all system components and ancillary devices to be furnished as a part of the proposed substitution.
- F. Reproducible drawings, marked up to illustrate the alterations to all systems required to accommodate the proposed substitutions

If the substitution requires any mechanical, electrical, or structural changes, the Contractor will be responsible for costs for evaluating a requested substitution. The cost for such an evaluation will be determined on a case-by-case basis, after receipt of written request. The Engineer will notify the Contractor in writing of said cost. If the Contractor wishes to proceed, he shall advise the Engineer in writing and submit additional information as may be requested. The City shall final approval of a substitution.

#### 1.4 SUBMITTAL APPROVAL PROCESS

The Engineer will review the submitted data and will issue a Submittal Response to the Contractor. The Engineer will review each submittal, mark to indicate action taken, and return promptly.

Submittal response notations are as follows,

- “Approved For Construction, No Exceptions Taken”  
The part of the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
- “Approved For Construction, As Noted”  
The part of the Work covered by the submittal may proceed, provided it complies with the requirements of the Contract Documents and it complies with the notations or corrections of the submittal response.
- “For Record Only”  
The information contained in the submittal has been accepted into the project records.
- “Revise and Resubmit”  
Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Contractor shall revise the submittal in compliance with the Contract Documents and the corrections noted in the submittal response.
- “Submit Specified Item”  
Contractor shall the submit the additional information requested in the submittal response. Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity until specified item has been approved by the Engineer.
- “Rejected”  
Contractor shall not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The Contractor shall revise or prepare a new submittal in accordance with the corrections noted in the submittal response.



The Engineer's review of submittals shall not extend to means, methods techniques, sequences or procedures of construction, or to verify quantities, dimensions, weights or gages, or to fabrication processes, except when specifically indicated or required by the contract documents, and will not relieve the Contractor from responsibility for errors of any sort in the submittals.

When submittals are required to be revised or corrected and resubmitted, the Contractor shall make such revisions and/or corrections and resubmit those items or other materials in the same manner as specified above. Submitted data shall be sufficient in detail for determination of compliance with the Contract Documents. No equipment or material for which listings, drawings, or descriptive material is required shall be installed until the Contractor has received approval from the Engineer. Regardless of corrections made in or review given to the drawings by the Engineer, the Contractor shall be responsible for the accuracy of such drawings and for their conformity to the drawings and specifications.

SECTION 0160  
PROGRESS PAYMENTS

1.1 PROGRESS PAYMENT AND RETAINED AMOUNTS

The City shall pay Contractor for all work completed in accordance with terms and conditions of the Contract Documents in accordance with the procedures described below and elsewhere in the Contract Documents.

A. Progress Payments

- On a monthly basis, during performance of the work, the Contractor shall prepare an estimate of the value of Contract work completed on a form approved by the City and submit to the Project Manager. Applications for payment will be reviewed and processed by the City in accordance with the applicable provisions of the Contract Documents. The pay application shall also provide such supporting documentation as the City or the other applicable provisions of the Contract Documents may require. Certified payroll must be submitted for review with or prior to pay application submittal. The St. Helens City Council generally meets the first and third Wednesdays of each month and must approve all pay applications.
- It is understood that the monthly estimates shall be approximate only, and all monthly estimates and partial payments shall be subject to correction in the estimate rendered following the discovery of an error in any previous estimate, and such estimate shall not in any respect be taken as an admission of the City of the amount of work done or of its quality or sufficiency nor as an acceptance of the work or the release of the Contractor of any of its responsibility under the Contract.
- Payment shall be made by the City about three (3) days after Council approval of the pay request. The City shall not be liable for interest on any late or delayed payment caused by any claim or dispute, any discrepancy in quantities, any failure to provide supporting documentation or other information required with the estimate or as a precondition to payment under the Contract, or due to any payment the City has a right to withhold under the Contract.

B. Retained Amounts

The City shall retain five percent (5%) of the amount earned on all progress payments. Monies retained will be released to Contractor following final acceptance of the project by the City. Contractor's monthly payment applications and invoices shall include retainage as a line item.

1.2 FIELD DOCUMENTATION OF BID ITEM QUANTITIES

Daily Bid Item Logs shall be the basis of recording and documenting all pay quantities. The City's Construction Inspector is responsible for ensuring that all quantity measurements are made and documented in accordance with the Contract Documents. Bid quantity entries, including supporting documentation, serve as both partial and final verification that correct payments are made on all pay applications and invoices.

The Contractor's foreman or superintendent shall sign the daily bid item log receipts in the possession of the City Construction Inspector for Contract Bid Items completed as specified. The bid item log shall be

signed by both the City Construction Inspector and the Contractor's authorized representative within 24 hours of completion of bid items that meet specifications. It is the responsibility of the Contractor to ensure the log is signed daily for the work completed. At a minimum, the bid item log shall contain the following: Bid item reference number, location of work, stationing of construction, description of work, quantity of work completed, and plan sheet reference number.

The Contractor will be provided a copy of all bid item logs. The Contractor's pay applications and invoices shall be equal to the bid items signed for and no more and shall reference bid item log receipt number on the appropriate pay request. Final quantities to be adjusted per project as-builts.

### 1.3 PAYMENT FOR EXTRA WORK

Extra Work done by the Contractor, as authorized and approved by the City, shall be compensated for in the manner described in Section 0140 – CLARIFICATION AND MODIFICATION OF WORK, and by Section 00196 of the OSSC, the more restrictive will apply. The compensation provided for Extra Work done by the Contractor constitutes full and final payment for the cost of the Extra Work, which cost is limited to:

- All reasonable costs of labor, materials, supplies, tools, equipment or machinery rental, power, fuel, lubricants, water and other similar operation expenses for the time that such of the above things are employed or used on such Extra Work and approved in writing by the Project Manager; and
- A markup amount not-to-exceed percentage allowances listed under Section 00196 of the OSSC. Costs shall be considered to cover and compensate the Contractor for profit, overhead, profit-and-overhead markups charged to Contractor by subcontractors and suppliers, general supervision, field office expense and all other elements of cost and expense not embraced within the cost of the Extra Work as described in this Section. No cost of off-site storage shall be included in the above description of cost unless off-site storage has been approved and directed by the City in writing. No other claims or reservations of right as to additional costs, prices, markups, costs not permitted by the OSSC included under this paragraph, disallowed costs or other future additional money or time shall be accepted; each change order shall be specific and final.

The method of determination and payment of cost, or credit to the City for any Extra Work shall be one of the following:

- A. Unit prices agreed on in writing and executed by the City before the Extra Work is commenced or unit prices already included in the Contract Documents, subject to all other conditions of the Contract. Mutual acceptance of a not-to-exceed lump sum properly itemized and supported by sufficient substantiating data to permit evaluation before the Extra Work is commenced, subject to all other conditions of the Contract.
- B. A not-to-exceed cost to be determined in a manner agreed upon by the parties plus a mutually acceptable fixed or percentage fee, agreed upon before the Extra Work is commenced and subject to all other conditions of the Contract.
- C. The force account method provided in these Contract Documents and governed by Section 00197 of the OSSC.
- D. Signed, daily reports in duplicate of the extra work to be paid for on a force account basis, shall be furnished to the Engineer by the Contractor. Materials used will be itemized and direct cost of labor and charges for equipment rental will be furnished by the Contractor or Subcontractor. The Contractor will

provide names, identifications, and classifications of workmen, the hourly rate of pay and hours of work, and the size, type, and identification number of equipment and hours of equipment operation.

- E. Material charges shall be substantiated by vendors' invoices with copies of such invoices submitted with the reports, or, if not available, submitted with subsequent reports. In the event said vendors' invoices are not submitted within 15 days after completion of the work, the City reserves right to establish the cost of such materials at the lowest current price at which said materials are available in the quantities concerned, delivered to the location of the work. The Engineer will compare his records with the reports furnished by the Contractor, make any necessary adjustments, and compile the cost of extra work paid for on a force account basis on forms furnished by the Owner. When these extra work reports are agreed upon and signed by both parties, they shall become the basis of payment for the work performed.

#### 1.4 PAYMENT WITHHELD

In addition to express provisions elsewhere contained in the Contract, the City may withhold from any payment otherwise due the Contractor such amount as determined necessary to protect the City's interest, or, if it so elects, may withhold or retain all or a portion of any payment or refund payment on account of:

- Unsatisfactory progress of the work not caused by conditions beyond the Contractor's control
- Defective work not corrected
- Contractor's failure to carry out instructions or orders of the Owner or its representative,
- Work or execution thereof is not in accordance with the Contract documents
- Claim filed by or against the Contractor or reasonable evidence indicating probable filing of claims
- Failure of the Contractor to make payments to any subcontractor or suppliers for material or labor used in the performance of the Work
- Unsafe working conditions allowed to persist by the Contractor

When the grounds for withholding payment are removed, payment shall be made for amounts withheld because of them, and City shall not be liable for interest on any delayed or late payment.

#### 1.5 FINAL PAYMENT

The amount of final payment will be the difference between the total amount due to the Contractor and the sum of all payments previously made. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. After computation of the final amount due, and after Final Acceptance of the Project, final payment will be mailed to the Contractor's last known address as shown in the records of the City.

## SECTION 0162

### MEASUREMENT & PAYMENT

#### 1.0 MEASUREMENT AND PAYMENT OF CONTRACT BID ITEMS

Measurement and Payment of Contract Bid Items shall be on a unit price basis in accordance with the prices set forth in the Contract for individual work items. Where work is required but does not appear as a separate item in the Contract, the cost for that work shall be included and absorbed in the unit prices named in the Contract. No payment or compensation shall be made for bid items that are not completed. Only payment for actual work completed will be made regardless of how the Contractor balances bid. Contractor shall make a careful assessment when preparing bid.

The City may add and/or delete bid item quantities during construction. The term "Lump Sum" when used as an item of payment will mean full compensation for the Work described in the Contract Documents. The unit will be construed to include all necessary fittings and accessories. Payments for Lump Sum items will be made in proportion to the amount of Work accomplished as determined by the Engineer as of the "period ending date" of each Partial Payment Estimate. Contractor shall provide a schedule of values for each lump sum item. The Unit Price and Lump Sum price for furnishing each item of Work listed in the Contract Price shall include all labor, materials, tools, equipment, superintendence, and incidentals necessary to perform and complete the Work, including profit, overhead costs, permit and license fees, royalties, and applicable taxes and fees.

#### 1.1 MOBILIZATION, BONDS, INSURANCE, AND DEMOBILIZATION

Payment for Mobilization, Bonds, Insurance and Demobilization shall be paid for at the Contract lump sum price as stated in the Schedule of Bid Prices of the Contract Documents for this project under "Mobilization" and shall include full compensation for the work involved as described herein and no additional allowance will be made.

Mobilization, Bonds, Insurance, and Demobilization typically includes, but is not limited to, the preparation of contract; completion of all tasks and submittal of all documents (bonds, insurance, schedule, etc.) required as a condition of issuing the Notice to Proceed; moving onto the site(s) all Contractor's equipment and materials required; installing and maintaining temporary buildings or trailers; providing power, utilities, lighting, fencing, etc. as may be required; providing all on-site communications equipment or facilities; obtaining all permits; permit fees; having all OR-OSHA required notices posted, establishment of a safety program; preparing and delivering all pre-construction notices and/or job signs; arrangement of markings and plan for verification (potholing) of existing facilities; and beginning work on the project; removing all equipment, unused materials, all temporary facilities, job trailers, final clean up, and any other items, facilities, tools or materials left behind by the Contractor at the completion of the work.

The amounts paid for Mobilization, Bonds, Insurance, and Demobilization shall be paid for according to the Section 00210 of the OSSC.

## SECTION 0170

### PROJECT RECORD DRAWINGS

#### 1.1 GENERAL REQUIREMENTS

Contractor shall maintain and keep up to date all times on site one set of drawings, specifications, shop drawings, equipment drawings and supplemental drawings which shall be corrected as the work progresses to show all changes made or different site conditions, including all addendum, Change Orders, job decisions, etc. Contractor shall make provisions to allow the Engineer to copy redline drawings during construction, as requested. Redline drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Engineer at any time. Upon completion of the Contract and prior to final payment, redline drawings shall be submitted to the City's Project Manager. All changes shall be neatly and legibly drawn to scale on one set of current conformed plan drawings using standard engineering drafting practices. In general,

- Contractor shall not use Record Drawings for construction purposes.
- Contractor shall protect Record Drawings from deterioration and loss in a secure location and shall provide access to documents for the Engineer's reference during normal working hours.
- Contractor shall keep Record Drawings current, as they will be reviewed for completeness by the Engineer as condition for Final Acceptance.
- Contractor shall,
  - (1) Maintain a clean, undamaged set of Contract Drawings and Shop Drawings and mark the set to show the actual installation and where the installation varies substantially from the Work as originally shown.
  - (2) Legibly and to scale, mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the work.
  - (3) Mark new information that is important to the City but was not shown on Contract Drawings.

#### 1.2 QUALIFIED REGISTERED SURVEYOR

All surveying required during the project will be performed by a qualified surveyor registered in the State of Oregon employed by the Contractor. The name of the person or agency so employed shall be submitted to the Engineer with proof of registration for approval not later than 10 (ten) days after the Notice to Proceed.

#### 1.3 REDLINE DRAWINGS AND PROJECT AS-BUILTS

Redline drawings and the as-built survey shall include, but not be limited to:

- any differences in alignment, structures, valves, and hydrant locations, pipe sizes, and other pipes or structures discovered during the progress of the work
- Pipe sizes, lengths and materials
- Fittings and appurtenances, including valves, bends, tees, reducers, blow offs, water meters, and hydrants
- Horizontal and vertical separation from existing and new utilities and drainage culverts/storm drain
- All changes in alignment
- All horizontal control points (e.g. centerline intersects, PC, PT)
- Centerline station and offset to each service tap; size of tap and meter
- If the water main continues in a straight horizontal and vertical alignment for more than 100 feet, the water main will be surveyed every 100 feet. Sufficient survey measurements shall be taken on horizontal and vertical curves to establish an accurate alignment

- A complete list of all materials installed and abandoned must be shown. The specific size and material type of each pipeline installed must be shown at every construction reference to that pipe. Any changes to the record drawing must be reflected on the materials list.

Contractor shall submit as-built deliverables prior to final acceptance of the project. The as-built survey shall contain all horizontal and vertical as-built data in ASCII format, including a northing, easting, elevation and description of all work completed under this contract. The Contractor shall provide all labor and materials necessary for submission of the Record As-built survey and shall submit As-Built CAD files on a flash drive at the end of the project.

- Neatly redlined plan mark-ups from beginning to end of construction
- As-Built Survey CAD file in latest version of AutoCAD, .dwg file format
- As-Built Survey CAD file in PDF format
- Text file of as-built survey points in the point file format (P,N,E,Z,D). As-built survey points in the text file clearly shall designate each corresponding structure, plan sheet, stationing, and rim and invert elevations of all pipes entering or exiting the structure.

## SECTION 0171

### CONTRACT CLOSEOUT PROCEDURES

#### 1.1 GENERAL REQUIREMENTS

This Section specifies administrative and procedural requirements for project closeout and final acceptance, including but not limited to final inspection procedures, submittal of warranties, redline drawings, as-built drawings, other regulatory inspections, removal of temporary facilities, final cleaning and demobilization.

#### 1.2 FINAL CLEANUP

Contractor shall cleanup the project site(s), including landscaped areas, of rubbish, litter, and foreign substances. Temporary protection and facilities installed for protection of the work during construction shall be removed and the site repaired to equal or better condition. Waste materials shall be removed from the site and disposed of in a lawful manner.

#### 1.3 PUNCH LIST INSPECTION

When the work is, in the opinion of the Engineer, complete in all respects, the Contractor shall call for a punch-list inspection. The Project Manager will schedule a walk-through inspection with the Contractor and other City representatives. The results of the inspection will form the basis of the final project punch list and shall be issued with Exhibit E, Certificate of Substantial Completion.

#### 1.4 SUBSTANTIAL COMPLETION

Upon completion of the project walk-through inspection with the Contractor, the Project Manager shall issue Exhibit E, Certificate of Substantial Completion, with a copy of the punch list of items to be completed or corrected to the Contractor. Unless stated otherwise, all punch list corrections shall be completed by Contractor within 30 days of issuance of Substantial Completion. The City reserves the right to complete any outstanding punch list work remaining after the thirty-day period at Contractor's expense.

#### 1.5 RESPONSIBILITY FOR DEFECTIVE WORK

##### A. Correction or Removal of Defective, Unacceptable or Unauthorized Work

- 1) When work fails to meet Contract requirements and is inadequate to serve the design purpose it will be considered defective. The Contractor shall correct or remove and replace the work at the Contractor's expense, as directed. All work which has been rejected or condemned shall be repaired, or if it cannot be repaired satisfactorily, it shall be removed and replaced at the Contractor's expense.
- 2) Defective materials shall be immediately removed from the site of the work. Work done without line and grade having been given, work done beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided, work done without written authority and prior agreement in writing as to process, shall be done at the Contractor's risk and shall be considered unauthorized and at the option of the Engineer may not be measured and paid for and may be ordered removed at the Contractor's expense.



- 3) Upon failure of the Contractor to repair satisfactorily or to remove and replace, if so directed, rejected, unauthorized or condemned work or materials immediately after receiving notice from the City, the Engineer shall, after giving written notice to the Contractor, have the authority to cause defective work to be remedied or removed and replaced, or to cause unauthorized work to be removed and to deduct the cost thereof from any monies due or to become due the Contractor. Alternatively, the City may, at its option, declare the Contractor in default, in which event the performance bond surety shall complete the Contract.

#### B. Acceptance of Defective or Unauthorized Work.

When work fails to meet Contract requirements, but is adequate to serve the design purpose, the Engineer will decide the extent to which the work will be accepted and remain in place. The Engineer will document the basis of acceptance by a letter and may adjust the Contract Price.

#### 1.6 FINAL INSPECTION

A final inspection of the project will be scheduled with the Contractor to verify all outstanding deficiencies have been corrected and all punch list items have been corrected prior to Final Acceptance.

#### 1.7 CERTIFICATE OF COMPLIANCE

Once all corrective items have been addressed; the Contractor shall submit Exhibit F, Certificate of Completion of the Contract Documents.

#### 1.8 RELEASE OF LIENS AND CLAIMS

Following the submission of the Certificate of Completion, the Contractor shall submit a signed, notarized copy of Exhibit G, Contractor's Release of Liens and Claims of the Contract Documents.

#### 1.9 FINAL ACCEPTANCE

When the Work is complete, the Engineer will conduct a final review of the project for final acceptance and will verify that,

- the Work has been inspected for compliance with the Contract Documents.
- the Work has been completed in accordance with the Contract Documents and all known deficiencies have been addressed.
- all required shop drawings, catalog cuts, maintenance manuals, instruction manuals, test reports, samples, operational manuals, and all other submittals have been submitted and reviewed.
- all deliverables have been submitted and have been as accepted, including but not limited to redline construction drawings, as-built survey, inspection videos (if applicable), pre-construction and post-construction site documentation, etc.
- all tools, surplus materials, construction equipment, storage sheds, debris, waste, and temporary services have been removed from the job site.
- Job site has been cleaned of rubbish, litter, and other foreign substances, and all surface restoration has been completed.

If the Engineer's review reveals that the Work is complete and is in 100% compliance with all Contract Documents, the Contractor will be issued Exhibit H, Certificate of Final Completion.

#### 1.10 FINAL PAYMENT AND RELEASE OF RETAINAGE

After receiving the Certificate of Final Completion, the Contractor shall submit a final application for payment in accordance with the provisions of the Contract. Final pay application shall identify total adjusted Contract Sum, previous payments and sum remaining due.

#### 1.11 WARRANTY

The Work is guaranteed by the Contractor from the date of Final Acceptance by the City. The Contractor shall warranty all materials and equipment that it furnishes for a period of two (2) years from date of final acceptance (Exhibit H) of the work by the City. This warranty shall mean prompt attention to the correction and/or complete replacement of the faulty material or equipment. Per OSCC Section 00170.85, within ten calendar days of written notification of defect(s), the Contractor or the Contractor's surety shall vigorously and continuously correct and repair the defects and all related damage. If the Contractor fails within ten days to proceed to comply with the terms of this warranty, the owner may have the defects corrected. The Contractor and Contractor's surety shall be liable for all expense incurred. In case of an emergency where delay would cause serious loss or damage, repairs may be made without notice to the Contractor and the Contractor or Contractor's surety shall pay the cost.

The Contractor's performance bond shall remain in effect during the warranty period. If, within the warranty period, repairs or changes are required in connection with the work, the Contractor shall promptly, without expense to the City:

- Place in satisfactory condition all guaranteed work,
- Correct all damage to the site, equipment or contents which is the result of the use of materials, equipment or workmanship that are inferior, defective, or not in accordance with the terms of the contract; and,
- Correct any work, material, equipment, or contents of building, structure or site disturbed in fulfilling the guarantee.

Repairs, replacements, or changes made under the warranty requirements shall be warranted for the specified warranty period beginning on the date of the acceptance of the repairs, replacements, or changes. The expiration of the two-year warranty period shall not affect any other claims or remedy available to the City.

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PLANS

BID SCHEDULE



OREGON DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISIONS

FOR

S. 1<sup>st</sup> Street at St. Helens Street Intersection Improvements

**PROFESSIONAL OF RECORD CERTIFICATION:**

<p>Seal w/signature</p>  <p>RENEWS: 12-31-2022</p>	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1<sup>st</sup> Street at St. Helens Street Intersection Improvements. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00210, 00220 00221, 00222, 00225, 00228, 00290, 00305, 00310, 00320, 00330, 00331, 00350, 00440, 00445, 00470, 00490, 00620, 00640, 00730, 00744, 00749, 00756, 00759, 00760, 00850, 00855, 00865, 00867, 00905, 00930, 00940, 00960, 00962, 00970, 01095,, 01140, 01150, 01160, 01170, 02001, 02030, 02050, 02415, 02560, 02690, 02910, 02926</p>
<p>Seal w/signature</p> 	<p>I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for S. 1<sup>st</sup> Street at St. Helens Street Intersection Improvements. Modified Special Provisions were prepared by me or under my supervision.</p> <p>Section(s) 00596C, 01040, 01120</p>

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

# **1<sup>st</sup> & St. Helens Intersection Improvements**

## **SPECIAL PROVISIONS**

### **WORK TO BE DONE**

The Work to be done under this Contract consists of the following:

1. Construct Concrete Intersection
  2. Construct Site Furnishings
  3. Install Storm System
  4. Install Landscape Planting & Irrigation
  5. Install Street Lighting
- Perform additional and Incidental Work as called for by the Specifications and Plans.

### **AUTHORITY OF CONSULTANT**

The consultant will be directly in charge of the Project. However, the consultant's authority on this Project is as designated in the official "Consultant Agreement" for this Project, and as designated by the Engineer. This does not include authority to approve Contract changes or semifinal and Final Inspection of the Project.

### **APPLICABLE SPECIFICATIONS**

The Specifications that are applicable to the Work on this Project is the 2021 edition of the "Oregon Standard Specifications for Construction", as modified by these Special Provisions. All Sections in Part 00100 apply, whether or not modified or referenced in the Special Provisions.

All number references in these Special Provisions shall be understood to refer to the Sections and subsections of the Standard Specifications bearing like numbers and to Sections and subsections contained in these Special Provisions in their entirety.

### **CLASS OF PROJECT**

This is a City Project.

## 1<sup>st</sup> & St. Helens Intersection Improvements

### SECTION 00210 - MOBILIZATION

Comply with Section 00210 of the Standard Specifications.

### SECTION 00220 - ACCOMMODATIONS FOR PUBLIC TRAFFIC

Comply with Section 00220 of the Standard Specifications modified as follows:

**00220.02(a) General Requirements** - Add the following bullets to the end of the bullet list:

- Before activating a modified traffic signal, revising lane usage, implementing new roadway geometry, or removing a "STOP" sign, protect traffic by installing "NEW TRAFFIC PATTERN AHEAD" (W23-2) signing according to 00222.40. Keep the signs in place for 30 Calendar Days after completing the modifications.
- When an abrupt edge is created by excavation, protect traffic according to the "Excavation Abrupt Edge" and the "Typical Abrupt Edge Delineation" configurations shown on the Standard Drawings.
- Protect pedestrians in pole base excavation areas by placing approved covers over all pole base excavations. Place a minimum of two B(II)LR barricades adjacent to and on either side of the excavated area, facing pedestrian traffic, or place covers and barricades as directed.

**00220.40(e)(2)(b) Special Events** - Add the following to the end of this subsection:

The following special events will occur during this Project:

- 13 Nights on the River at Columbia River Park, June – August, every Thursday evening
- 4th of July celebration, downtown area, July 1-4, 2022
- Spirit of Halloweentown, downtown area, September 12 – November 4, 2022
- Christmas Ships, downtown area, December 10, 2022

### SECTION 00221 - COMMON PROVISIONS FOR WORK ZONE TRAFFIC CONTROL

Comply with Section 00221 of the Standard Specifications modified as follows:

**00221.03 Traffic Safety and Operations** - Replace the bullet that begins "When paving operations create..." with the following bullet:

- When paving operations create an abrupt or sloped edge drop off greater than 1 inch, protect traffic by installing signing according to the "2 Lane, 2 Way Roadway Overlay Area" detail shown on the Standard Drawings. Protect longitudinal and transverse Pavement joints by placing and maintaining an asphalt concrete wedge according to 00221.07(c)(1).

Add the following subsection:

## 1<sup>st</sup> & St. Helens Intersection Improvements

**00221.06(d) Partial Intersection Closure** – Contractor to provide construction staging plan detailing pedestrian and vehicle access (and all appropriate signing and temporary ramps) during construction of the 1<sup>st</sup> & St. Helens intersection. The following closures and detour route may be utilized for 45 contiguous days:

- Restrict left and right turns from St. Helens Road to 1<sup>st</sup> Street, restrict access to St. Helens Road from 1<sup>st</sup> Street.
  - Detour 1<sup>st</sup> Street southbound traffic from St. Helens to River Street and Plaza Square
  - Detour north bound 1<sup>st</sup> Street traffic to 2<sup>nd</sup> street via the alley on the south side of 212 S 1<sup>st</sup> Street.
  - Detour 1<sup>st</sup> Street northbound traffic from St. Helens to 2<sup>nd</sup> Street and Columbia Blvd.
- Provide access to all businesses and residents.

**00221.07(c)(1) Paving** - Replace this subsection, except subsection number and title, with the following:

When the longitudinal joint is greater than 1 inch in height, install additional TCD according to 00221.03. Complete the placing of ACP and construction of paving joints according to 00735.48, 00735.49, 00743.45, 00744.44, 00744.45, 00745.47, and 00745.48, as applicable.

**00221.90(b) Temporary Protection and Direction of Traffic** - Delete the bullet that begins “Moving temporary barrier to and from Contractor’s stockpile areas”.

### SECTION 00222 – TEMPORARY TRAFFIC CONTROL SIGNS

Comply with Section 00222 of the Standard Specifications modified as follows:

**00222.40(e) Temporary Sign Placement** - Add the following to the end of the bullet list:

- At least ten Calendar Days before closing a pedestrian pathway or sidewalk, place a “SIDEWALK CLOSED, Full Time” (CW11-4) sign in advance of each future closure point. Locate the sign so it is legible from the nearest alternate pedestrian pathway facing incoming pedestrian traffic. The sign may be mounted between the panels of a Type II barricade or on a single-post TSS. Do not place the sign or sign support such that it narrows the pedestrian pathway to a width of less than 4 feet.
- Before opening the TPAR, place TPAR signing and other TCM as shown, or as directed. Maintain the “SIDEWALK CLOSED, Full Time” (CW11-4) signs while the TPAR is open to pedestrian traffic.
- At least ten Calendar Days prior to the start of work, place a “SIDEWALK OPEN” (CW11-3) sign in advance of each end of the Work Area. Locate the sign so it is legible from the nearest alternate pedestrian pathway facing incoming pedestrian traffic. The sign may be mounted between the panels of a Type II barricade, or on a single-post TSS. Do not place the sign or support such that it narrows the pedestrian pathway to a width less than 4 feet.



## 1<sup>st</sup> & St. Helens Intersection Improvements

- Before starting work, place pedestrian-specific TCM as shown in the TCP, or as directed. Maintain "SIDEWALK OPEN" (CW11-3) signs while work is affecting the pedestrian pathway.
- Place a "PEDESTRIANS ON ROADWAY" (CW11-2) sign at the beginning of each end of the Work Area, facing incoming traffic as shown, or as directed.
- Install the following warning signs for each new "STOP" sign installed in the intersection. Install a "Stop Ahead" (W3-1) symbol sign approximately 100 feet in advance of the "STOP" sign. Install a "NEW TRAFFIC PATTERN AHEAD" (W23-2) sign approximately 100 feet in advance of the "Stop Ahead" sign. Keep the "NEW TRAFFIC PATTERN AHEAD" signs in place 30 Calendar Days after installing the "STOP" sign.
- Install an 18 by 24-inch "NO PARKING" (R8-3a) sign in every block where on-street parking is prohibited, facing incoming traffic.
- For paving operations on non-freeways, place "ABRUPT EDGE" (CW21-9) and "ROAD WORK XX MPH" (CW20-1a) signs as shown. Use an "XX" value equal to 10 mph below the current posted regulatory speed. If a speed is posted for a temporary regulatory speed reduction, that speed is the current posted regulatory speed.
- For all other moving operations that do not create an abrupt edge adjacent to traffic, omit the "ABRUPT EDGE" signs.
- When construction requires bicycles to use the Traffic Lanes, install a "Bicycle ON ROADWAY" (CW11-1) symbol sign on 1/2 mile spacing through the affected area. Keep the signs in place until completion of the Shoulder or bikeway final surface.

### SECTION 00225 - TEMPORARY PAVEMENT MARKINGS

Comply with Section 00225 of the Standard Specifications modified as follows:

**00225.40 Temporary Pavement Markers** - Replace the paragraph that begins "Unless otherwise shown..." and the three bullets with the following paragraphs and bullets:

Install temporary flexible overlay pavement markers for temporary centerline marking as follows:

- Place and maintain one temporary flexible overlay pavement marker on 40 foot spacing in tangent and curve sections except as below.
- Place and maintain one temporary flexible overlay pavement marker on 20 foot spacing in curved alignment sections identified by a speed rider displaying less than the posted speed and channelization areas.
- Replace damaged or missing flexible markers at the end of every shift at no additional cost to the Agency.

Establish alignment for placing the temporary flexible overlay pavement markers as follows:

## 1<sup>st</sup> & St. Helens Intersection Improvements

- Control markers at:
  - 200 foot intervals on tangents
  - 50 foot intervals on curves
  - 40 foot intervals on curves with speed rider
- Use string line or other appropriate means to maintain proper alignment of the markers. Adjust placement to avoid straddling a longitudinal joint, while maintaining a suitable alignment of markers.
- Remove and replace misaligned markers at no additional cost to the Agency.

### SECTION 00228 - TEMPORARY PEDESTRIAN AND BICYCLIST ROUTING

Comply with Section 00228 of the Standard Specifications modified as follows:

**00228.00 Scope** - Replace this subsection, except subsection number and title, with the following:

In addition to the requirements of Section 00221, this Work consists of furnishing, installing, operating, maintaining, inspecting, and removing temporary devices for accommodating pedestrians and bicyclists through a work zone.

**00228.13 Temporary Curb Ramps** - Add the following sentence to the end of this subsection:

Furnish truncated dome detectable warning surface for temporary curb ramps from the QPL according to 00759.12.

**00228.43 Temporary Curb Ramps** - Add the following paragraph to the end of this subsection:

Install a minimum 2 foot wide truncated dome detectable warning surface on temporary curb ramps at pedestrian street crossings. Omit truncated dome detectable warning surfaces on temporary curb ramps that are not at a pedestrian street crossing.

**00228.80(a) Length Basis** - Replace this subsection, except subsection number and title, with the following:

Pedestrian channelizing devices and bicycle channelizing devices will be measured on the length basis upon delivery to the Project. The quantities will be limited to those in the approved TCP.

**00228.80(b) Unit Basis** - Replace this subsection, except for the subsection number and title, with the following:

Temporary curb ramps will be measured on the unit basis, at each location where a temporary curb ramp is constructed or placed.

## 1<sup>st</sup> & St. Helens Intersection Improvements

**00228.90 Payment** - Add the following paragraph after the paragraph that begins "In item (c), the type...":

Item (c) includes furnishing and installing truncated dome detectable warning surfaces.

### SECTION 00280 - EROSION AND SEDIMENT CONTROL

Comply with Section 00280 of the Standard Specifications modified as follows:

**00280.06 Erosion and Sediment Control Manager** - Delete this subsection.

**00280.62 Inspection and Monitoring** - Replace this subsection, except for the subsection number and title, with the following:

Inspect the Project Site and all ESC devices for potential erosion or sediment movement on a weekly basis and when 1/2 inch or more of rainfall occurs within a 24-hour period, including weekends and holidays.

If a significant noncompliance or serious water quality issue occurs that could endanger health or the environment, verbally report it to the Engineer within 24 hours.

**00280.90 Payment** - In the paragraph that begins "Item (a) includes..." delete the bullet that specifies "providing the Erosion and Sediment Control Manager".

Replace the paragraph that begins "When only Item (a) is..." with the following paragraph:

Additional ESC devices required for permit compliance will be paid for as Extra Work according to Section 00196.

### SECTION 00290 - ENVIRONMENTAL PROTECTION

Comply with Section 00290 of the Standard Specifications modified as follows:

**00290.20(c)(2) Clean Fill** - Add the following paragraph to the end of this subsection:

Manage all excavated soil that does not meet the definition of clean fill according to Section 00294.

Add the following subsection:

**00290.30(a)(7) Water Quality:**

- Do not discharge contaminated or sediment-laden water, including drilling fluids and waste, or water contained within a work area isolation, directly into any storm drain or waters of the State or U.S. until it has been satisfactorily treated (using a best management practice such as a filter, settlement pond, bio-bag, dirt-bag, or pumping to a vegetated upland location).
- Do not use permanent stormwater quality treatment facilities to treat construction runoff unless prescribed by an ESCP approved under Section 00280.

## 1<sup>st</sup> & St. Helens Intersection Improvements

- If construction discharge water is released using an outfall or diffuser port, do not exceed velocities more than 4 feet per second, and do not exceed an aperture size of 1 inch.
- Do not use explosives under water.
- Implement containment measures adequate to prevent pollutants or construction and demolition materials, such as waste spoils, fuel or petroleum products, concrete cure water, silt, welding slag and grindings, concrete saw cutting by-products and sandblasting abrasives, from entering waters of the State or U.S.
- Implement containment measures adequate to prevent flowing stream water from coming into contact with concrete or grout within the first 24 hours after placement.
- Do not end-dump riprap into the waters of the State or U.S. Place riprap from above the ordinary high water line.
- Cease Project operations under high flow conditions that may result in inundation of the Project area, except for efforts to avoid or minimize resource damage.
- The Engineer retains the authority to temporarily halt or modify the Work in case of excessive turbidity or damage to natural resources.
- If Work activities violate permit conditions or any requirement of this subsection, stop all in-water work activities and notify the Engineer.
  
- Do not cause a visible sediment plume in waters of the State or U.S.

**00290.32 Noise Control** - Add the following paragraphs to the end of this subsection:

Review City of St. Helens Municipal Code Title 8 which describes noise control regulations. Comply with the applicable noise control requirements of the permit for Project Work.

Copies of the noise variance permit for this Project are available from the Engineer.

### **SECTION 00305 - CONSTRUCTION SURVEY WORK**

Comply with Section 00305 of the Standard Specifications modified as follows:

Add the following:

**00305.06 As-built Survey:** Contractor shall provide an asbuilt topographic survey of all improvements. Survey shall include the following:

- New curb
- New Sidewalk
- ADA Ramps
- Storm Pipe and Manholes (rim elevations, flow lines)
- Sanitary manholes
- Fire Hydrant and valves
- Site Furnishings
- Street trees
- Street lights, junction boxes, and conduit
- Signing and Striping
- Existing buildings

## **1<sup>st</sup> & St. Helens Intersection Improvements**

Survey shall be provided in AutoCAD with a finish grade DTM.

Add the following:

**00305.91 Payment** – The accepted quantities of Work will be paid for at the Contract Lump Sum amount for the item “As-Built Survey”.

Payment will be payment in full for furnishing all Material, Equipment, labor, and Incidentals necessary to complete the work as specified.

No separate or additional payment will be made for any temporary protection and direction of traffic measures including flaggers and signing necessary for the performance of the as-built survey work.

No separate or additional payment will be made for preparing surveying documents including but not limited to office time, preparing and checking survey notes, and all other related preparation work.

Costs incurred caused by survey errors will be at no additional cost to the Agency. Repair any damage to the Work caused by Contractor's survey errors at no additional cost to the Agency. The Engineer may make an equitable adjustment, which may decrease the Contract Amount, if the required as-built survey work is not performed

### **SECTION 00310 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Comply with Section 00310 of the Standard Specifications modified as follows:

**00310.90 Payment** - Add the following to the end of this subsection:

No separate or additional payment will be made for removal or disposal Work included in Section 00330 according to 00310.02.

### **SECTION 00320 - CLEARING AND GRUBBING**

Comply with Section 00320 of the Standard Specifications.

### **SECTION 00330 - EARTHWORK**

Comply with Section 00330 of the Standard Specifications modified as follows:

**00330.03 Basis of Performance** - Add the following paragraph to the end of this subsection:

Perform all earthwork under this Section on the excavation basis.

**00330.14 Selected Granular Backfill** - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

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**00330.15 Selected Stone Backfill** - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

**00330.41(a)(5) Waste Materials** - Replace this subsection, except for the subsection number and title, with the following:

Dispose of waste materials according to Section 00236.

**00330.92 Kinds of Incidental Earthwork** - Add the following bullet to the end of the bullet list:

- Earthwork required for driveways and road approaches. Earthwork for driveways and road approaches will be that which is outside the Neat Line limits shown on the typical sections.

### SECTION 00331 - SUBGRADE STABILIZATION

Comply with Section 00331 of the Standard Specifications.

### SECTION 00350 - GEOSYNTHETIC INSTALLATION

Comply with Section 00350 of the Standard Specifications modified as follows:

**00350.01 Definitions** - Replace the sentence that begins “**Embankment Geotextile** - For installation...” with the following sentence:

**Embankment Geotextile** - Embankment geotextile is used as a reinforcement within embankments and as a separation and reinforcement under embankments.

Replace the bullet that begins “**Nonwoven Geotextile** - A textile...” with the following bullet:

- **Nonwoven Geotextile** - A textile produced by bonding or interlocking of fibers by mechanical, heat or chemical means.

Replace the sentence that begins “**Riprap Geotextile** - For installation...” with the following sentence:

**Riprap Geotextile** - Riprap geotextile is used as a filter and separator behind or beneath riprap, Buttresses, inlays, shear keys and erosion control applications.

Replace the sentence that begins “**Subgrade Geotextile** - For installation...” with the following sentence:

**Subgrade Geotextile** - Subgrade geotextile is used as a separator and reinforcement on Subgrades and in other material separation applications.

**00350.41(f)(5) Geotextile Placement** - Replace the paragraph that begins “Slit wrinkles or folds ...” with the following paragraph:

## **1<sup>st</sup> & St. Helens Intersection Improvements**

Slit wrinkles or folds exceeding 1 inch and lay flat. Shingle-lap not more than 6 inches in the direction of the paving. Broom or squeegee to smooth the geotextile and pneumatic roll to maximize geotextile contact with the Pavement surface. Additional hand-placed sealant material may be required at laps as determined.

### **SECTION 00405 - TRENCH EXCAVATION, BEDDING, AND BACKFILL**

Remove and Replace with the following St. Helens special provision:

#### **TRENCH EXCAVATION, BEDDING, & BACKFILL**

##### **1.1 GENERAL REQUIREMENTS**

This section includes work for all necessary excavations in the performance of the Contract and shall conform to the City of St. Helens Standards and the most current version of the Oregon Standard Specifications for Construction except as modified herein. In the case of discrepancy, the more stringent provision shall apply. Work shall include, but is not limited to, excavation of ditches, trenches, embankments, and other earth-moving work, the use of sheeting, shoring, and sheet piling; all pumping and work necessary to keep trenches free from water; supporting and protecting structures, pipes, conduits, culverts, posts, poles, wires, fences, buildings, public and private property adjacent to the work; removing of all sheeting and shoring not necessary to support the sides of excavations after completion of work; removing all surplus excavated material, and backfilling and grading of compacted backfill.

##### **1.2 POTHOLING**

Pothole Excavation - Pothole excavation is the removal and replacement of all materials via coring, vacuum extraction, or similar method. Prior to excavating, effort shall be made to determine whether underground installations; i.e., sewer, water, gas, electric lines, storm drain, cable TV, telephone, and fiber optics, will be encountered and, if so, where such underground installations are located. All known owners of underground facilities in the area concerned shall be advised of proposed work at least 48 hours prior to the start of actual excavation. Potholing for existing utilities shall be used to locate all potential subsurface conflicts in work area.

##### **1.3 EXCAVATION CLASSIFICATIONS**

Excavation shall be classified as Common Excavation, Rock Excavation, or Unsuitable Excavation.

- A. Common or General Excavation is defined as all excavation, regardless of the type, character, composition, or condition of the material encountered and shall further include all debris, junk, broken concrete, boulders which do not require drilling and blasting or other

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approved splitting and breaking methods, and all other material. All excavation shall be considered common excavation unless provided for otherwise elsewhere in these specifications.

- B. Rock Excavation is defined as the removal of solid rock in ledges, bedded deposits, or unstratified masses that by actual demonstration cannot, in the opinion of the Engineer, be reasonably loosened or ripped mechanically and requires removal by wedging, sledging, barring, breaking up with power operated tools, drilling or blasting.
- C. Unsuitable Materials are soils exposed at the bottom an excavation or obtained from the Contractor's excavations that are compressible, expansive, contain extraneous rubble, offer uneven foundation support, or have natural moisture content three percent (or greater) in excess of its optimum moisture content. Unsuitable materials include, but is not limited to mulch, peat, expansive clays, soils in a quick condition, rubble, portions of trees or similar vegetation, or wood.
- 1) The Contractor shall notify the Engineer immediately when unsuitable material is encountered. The Engineer will investigate questionable material to determine its suitability.

Should the Engineer require soils testing be performed to aid in his determination. Tests revealing suitable materials shall be paid for by the Contractor.

- 2) Where the Engineer determines that unsuitable material is present which will not provide adequate support of the work, the Contractor shall remove the unsuitable material as directed by the Engineer and replace the unsuitable material with select backfill up to the bottom of the specified grade.

### 1.4 LIMITS OF EXCAVATION

- A. All excavations shall conform to the lines, grades, and cross sections established by the Contract Documents.
- B. Excavation shall allow for forms, shoring, working space, gravel base, and finish topsoil where required. Do not excavate deeper than elevation shown without approval from the Engineer. Keep the excavation width to the minimum necessary to install the Work in a safe manner.
- 1) Trench limits shall be,
    - Depth: From six inches below the bottom of the pipe to top of



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ground surface

- Width: Outside diameter of the pipe plus twelve inches, not less than two feet total width
  - Length: Per linear foot of pipe installed. Length will be the horizontal distance measured along the centerline of the pipe
  - Excavation for manholes and other structures shall be wide enough to provide a minimum of 12 inches between the structure surface and the sides of the excavation and a depth 6 inches of below the bottom of the structure.
- 2) Excavation for roadways, ramps, sidewalks, channels, ditches, etc. shall be to the cross sections, grades, and elevations shown on the Contract Drawings.

### 1.5 EXCAVATION

- A. The Contractor shall exercise sound construction practices in excavating, backfilling, and compacting so no damage will occur to any foundation structure, pole line, pipe, or other facility. If, as a result of excavation, there is a disturbance of ground that endangers other property, the Contractor shall immediately take remedial action at the Contractor's own expense. No act of the City or his representatives shall in any way affect liability of the Contractor for damages, expenses or costs that may result from trench excavation.
- B. The site of an open cut excavation shall be first cleared of all obstructions preparatory to excavation. Wherever paved or surfaced streets are cut for installing utilities, the Contractor shall use a standard T-Cut where pavement cut shall be full depth longitudinally and transversely, under the direction of the Project Construction Inspector. Pavement cuts shall be straight and clean and shall be either parallel or perpendicular with respect to the travel lane. No jagged, broken, or undermined edges will be allowed. Any cut or broken pavement shall be removed from site during excavation. Full depth cut is defined as the thickness of asphalt from top of asphalt to top of base aggregate.
- C. Excavated material shall be placed at locations and in such a manner that it does not create a hazard to pedestrian or vehicular traffic, nor interfere with the function of existing drainage facilities. During wet weather conditions, stockpiles shall be removed or tarped throughout the construction process.
- D. Excavation for trenches in which pipelines are to be installed shall

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provide adequate space for workers to place and joint the pipe properly and safely, but in every case the trench shall be kept to a minimum width. The width of trench at the top of the pipe shall not exceed the limits specified in the Contract Drawings. Unless otherwise permitted by the Engineer, trenching operations shall not be performed beyond the distance which will be backfilled and compacted the same day

- E. Cut areas as shown on the Plans, including ditches within the cut sections, and excavations for entrances, approach roads, streets, intersections, sidewalks, ramps, gutters, ditches, berm ditches, and flumes.
- F. Topsoil to be salvaged within the limits of the work in accordance the Contract Documents.
- G. Where the Plans indicate the placement of a selected material below subgrade in excavation areas, excavate to the depth necessary to place the material to its specified compacted thickness.
- H. Where unstable material is encountered below subgrade in excavations, excavate such material below subgrade as directed. Dispose of unstable materials according to Section 00330.41(a)(5) of the OSSC.
- I. The removal and disposal of existing surfacing, sidewalks, curb, or curb and gutter, structures, etc., shall be in accordance with the Contract Documents and Section 02420 – DEMOLITION & DISPOSAL

### 1.6 ROCK EXCAVATION

Excavations greater than 3 feet in depth within the City limits may consist of mainly unweathered, solid basalt rock with greater than 40,000 psi compressive strength. The City has not performed any specific geotechnical survey of the project area and any geotechnical or preparatory work needed to submit a bid and/or complete the construction shall be considered incidental to construction and no additional payment shall be made. The Contractor is fully responsible for performing geotechnical investigations and the City shall incur no costs resulting from damaged equipment, construction delays, or additional work due to unknown underground conditions.

#### A. Rock Removal

If rock is encountered, payment shall be on a per Cubic Yard basis and shall be full compensation for all permits, labor, tools, materials, machinery, transportation, equipment, testing as required, and services of all kinds required and necessary to

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establish and meet the requirements of this section. For additional details, refer to specification section 01620 Measurement & Payment.

B. Measurement for determining rock quantities shall be based on the following dimensions:

- Depth: From six inches below the bottom of the pipe to top of rock surface, or from the bottom of the specified grade to the top of rock surface
- Width: The outside diameter of the pipe plus twelve inches, not less than two feet total width, or from the limits of the work
- Length: Per linear foot of pipe installed. Length will be the horizontal distance measured along the centerline of the pipe, or from the limits of the work
- Structures: Rock excavation for manholes, inlets, and other structures will be computed from the rock excavated to a depth 6 inches below the bottom of the structure and an area within a line parallel with, and 12 inches outside of, the actual dimensions of the manhole, inlet, or structure.

### **1.7 OVER-EXCAVATION AND SELECT BACKFILL**

When there is excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials, the Contractor shall notify the Engineer for approval to remove the unsuitable material and exercise care to avoid excavations below established grade where firm earth conditions exist. Select aggregate fill shall be as designated in Section 2.0 BACKFILL in these specifications. Contractor shall bear costs where unauthorized excavations have been carried beyond points required for the work.

### **1.8 EXCAVATION PROTECTION**

- A. The Contractor shall provide all materials, labor, and equipment necessary to adequately protect the work, existing property, utilities, pavement, etc., and to provide safe working conditions, in compliance with all OSHA requirements, including furnishing and installing adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement or other ground movement.
- B. The method of protection shall be according to the Contractor's

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design. The Contractor may elect to use a combination of shoring, over break, sliding trench shields, or other methods of accomplishing the work provided the method meets the approval of all applicable local, state, and federal safety codes. Damages resulting from improper shoring, improper removal of shoring, or from failure to shore shall be the sole responsibility of the Contractor.

- C. Trench Protection shall be installed and maintained, as required, for shielding, shoring, sheeting, bracing, and trench support systems, hereinafter called "shoring", to prevent caving and to protect adjacent structures, property, utilities, workers, and the public. Contractor shall remove shoring during backfilling in a manner that will not damage adjacent structures, property, utilities, or the pipe, permit voids in the backfill, or disturb the compacted pipe bedding material between the pipe and the undisturbed trench wall. Maintain design information for shoring onsite at all times. Make this information available for the Engineer's review upon request.
- D. Bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.
- E. The Contractor shall furnish, install, and leave in place, construction sheeting and bracing when specified or where indicated or shown on the Drawings. Any construction sheeting and bracing which the Contractor has placed to facilitate its work may be ordered in writing by the Engineer to be left in place. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating an obligation on its part to issue such orders.
- F. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
- G. Engineered Systems - Engineered Shoring is required for temporary earth support systems for excavations greater than 20 feet deep including bore pits, jacking pits, receiving pits, and shafts. Engineered Shoring is also required for areas subject to

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vibration, groundwater, utility crossings, or where required on the Drawings. Submit the following for each area where Engineered Shoring is required:

- 1) Detailed construction sequence descriptions. The sequence shall detail installation, excavation, maintenance, backfill, and removal requirements.
- 2) Design Calculations shall be prepared and sealed by a State of Oregon licensed Professional Engineer and include design criteria, analysis assumptions, construction sequence requirements, and detailed design for each system and structural element of the proposed shoring system.
- 3) Drawings shall be prepared and sealed by a State of Oregon licensed Professional Engineer. Drawings shall present an explicit representation of the character, extent, and details of the proposed shoring in relation to the project site. Working Drawings shall show the following:
  - a. Details, arrangement and method of assembly, method of disassembly of the proposed system and sequence of construction, and equipment used for installation
  - b. Method of pre-loading the bracing and pre-load values.
  - c. Full excavation depth.
  - d. Loads on the support system for various stages of excavation, bracing, and / or tieback installation and removal and concrete placement.
  - e. Expected equipment loads.
  - f. Maximum design load to be carried by the various members of the support system.
  - g. The depth below the main excavation to which the support system is to be installed.
  - h. Existing utilities and facilities: After checking locations by field investigation, revise drawings to show actual locations of facilities and excavation supports, interference with proposed work, and measures proposed to overcome such interference.
  - i. Allowable shoring deflections and proposed method of monitoring shoring movements.

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### 1.9 DEWATERING

Furnish, install, and operate all necessary machinery, appliances, and equipment to keep excavations free from water during construction.

Dewater and dispose of water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies and shall have available at all times competent workmen for operation of pumping equipment. Control of ground water shall be such that softening of the bottom of excavations or visible water shall be prevented.

Dewatering systems shall be designed and operated to prevent removal of natural soils. Static water level shall be drawn below bottom of excavation to maintain undisturbed state or natural soils and allow placement of backfill to required density. Dewatering system shall be installed and operated so that ground water level outside excavation is not reduced to extent that would damage or endanger adjacent structures or property. Unless otherwise shown, dewatering shall be considered incidental to construction.

### 2.0 BACKFILL

Backfill is defined as the furnishing, placing, and compacting of material for foundations, sidewalks, ramps, curbs, pavement, miscellaneous structures, or flatwork, and in the trenches above pipe zone up to bottom of the specified elevation, pavement base rock, ground surface, or surface material. No additional payment will be made for backfill material, unless specified otherwise, and it shall be considered incidental to construction.

- A. Class A Material shall be suitable native or common excavated material that, in the opinion of the Engineer, meets the characteristics required for the specific surface loading or other criteria of the backfill zone. Use approved native material excavated from within limits of the project, free from vegetation and other deleterious material, and containing no frozen ground. Maximum particle size shall be 3 inches. If the Engineer determines native material is not suitable, the Contractor shall use another class of backfill as directed.
- B. Class B Material shall be granular material consisting of gravel or crushed rock meeting the requirements of Section 00641 of the Oregon Standard Specifications for Construction. Designated size shall be 1"-0 or 3/4"-0. All gradations of crushed rock shall comply with Standard Specifications for Construction for Base Aggregates.
- C. Class C Material: NOT USED
- D. Class D Material shall be pit run or bar run material, well graded from

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coarse to fine. The maximum dimension shall be 3 inches. Material shall be free from organic material. Classification will be determined according to requirements of ASTM D 2487.

- E. Class E Material shall be Controlled Low Strength Material (CLSM). CLSM shall be composed of cement, pozzolans, fine aggregate, water, and admixtures. CLSM shall have a low cement content, be non-segregating, self-consolidating, free-flowing and excavatable material which will result in a hardened, dense, non-settling fill and a compressive strength of 100 psi to 200 psi at 28 days if not otherwise shown or specified.

Backfill located in the public right-of-way shall always be Class B. For pipe, structures located outside the public right-of-way, backfill shall be approved Class A (native) Backfill. All excavations under pavement or sidewalk must be backfilled with 3/4"-0 crushed rock. Native backfill material shall be selected from excavated native material free from roots or other organic material, trash, mud, muck, frozen material and large stones. When native excavated material is used for backfill around pipe, it shall be free of rocks, cobbles, stones or other debris having a dimension greater than 1-1/2 inches.

The Engineer may sample excavated material to determine the suitability of the Class A material for use as backfill. Contractor shall prevent excavated material from becoming saturated beyond the critical moisture limits and replace any saturated Class A material with Class B at no additional cost to the City. In general, backfilling shall begin as soon as the work is in approved condition to receive it and shall be carried to completion as rapidly as possible. New trenching shall not be started when earlier trenches need backfilling, or the surfaces of streets or other areas need to be restored to a safe and proper condition.

### 2.1 PIPE BEDDING

- A. Pipe Bedding material shall consist of Class B material. The minimum depth of bedding placed before installing pipe shall be 6" or as directed by the Engineer. Bedding shall be Class B material both within the public right-of-way and outside the public right-of-way.
- B. Contractor shall spread the bedding smoothly to the proper grade so that the pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the joint. Bedding under the pipe shall provide a firm, unyielding support along the entire pipe length.
- C. For all pipes located in the public right-of-way, bedding and pipe zone material shall be Class B, and backfill shall be Class B. For pipes located outside the public-right-of-way, bedding and pipe

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zone material shall be Class B, and backfill shall be Class A.

- D. Bedding of pipes, trench excavation and backfill shall conform to applicable portions of Section 405 Trench Excavation, Bedding and Backfill of the OSSC and in accordance with the Contract Drawings with the following additions and modifications.
- E. No additional payment will be made for bedding or backfill material and it shall be considered incidental to construction.

### **2.2 PIPE ZONE**

- A. Pipe Zone material shall consist of Class B material. Pipe zone material shall be placed to a minimum depth of 12" above the outside diameter of the pipe barrel for the full width of the trench. Pipe zone backfill shall be Class B material both within the public right-of-way and outside the public right-of-way.
- B. Pipe zone material shall be placed in a manner that equalizes pressure on the structure and minimizes stress. Contractor shall not allow sharp, heavy pieces of material to drop directly onto or contact the pipe and shall prevent pipe from movement both horizontally and vertically.
- C. As required under the haunches of pipe and in areas not accessible to mechanical tampers or to testing, compact with hand methods to ensure intimate contact between the backfill material and the pipe or structure.

### **2.3 COMPACTION**

- A. Backfill trench above the pipe zone to the specified grade. Backfill shall be placed and compacted in lifts per the OSSC.
- B. In-place dry density of compacted material shall be at the percent of maximum dry density specified or shown at optimum moisture content determined on the basis of the latest addition of AASHTO T- 99.
- C. In general, compact all trench backfill to a minimum of 95% of Standard Proctor maximum density in paved areas and in street rights-of-ways or 90% of Standard Proctor maximum density in other areas, or as specified, with mechanical vibrating or impact tampers.
- D. Condition backfill material to within 2% of optimum moisture content required for compaction, as determined by ASTM D 698 throughout each lift of the fill. Material which does not contain sufficient moisture to obtain proper compaction shall be wetted and thoroughly mixed as directed. Material containing an excess of moisture shall be dried by



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manipulation, aeration, drainage or other means before being compacted.

- E. When the backfilling is complete, finish the surface area, with aggregate base material or topsoil, as specified. In paved or graveled areas, maintain the surface of the trench backfill level with the existing grade with 3/4" - 0 or 1" - 0 aggregate material, or asphalt concrete if directed, until final pavement replacement is complete and accepted.

### SECTION 00415 - VIDEO PIPE INSPECTION

Comply with Section 00415 of the Standard Specifications modified as follows:

**00415.42(a) Remote Video Inspection with Laser Profiler** - Replace the paragraph that begins "Use video inspection equipment meeting..." with the following paragraph:  
Use video inspection equipment meeting the requirements of 00415.22. Calibrate the laser profiler according to the manufacturer's specifications and ASTM F3080 Section 9.

### SECTION 00440 - COMMERCIAL GRADE CONCRETE

Comply with Section 00440 of the Standard Specifications modified as follows

**00440.12 Properties of Commercial Grade Concrete** - Replace the bullet that begins "Slump - 5 inches..." with the following bullets:

- **Slump** - 5 inches or less
  - For concrete sidewalks, ramps, driveways, or other hand finished surface applications, and when using a high range water reducing admixture, provide a slump of 8 inches or less as approved by the Engineer.

**00440.13 Field-Mixed Concrete** - Replace the subsection, except for subsection number and title, with the following:

CGC Work items listed in 00440.14(a) may be field-mixed conventionally, or by volumetric/mobile mixers conforming to ASTM C685. When approved, concrete sidewalks, concrete curb ramps, concrete driveways, and other flat concrete surfaces may be field-mixed using volumetric/mobile mixers conforming to ASTM C685, request approval prior to placement. For all other CGC applications, submit written request to the Engineer for approval to use volumetric/mobile mixers conforming to ASTM C685 at least 21 Days prior to placement.

Pre-packaged dry blended concrete from the QPL may be used for Work items listed in 00440.14(a).

**00440.40(b) Placing** - Add the following bullet to the end of the bullet list:

- When haul time or placement conditions warrant exceeding the time of discharge, submit a detailed breakdown of the estimated time needed from batching to discharge of a load along with the measures that will be taken to ensure slump, temperature and

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uniformity will be maintained. Submit in advance to establish a new time limit at the Engineer's discretion.

### **SECTION 00445 - SANITARY, STORM, CULVERT, SIPHON, AND IRRIGATION PIPE**

Comply with Section 00445 of the Standard Specifications.

### **SECTION 00470 - MANHOLES, CATCH BASINS, AND INLETS**

Comply with Section 00470 of the Standard Specifications modified as follows:

**00470.41(c) Grates, Frames, Covers and Fittings** - Replace this subsection, except for the subsection number and title, with the following:

Set metal frames for manholes on full non-shrink grout beds to prevent infiltration of surface water or groundwater between the frame and the concrete of the manhole section. If concrete is to be poured around the frames, coat the portion of the frame that will contact the concrete with hot asphalt before placing the concrete. Set frames, covers and grates true to the locations and grades established. Clean bearing surfaces and provide uniform contact. The use of a bolt adjustment system for frames from the QPL is allowed. Secure all fastenings. Construct all mortared, sanitary sewer manhole necks and all riser ring joints made with non-shrink grout using an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted.

**00470.42 Precast Concrete Catch Basins and Inlets** - Add the following sentence to the end of this subsection:

Grade adjustments using a bolt system from the QPL is allowed.

### **SECTION 00490 - WORK ON EXISTING SEWERS AND STRUCTURES**

Comply with Section 00490 of the Standard Specifications.

### **SECTION 00596C - CAST-IN-PLACE CONCRETE RETAINING WALLS**

Comply with Section 00596C of the Standard Specifications modified as follows:

**00586C.00 Scope** – Add the following sentence:

This work includes freestanding stone veneer seatwalls and end columns, with precast concrete caps and skate deterrent.

Add the following subsections:

**00596C.16 Stone Veneer** - Provide benches meeting the following requirements:

- (a) Material: locally sourced dark gray basalt, which matches the stone veneer used in the recent construction of wayfinding signage in St. Helens, and matches the historic stone veneer used on the St. Helens courthouse and City Hall .

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- (b) Size: 3" nominal thickness. Widths and lengths to be 6" – 16", not to exceed 16", square and rectangular shapes. Saw cut back and sides with split face.
- (c) Quality Assurance: Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties. Engage an experienced installer who specializes in site stone layout and has completed projects using stone similar in material, design and extent to that indicated for the project that has resulted in construction within a ten-year record of successful in-service performance.
- (d) Anti-Graffiti Coating: Provide a non-yellowing, non-sacrificial anti-graffiti coating in a flat finish by one of the following:
  - "AGS-1" aliphatic polyurethane Anti-Graffiti Coating System by US Coating Solutions - [www.uscoatingsolutions.com](http://www.uscoatingsolutions.com); (800) 925-1840
  - "VandIGuard Non-Sacrificial Anti-Graffiti Coating" by Rainguard - [www.rainguard.com](http://www.rainguard.com);
  - Or, approved equal.

**00596C.17 Precast Concrete Cap** – Provide precast concrete caps meeting the following requirements:

- (a) **Portland Cement** - ASTM C 150, Type I or Type III, gray, of same type, brand, and source. Standard gray Portland cement may be used for nonexposed backup concrete.
- (b) **Coloring Admixture** - ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
  - (1) Davis Color #5237 ('Sandstone') integral color pigment admixture, or approved equal
- (c) **Normal-Weight Aggregates** - Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S.
- (d) **Grout Material** - Premixed, nonmetallic, nonshrink, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water reducing agents, complying with ASTM C 1107, or consistency suitable for application.
- (e) **Concrete Mixes** - When included in design mixes, add coloring admixtures to concrete mixes according to manufacturer's written instructions.
- (f) **Mold Fabrication** - Maintain molds to provide completed precast concrete cap units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
  - (1) Edge and Corner Treatment: Uniformly chamfered.
- (g) **Finishes**
  - (1) Finish exposed-face surfaces of precast concrete cap units to match approved sample panels and as follows:

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- Smooth-Surface Finish: Provide all exposed surfaces free of pockets, sand streaks, and honeycombs, with uniform color and texture. Texture shall be smooth, steel trowel finish.
- (2) Finish exposed top, bottom, front, and back surfaces of precast concrete cap units to match face-surface finish. Provide surfaces free of pockets, sand streaks, and honeycombs, with uniform color and texture.

### (h) Fabrication

- (1) Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precast operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
- (2) Furnish loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast concrete cap units to supporting and adjacent construction.
- (3) Cast-in reglets, slots, holes, and other accessories in precast concrete cap units to receive windows, cramps, dowels, reglets, waterstops, flashings, and other similar work as indicated.
- (4) Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" and PCI MNL 117 for fabricating, placing, and supporting reinforcement.
  - Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
  - Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
  - Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- (5) Reinforce precast concrete seatwall and end column cap units to resist handling, transportation, and erection stresses.
- (6) Mix concrete according to PCI MNL 117 and requirements in this Section. After concrete batching, no additional water may be added.

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- (7) Discard precast concrete seatwall and end column cap units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by Engineer.

**00596C.18 Mortar** – PremiumPlus Thin-set Mortar with CustomFlex Ultra-Strength Thin-set Additive, or approved equal.

**00596C.19 Grout** – Polyblend sanded grout, color shall match the color used for the stone veneer in the recent construction of wayfinding signage in St. Helens, and the mortar used for the historic stone veneer on the St. Helens courthouse and City Hall.

**00596C.20 Skate Deterrent** – Furnish skate deterrents meeting the following requirements:

- Material: Stainless steel skate deterrent with locking pin for grout joint installation. Insert shall have a chamfer to match the chamfer of the precast concrete cap.
- Basis of design: D135-12 for Chamfer, manufactured by Intelliccept Skatestoppers.
  - Contact information: Tel 619-447-6374, [info@skatestoppers.com](mailto:info@skatestoppers.com)

**00596C.21 Veneer Anchors** - Provide hot-dip galvanized steel corrugated-metal veneer anchors:

- Dur-O-Wall #DA990 CWT - Corrugated Wall Ties, by Dayton Superior Corporation, Dur-O-Wall Division, or approved equal.

**00596C.22 Anti-Graffiti Coating:** Provide a non-yellowing, non-sacrificial anti-graffiti coating in a flat finish by one of the following:

- “AGS-1” aliphatic polyurethane Anti-Graffiti Coating System by US Coating Solutions - [www.uscoatingsolutions.com](http://www.uscoatingsolutions.com); (800) 925-1840
- “VandlGuard Non-Sacrificial Anti-Graffiti Coating” by Rainguard - [www.rainguard.com](http://www.rainguard.com);

Or, approved equal.

**00598C.23 Quality Control** – Provide quality control according to Section 00165 and the following:

**(a) Experience and Qualifications** – Submit evidence of an installer who employs experienced stone masons and stone fitters who are skilled in installing stone veneer assemblies similar in material, design, and extent to those indicated for this Project and whose projects have a record of successful in-service performance.

**(b) Submittals:**

- (1) **Experience Documentation** – Provide documentation of qualification in (a) above.
- (2) **Stone Samples for Verification** – Include at least four samples for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples shall be dressed and prepared as if ready for installation. Samples will establish the standard by which stone provided will be judged.

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- (3) **Colored Mortar Samples for Verification** – Include at least four samples for each type of mortar, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Label samples to indicate types and amounts of pigments used.
- (4) **Anti-Graffiti Coating:** Specification Sheet for product. Include product on wall mockup.
- (5) **Precast Concrete Caps:** Provide shop drawings of precast concrete caps for approval by Owner's Representative.
- (6) **Skate Deterrent:** Specification Sheet for product. Include product on wall mockup.

(c) **Source Limitations** - Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.

(d) **Mockups** - Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.

- (1) Build mockup of typical wall area and stone curb as shown.
- (2) Build mockups for typical exterior wall in sizes approximately 48 inches long by 18 inches high by full thickness, including face and backup wythes and accessories. Build mockup for stone curb approximately 60 inches long.
  - Include veneer anchors in exterior masonry-veneer wall mockup.
- (3) Approval of mockups is for color, texture, and blending of stone; relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

(d) **Layout** – Set stakes at each coordinate point shown on the plans and indicate the point number on the stake. The Engineer will review the point locations and make adjustments as needed. Do not begin construction of the wall until the Engineer approves the final wall layout.

**00596C.43 Wall Construction** – add the following subsections:

**(d) Stone Veneer Seatwalls and Stone Veneer End Columns**

- Submit one set of stone veneer samples illustrating minimum and maximum stone sizes, color range and texture. Submit mortar samples showing full range of colors expected in the finished construction.
- Construct cast-in-place concrete core with reinforcement per the drawings.
- Construct stone veneer as shown in drawings.

(e) **Skate Deterrent** – Submit product for approval by Engineer prior to installation. Install as shown in drawings and per manufacturer's instructions.

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### **00596C.44 Setting of Stone Veneer:**

- (a) Perform necessary field cutting as stone is set. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
- (b) Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, fabrication, or that is otherwise unsuitable for intended use.
- (c) Arrange and trim stones in random ashlar pattern with course heights as indicated in random lengths with offset between vertical joints as shown.
- (d) Set stone to comply with requirements as shown. Install veneer anchors, supports, fasteners, and other attachments indicated or necessary to secure stone veneer assemblies in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and industry standards.
- (e) Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment, if any. Lay walls with joints not less than 1/4 inch at narrowest points and no more than 1/2 inch at widest points.
- (f) Apply anti-graffiti coating per Manufacturer's recommendations.

### **00596C.45 Installation of Anchored Stone Masonry:**

- (a) Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Fasten anchors to concrete as shown.

### **00596C.46 Pointing:**

- (a) Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- (b) Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- (c) Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
  - (1) Joint Profile: match the joint profile of the stone veneer used in the recent construction of wayfinding signage in St. Helens, and the historic stone veneer used on the St. Helens courthouse and City Hall.

### **00596C.47 Adjusting and Cleaning:**

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- (a) Remove and replace stone veneer assemblies of the following description:
  - (1) Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if Engineer approves methods and results.
  - (2) Defective joints.
  - (3) Stone veneer assemblies not matching approved samples and mockups.
  - (4) Stone veneer assemblies not complying with other requirements indicated.
- (b) Replace in a manner that result in stone veneer assemblies' matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- (c) **In-Progress Cleaning** – Clean stone veneer assemblies as work progresses. Remove mortar fins and smears before tooling joints.
- (d) **Final Cleaning** – After mortar is thoroughly set and cured, clean stone veneer assemblies as follows:
  - (1) Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - (2) Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Owner's Representative approval of sample cleaning before cleaning stone veneer assemblies.
  - (3) Clean stone veneer assemblies by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.

**00596C.48 Acceptance of Precast Concrete Caps** – Acceptance of Precast Concrete Caps will be based on review of working drawings and submittals with the following requirements:

- (a) **Design Mixes** – For each concrete mix.
- (b) **Working Drawings** – Submit working drawings according to 00150.35. Submit this information at least 30 calendar days before beginning construction of the Precast Concrete Caps. Obtain the Owner's Representative written approval prior to fabricating any materials. Working drawings shall include, but not be limited to, the following:
  - (1) Detail fabrication and installation of precast concrete cap units.
  - (2) Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, and types of reinforcement, including special reinforcement.
  - (3) Indicate locations and details of anchorage devices to be embedded in other construction.



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- (c) **Samples** – Provide a sample for each type of finish indicated on exposed surfaces of precast concrete seatwall and end column cap units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.
- (d) **Material Certificates** – Signed by manufacturers certifying that each of the following items complies with requirements:
  - (1) Concrete materials.
  - (2) Reinforcing materials.
  - (3) Coloring Admixtures.
  - (4) Bearing pads.
  - (5) Water-absorption test reports.

### 00596C.49 Quality Assurance - Precast Concrete Caps

- (a) **Fabricator Qualifications** - A firm that is experienced in manufacturing precast concrete seatwall and end column cap units similar to those indicated for this Project and with a record of successful in-service performance.
- (b) **Product Options** - Drawings indicate size, profiles, and dimensional requirements of precast concrete units and are based on the specific types of units indicated. Other fabricators' precast concrete units complying with requirements may be considered.
- (c) **Mockups** – Before installing precast concrete seat wall and end column cap units, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
  - (1) Build mockups in the location and of the size as directed by Owner's Representative.
  - (2) Notify Owner's Representative seven days in advance of dates and times when mockups will be constructed.
  - (3) Obtain Owner's Representative approval of mockups before starting fabrication.
  - (4) In presence of Owner's Representative, damage part of an exposed face of an uninstalled sample for each finish, color, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.
  - (5) Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

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(6) Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**00596C.90 Payment** – Add the following pay items:

- (e) Stone Veneer Seatwall with Pre-cast Concrete Cap.....Linear Foot
- (f) Stone Veneer End Column with Pre-cast Concrete Cap....Each
- (g) Skate Deterrent.....Each

Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

Excavation below elevations shown will be paid for according to 00510.90(c).

No separate or additional payment will be made for:

- excavation, shoring, and specified backfill
- wall drainage and filter systems
- footings
- concrete and reinforcement for concrete
- Precast caps
- Stone veneer
- Skate deterrents

### **SECTION 00620 - COLD PLANE PAVEMENT REMOVAL**

Comply with Section 00620 of the Standard Specifications modified as follows:

**00620.40(e) Warning Signs** - Replace this subsection, except for the subsection number and title, with the following:

Provide warning signs as required where abrupt or sloped drop-offs occur at the edge of the existing or new surface according to Sections 00221 and 00222.

### **SECTION 00640 - AGGREGATE BASE AND SHOULDERS**

Comply with Section 00640 of the Standard Specifications.

### **SECTION 00730 - EMULSIFIED ASPHALT TACK COAT**

Comply with Section 00730 of the Standard Specifications modified as follows:

**00730.11 Emulsified Asphalt** - In the paragraph that begins "Obtain samples according to AASHTO T 40..." replace the words "AASHTO T 40" with the words "AASHTO R 66".

**00730.90 Payment** - Replace this subsection, except for the subsection number and title, with the following:

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No separate or additional payment will be made for Emulsified Asphalt tack coat.

### **SECTION 00744 - ASPHALT CONCRETE PAVEMENT**

Comply with Section 00744 of the Standard Specifications modified as follows:

**00744.11(a) Asphalt Cement** - Add the following to the end of this subsection:

Provide PG64-22 grade asphalt cement for this Project.

### **SECTION 00749 - MISCELLANEOUS ASPHALT CONCRETE STRUCTURES**

Comply with Section 00749 of the Standard Specifications.

### **SECTION 00756 - PLAIN CONCRETE PAVEMENT**

Comply with Section 00756 of the Standard Specifications modified as follows:

**00756.15(a) Concrete Mixture** - Replace this subsection, except for the subsection number and title, with the following:

- Sample and test according to the MFTP.
- For all plain concrete pavement, provide personnel according to 00756.30 to sample and test the mix for temperature, air content, slump, water-cementitious ratio, density and yield, from the first load of each placement, whenever there is a visible change in the slump of the concrete, and when a set of cylinders is obtained.
- If the results of any test are outside of the Specification limits, stop the placement of the load. Correct the load or reject it and do not incorporate it into the Work. Test subsequent loads before any further concrete placement. Correct the subsequent loads if any of the tests are still outside the Specification limits. If the load cannot be corrected, reject it and do not incorporate it into the Work. Testing of subsequent loads may return to the specified frequency when the test results from two consecutive loads are shown to meet the Specification limits.

**00756.95(a) General** - Replace the bullet that begins “The average of the IRI for both...” with the following bullet:

- The IRI in each wheel path is 65.0 inches per mile or less.

### **SECTION 00759 - MISCELLANEOUS PORTLAND CEMENT CONCRETE STRUCTURES**

Comply with Section 00759 of the Standard Specifications modified as follows:

**00759.03 Required Submittals** - Replace this subsection, except for the subsection number and title, with the following:

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Material ordered or Work done before the Engineer reviews and returns the documents shall be at the Contractor's risk.

Submit the following:

**(a) ADA Certification for Contractors** - For all supervisory personnel who directly supervise the curb ramp Work, submit the names, telephone numbers, and copies of the ODOT ADA Certification for Contractors at least 10 Calendar Days before the preplacement conference.

**(b) Curb Ramp Work Plan** - Do not begin any curb ramp Work before the plan for completing the Work has been approved. At least 21 Calendar Days before the curb ramp Work is scheduled to begin, submit a plan for accomplishing all phases of the curb ramp Work, including but not limited to the following (also see 00180.41):

- Surface preparation
- Compliance with Working Drawings and details submitted under 00759.03(c)
- Compliance with current Standard Drawings and Plans
- Waste handling and disposal

**(c) Working Drawings** - At least 10 Calendar Days before the construction of a grouping of one or more curb ramp location(s), not to exceed 32 ramps unless otherwise approved under 00180.41, submit unstamped Working Drawings according to 00150.35. Include field verification of each ramp site, and all dimensions, slopes and grades necessary to demonstrate compliance with the Standard Drawings and Plans. Marked up Supplemental Drawings, if field verified, may be submitted as Working Drawings. Notify the Engineer of any deficiencies or noncompliance with the Standard Drawings or Plans. The Engineer will provide additional or modified Plans as needed. Do not begin Work at a curb ramp until submittals for that curb ramp have been received, reviewed, and accepted in writing by the Engineer.

After submittal of the unstamped Working Drawings, according to 00150.35 a site visit may be requested by the Contractor or Engineer. The site visit will include a review of any field markings and discuss the submitted unstamped Working Drawings. The Engineer will provide additional or modified information, as needed.

Include the following in the Working Drawings:

- Verification of elevations, slopes, grades and dimensions necessary to demonstrate compliance with the Standard Drawings and Supplemental Drawings,
- Verification of potential utility conflicts or other street furnishings that may require relocation or adjustment.
- Identification of infeasibilities or constructability issues with the Standard Drawings and Supplemental drawings.

**(d) Corrective Action Plan** - Unless otherwise approved, notify the Engineer before performing corrective action. Include TPAR necessary to complete corrective action work.

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At least 21 Calendar Days before concrete Structures Work is scheduled to begin, submit a corrective action plan. The corrective action plan shall address procedures to correct deficient Structures through minor corrective action or replacement according to 00759.55(a), and include:

- List of minor corrective actions that will be used to correct deficiencies, according to 00759.50 and 00759.55.
- Procedures for performing corrective action.
- Proposed concrete grinding Equipment and method of grinding.
- Proposed concrete repair Material used for resurfacing ground concrete surfaces according to Section 02015.
- Construction activities, Equipment and staging necessary to complete corrective action Work.

The Engineer will review the corrective action plan(s) and provide a response to the Contractor within 5 Days after receiving the plan. Do not begin concrete Structure Work until the corrective action plan is approved by the Engineer.

**00759.04 Preplacement Conference** - Replace this subsection, except for the subsection number and title, with the following:

Before beginning any curb ramp Work, meet with the Contractor's ODOT ADA Certified supervisory personnel and any quality control personnel if applicable, any curb ramp Subcontractors' supervisory personnel, and the Engineer at a mutually agreed upon time.

If the Contractor's personnel change, or if the Contractor proposes a significant revision to the plan for accomplishing the curb ramp Work, the Engineer may require additional preplacement conferences. If the Contractor's schedule of work identifies multiple groups of curb ramp construction, as allowed by 00180.41, additional preplacement conferences may be required for each ramp group, at a mutually agreed upon time before Work begins.

All supervisory personnel who have an active ODOT ADA Certification for Contractors and directly supervise the curb ramp Work are required to attend the preplacement conference.

Add the following subsection:

**00759.23 Concrete Resurfacing Equipment** - Furnish power-operated scarifying Equipment capable of uniformly removing and preparing the existing surface to depths required. For concrete grinding operations, furnish 12 segment grinders, fine-toothed scarifying Equipment, or other approved grinding Equipment.

**00759.31 Qualifications** - Add the following sentence to the end of the paragraph:

Provide onsite supervisory personnel that are ODOT ADA Certified during construction of the curb ramps.

**00759.46 Concrete** - Replace this subsection, except for the subsection number and title, with the following:

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Construct the Structures between suitable forms or by the extrusion method. Place concrete according to the Plans, Section 00440, and this Section.

**00759.50(a) General** - Add the following paragraphs to the end of this subsection:

Install charcoal grey truncated domes as shown. Place according to the manufacturer's recommendation. Install abutting truncated dome panels with no more than 1/4 inch spacing. Install anchors along cut edges of truncated dome panels according to manufacturer's recommendations.

In addition, finish concrete surfaces of Structures to be within the established Slopes and dimensions allowed by the Standard Drawings and Plans. Repair or remove and replace Structures not meeting the Standard Drawings and Plans at no additional cost to the Agency.

**00759.50(c) Driveways, Walks, and Surfacing** - Replace this subsection, except for the subsection number and title, with the following:

Prevent segregation of the concrete during placement. Strike-off the concrete to the grade shown, and float the surface smooth. After the water sheen disappears, edge the joints and remove edging tool marks prior to final finishing. Lightly cross-broom the surface to a uniform texture. Do not trowel joints or edges after brooming surface.

The 24 inch smart level will be used to measure driveway and sidewalk cross slopes on the Pedestrian Access Route.

**00759.50(d) Curb Ramps** - Replace this subsection, except for the subsection number and title, with the following:

Prevent segregation of the concrete during placement. Strike-off the concrete to the grade shown and float the surface smooth. After the water sheen disappears, edge the joints and remove edging tool marks prior to final finishing. Lightly cross-broom the surface to a uniform texture. Do not trowel joints or edges after brooming surface.

The 6 inch smart level will be used to measure curb running slope. The 6 inch smart level will be used to measure slopes on portions of the curb ramp, gutter pan, or adjacent surfaces that cannot accommodate a 24 inch smart level. All other curb ramp locations will use a 24 inch smart level to measure slopes.

Add the following subsection:

**00759.55 Correction of Deficient Structures** - Unless otherwise approved, notify the Engineer before performing corrective action. Correct deficiencies at no additional cost to the Agency. Perform corrective actions as directed, according to the approved corrective action plan, and according to the following:

**(a) Minor Corrective Action** - Submit Equipment and procedure for minor corrective action to the Engineer for approval. Minor corrective action can be performed to correct a deficiency up to 1 square foot per panel. Corrective action exceeding 1 square foot per panel requires removal and replacement according to 00150.25. Perform minor corrective action according to the following:

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**(1) Concrete Grinding** - Grinding to correct high area deficiencies is limited to 3/16 inch. Use equipment meeting the requirements of 00759.23. Resurface all ground concrete surfaces according to 00759.55(a)(2).

**(2) Concrete Resurfacing** - Resurfacing to correct low area deficiencies is limited to 3/16 inch depth. Existing concrete is to be at least 7 Days old prior to resurfacing. Resurface repair areas according to the following:

a. **Keyway** - Sawcut a keyway at the boundaries of repair areas that are not already defined by panel control joints. Sawcut shall be 1/8 inch wide and 1/4 inch deeper than the edge of the repair area. Bevel inside edge of keyway at a 45 degree angle.

b. **Surface Preparation** - Prepare limits of repair area by grinding using Equipment from 00759.23. After grinding, sandblast the surface of the repair area. Clean the surface using a low pressure washer, less than 5,000 psi.

c. **Presoak** - Presoak the repair area for a minimum of 30 minutes to saturated surface dry. Prior to resurfacing, ensure there is no ponding water on the surface.

d. **Resurface** - Provide concrete resurfacer from the QPL according to 02015.60; refer to QPL remarks to select an appropriate material based on allowable installation depths. Furnish resurfacer in a color that closely matches the color of surrounding concrete surfaces. Mask boundaries of the repair area. Use hand tools to work resurfacer into keyways and match existing grade at boundaries. Apply a light broom-finish to achieve non-slip surface.

e. **Curing and Return to Traffic** - Wet cure for a minimum of 1 hour or per the manufacturer's recommendation, whichever is more restrictive. Follow manufacturer's recommendation for return to traffic time.

**(3) ACP Grinding** - Taper grind to match existing Pavement with a minimum grinding width of 1 foot for each 1/4 inch of ACP removed.

**(b) Acceptance of Structures** - Once the corrective work or replacement has been completed, acceptance will be based on the Engineer's inspection and approval of the Structure.

### 00759.90 Payment -

Replace the paragraph that begins "Item (k) includes the additional Work required ..." with the following paragraph:

Item (k) includes the additional Work required to construct a curb ramp or replace an existing curb ramp. Payment for the area of the curb ramp will be made under the concrete walks Pay Item.

Replace the paragraph that begins "No separate or additional payment will be..." with the following paragraph and bullet list:

No separate or additional payment will be made for:

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- curb ramp Working Drawings
- curb ramp plan
- preplacement conference
- concrete form verification
- any necessary repair or removal and replacement of Structures
- providing supervisory personnel who have an active ODOT ADA Certification for Contractors to directly supervise the curb ramp Work
- developing corrective action plans

### SECTION 00760 - UNIT PAVERS

Section 00760, which is not a Standard Specification, is included in this Project by Special Provision.

#### Description

**00760.00 Scope** - This Work consists of furnishing and installing masonry unit pavers at locations shown or directed.

#### Materials

**00760.10 Unit Paving Material** - Furnish pavers and related material meeting the following requirements:

- **Paving Unit Type** - Brick Pavers
- **Basis of Design** - Endicott Brick Pavers
- **Unit Color** - Manganese Ironspot
- **Unit Size** - 1-1/4" x 4" x 8"
- **Unit Strength** - Conform to ASTM C902
- **Joint Mortar** - Meets ANSI A118.4, Specifications for latex-portland cement mortar.

Submit proposed equivalent products to the Engineer for consideration. See Sections 00120.16 and 00180.31.

#### Construction

**00760.40 General** - Install pavers per the drawings and according to the manufacturer's instructions.

**00760.44 Unit Pavers** - See drawings for laying pattern of all unit pavers.



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**00760.46 Surface Tolerance** - Do not deviate the longitudinal and transverse surface grades by more than 1/4 inch in 12 feet.

**00760.47 Clean Up** - Remove excess mortar and broken paving material from the site when complete.

### **Measurement**

**00760.80 Measurement** - The quantities of unit pavers will be measured on the square foot basis.

### **Payment**

**00760.90 Payment** - The accepted quantities of unit pavers will be paid for at the Contract unit price, per square foot for the item "Unit Pavers".

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

No separate or additional payment will be made for Base preparation.

## **SECTION 00850 - COMMON PROVISIONS FOR PAVEMENT MARKINGS**

Comply with Section 00850 of the Standard Specifications.

## **SECTION 00855 - PAVEMENT MARKERS**

Comply with Section 00855 of the Standard Specifications modified as follows:

**00855.90 Payment** - Replace the Pay Items (i) and (j) with the following Pay Items:

- (i) Bi-Directional Blue Type IAR Markers..... Each
- (j) Bi-Directional Blue Type IAR Markers, Recessed ..... Each

## **SECTION 00865 - LONGITUDINAL PAVEMENT MARKINGS - DURABLE**

Comply with Section 0865 of the Standard Specifications.

## **SECTION 00867 - TRANSVERSE PAVEMENT MARKINGS - LEGENDS AND BARS**

Comply with Section 00867 of the Standard Specifications.

## **SECTION 00905 - REMOVAL AND REINSTALLATION OF EXISTING SIGNS**

Comply with Section 00905 of the Standard Specifications.

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### SECTION 00930 - METAL SIGN SUPPORTS

Comply with Section 00930 of the Standard Specifications modified as follows:

**00930.80 Measurement** - Add the following to the end of this subsection:

The estimated quantities of structural steel are as follows:

Item	Estimated Quantity (Pound)
<b>Minor Sign Supports</b>	
Pipe Sign Supports	175

### SECTION 00940 - SIGNS

Comply with Section 00940 of the Standard Specifications.

### SECTION 00960 - COMMON PROVISIONS FOR ELECTRICAL SYSTEMS

Comply with Section 00960 of the Standard Specifications modified as follows:

Add the following subsection:

**00960.42(c) Metallic Conduit** – Paint the following with rust-preventative coating:

- Threads on all metal conduit.
- Areas where the coating has been damaged so underlying metal is exposed.
- Exposed, ungalvanized threads resulting from field cuts.

If corrosive Soil conditions exist, coat metallic conduit with a nonmetallic coating or wrap with corrosion protection tape at least 10 mils thick.

Add the following subsection:

**00960.45(f) Structure Mounted Poles and Cabinets** – Bond all poles and cabinets mounted on Structures or walls to a common ground rod at the end of the Structure. Ground the system at the first convenient acceptable location off the Structure.

**00960.46 Service Cabinet and Electrical Energy** - Replace this subsection, except for the subsection number and title, with the following:

Install service cabinet and associated equipment, then arrange for the Utility providing power to have the service cabinet inspected and make the electrical hook-up prior to field testing. Field test according to 00990.70(g) for traffic signals, or according to 00970.70 for illumination.

Table 00960-1 contains Utility contact information to arrange for the utilities to make electrical hookups:

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Table 00960-1

Location	Utility	Utility Contact Person's Name, Email and Phone Number	Utility Job Number
S. 1 <sup>st</sup> St. & St. Helens Street	Columbia River PUD	Brooke Sisco <a href="mailto:bsisco@crpud.com">bsisco@crpud.com</a> O: 503-366-3261 C: 971-225-8328	N/A

Furnish and install a meter base approved by the serving Utility (with cover by the Utility), where shown.

### SECTION 00962 - METAL ILLUMINATION AND TRAFFIC SIGNAL SUPPORTS

Comply with Section 00962 of the Standard Specifications modified as follows:

**00962.48 Coating** - Replace this subsection, except for the subsection number and title, with the following:

Prepare and powder coat supports according to the applicable portions of Section 00593 or prepare and coat supports according to the applicable portions of Section 00594. Provide coating materials for field application, repairing damaged coatings, and coating hardware after installation, according to Section 00593 or 00594. Do not coat:

- Slip plate or arm connection surfaces.
- Slip base bolting hardware.
- Anchor rods, anchor rod washers, and anchor rod nuts.

### SECTION 00970 - HIGHWAY ILLUMINATION

Comply with Section 00970 of the Standard Specifications.

### SECTION 01040 - PLANTING

Comply with Section 01040 of the Standard Specifications modified as follows:

**01040.14 Topsoil** – Replace the third bulleted item to read:

Provide one 20-pound representative Soil sample of each Topsoil type for testing of particle size range and organic matter by the Contractor at approved Oregon State Testing Laboratories unless otherwise specified.

Add the following subsection:

**01040.14(d) Planting Soil** - Imported mix or blended onsite materials that approximately consists of 60 to 80 percent loamy soil according to USDA textures, and 20 to 35 percent compost by volume. Coarse sand amendment may be required for soils with excessive clay content. Estimated material percentages are provided as a general guideline to achieving the final planting soil mixture and may require modifications or additional testing. All materials

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furnished shall be free of plants designated by the Oregon Department of Agriculture as Type "A" or Type "B" weeds. Additional requirements:

**(1) Topsoil** – Unscreened and friable with clumps, clods and soil fragments (peds) intact that does not exceed 6 inches in any dimensions. Topsoil can come from a single source or combination of sources such as existing on-site or imported. Topsoil shall conform to the requirements of 01040.14.

**(2) Compost** – Commercially manufactured compost according to Section 01040.15(b) with a "fine" composition type and 98 percent of particles passing through a 1/2-inch sieve.

**(3) Coarse Sand** – Coarse concrete sand that is washed, clean, free of toxic contaminants; sharp natural sand free of limestone shale, slate particles and is not manufactured conforming to ASTM C33 with a Fines Modulus Index of 2.8 and 3.2. The gradation of coarse sand is to meet the following criteria:

Sieve Size	Percent Passing
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10
No. 200	2 - 5

**(4) Blended Materials** – An analysis according to ASTM D5268 or approved testing method is to be conducted for the final soil mix proposed. Planting Soil mix of all blended materials including Topsoil, compost, and coarse sand shall meet the following USDA Soil Classification System:

Texture Class	Percent Range
Sand	20 - 55
Silt	20 - 50
Clay	7 - 30

In addition, the blended materials shall meet the following requirements:

- Loose and friable
- pH: 6 to 8
- Organic matter content (loss on ignition): 6 to 10 percent
- Topsoil shall have less than 1 percent inert debris by volume
- Free of hazardous materials or pathogens and heavy metals by state and federal standards
- Soluble salt concentration less than 3.0 mmhos/cm (dS/m)
- No visible free water and materials not to be worked together when saturated

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- Gravel, Rock, sticks, and roots may not comprise more than 10 percent of the soil mix and may not be larger than 6 inches in any dimension

**01040.15(d) Biochar** – Furnish commercially manufactured soil amendment sustainably sourced biomass charcoal generated from pyrolysis. Additional requirements of biochar to include:

- Cationic exchange capacity: 25 to 45 millieq/l
- Carbon: 85 wt percent C
- Moisture: 15 wt percent H<sub>2</sub>O
- pH: 7
- Manufacturer: CoolTerra or approved equal.

**01040.19(e) Availability** – Modify the first sentence of this subsection to read:

- Furnish a list of nursery sources for all specified plants within 60 Calendar Days after the execution of the Contract.

**01040.20(a) Bark Mulch** – Modify the subsection to read:

Ground, shredded or broken particles from the bark of fir or hemlock trees which is free of non-bark debris, harmful bacteria, disease spores, pests and substances toxic to plant growth. Provide bark mulch that is the standard trade sizes of "medium" to "fine". Size range of mulch to be 1-inch minus with less than 30 percent of materials finer than 1/4-inch. Mulch to be naturally colored and dark.

**01040.43(b) Subsoil Preparation** – Replace the subsection to read:

Grade and finish areas that are to receive planting soil. Ensure exposed subgrade elevations are at the appropriate level to accommodate the full planting soil depth. Prepare the subgrade by scarifying, tilling and/or ripping the subsoil to 6 inch depth. Remove stones larger than 3 inches in any dimension. Remove sticks and roots larger than 5 inches in any dimension. Remove all trash and construction debris and obtain approval from the Owner's Representative before hauling and spreading soil materials.

**01040.43(c) Hauling and Spreading** – Replace subsection with the following:

Depending on Project conditions and following the requirements of 01040.48, planting Soil may be installed by any of the following:

- Spreading Topsoil material first (or utilizing existing Topsoil if applicable) and mixing and spreading Soil conditioners, coarse sand and other amendments in-place to create planting soil.
- Mixing the bulk of materials such as Topsoil, Soil conditioners, coarse sand and other amendments at a designated location on-site but away from its final installed location. Once blended the planting soil is hauled and spread.
- Imported from off-site as homogeneously blended planting soil mix and spread.

Coordinate any Soil installation requirements and locations that impact the Project with the Owner's Representative prior to installation. Avoid excessive and unnecessary movement or

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handling of Soil materials. Do not overly compact any soil material or subsoil that may receive plantings when handling, hauling and spreading soil materials. Protect from damage any surrounding objects, Pavement, Structures and areas that are traveled, crossed, or mounted by Equipment.

Smoothly spread any Soil material over the specified areas to the thicknesses, grades, and slopes shown or directed. Avoid wasting Topsoil and do not place material during wet conditions. Do not work saturated soils in any manner. Material placed contrary to Agency instructions or in undesignated places will not be paid for and removal may be required at the discretion of the Agency.

**01040.48 Planting Area Preparation** - Replace the sentence that begins "Identify, kill, and remove..." with the following sentence:

Identify, kill, and remove Weeds according to 01030.62(b)(3).

**01040.48(a) Method "A" (Cultivated Planting Areas – Non-lawn)** – Replace subsection with the following:

### **Placing Planting Soil Over Exposed Subgrade:**

- Install planting Soil mixed prior to depths indicated on the Plans in two equal lifts after the subsoil has been prepared and accepted. Compact each lift to 75 to 85 percent of maximum Standard Proctor density according to ASTM D698. Incorporate into the planting Soil any Soil amendments, Soil bio-amendments and fertilizers as recommended by testing analysis.

**01040.49 General Planting** – Modify the ninth bulleted item to read:

- Balled and burlapped plants are to be placed with tie wire, string or twine removed from the root ball package prior to any backfilling. The bottom portion of the root ball as it rests in the bottom of the excavation may have its burlap left in the planting hole if the material is natural and fully biodegradable. If root ball is falling apart or cracked, remove the top portion of burlap as indicated in the Plans. Materials that are not biodegradable may not be left on the root ball package or within the planting bed.

**01040.49 General Planting** – Modify the eleventh bulleted item to read:

Apply bark mulch of the type and depth as indicated in 01040.53.

**01040.49 General Planting** – Modify the fourteenth bulleted item to read:

Water all planting materials in as indicated in the Special Provisions.

**01040.50(h) Special Planting Requirements** – Add the following to the subsection:

Water all planting materials in as indicated in the Special Provisions.

**01040.77(a) Watering** – Modify the first sentence to read:

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Water all plants as necessary for plant health using the installed permanent or temporary irrigation system, or such means as has been established for the Project.

**01040.80(f) Mulch** - Replace this subsection, except for the subsection number and title, with the following:

Mulch will be measured on the volume basis at the time of placement, or on the weight basis. Trucking invoices may be used to determine volumes if the quantities are verifiable to the satisfaction of the Engineer.

**01040.90(d) Plant Materials** - Replace the paragraph that begins "Partial payments for plant Materials will..." and the partial payment table with the following paragraph and table:

Partial payments for plant Materials will be made as follows:

At the time of the original planting .....	60%
After the first plant establishment inspection .....	10%
After the second plant establishment inspection.....	10%
After the third plant establishment inspection .....	10%
At completion of the establishment period.....	10%

### SECTION 01095 - SITE FURNISHINGS

Section 01095, which is not a Standard Specification, is included in this Project by Special Provision.

#### Description

**01095.00 Scope** - This Work consists of constructing site furnishings such as benches, trash receptacles, bicycle racks, specialty signs, drinking fountains, skate deterrents, and other furnishings as shown or directed.

#### Materials

##### 01095.10 General:

(a) **Benches** - Provide benches meeting the following requirements:

- Material: All-steel, welded construction with vertical slats, fully assembled with tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 60" length
- Basis of Design: OCC Outdoors Products, 5ft Main Street Park Bench

(b) **Bicycle Racks** - Provide bicycle racks meeting the following requirements:

- Material: Steel tubing with pre-drilling surface mounting plates and tamper-resistant anchoring hardware
- Color: Black powder coated finish

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- Size: 35" L x 2-1/2" W x 33" H
- Basis of Design: OCC Outdoors Products, Circle Style Surface Mount Bike Rack

### (c) Pedestrian Directional Sign –

- Furnish completed sign using manufactured unit indicated in drawings.
- Use artwork provided by Owner's Representative.
- Color to conform to the City of St. Helens Branding and Wayfinding Master Plan.

### (d) Drinking Fountain - Provide drinking fountain meeting the following requirements:

- Pedestal steel drinking fountain with powder coat finish, corrosion resistant for outdoor use, with 2 stainless steel, ADA compliant drinking stations and 1 pet bowl.
- Includes tamper-proof anchor bolts for free-standing surface mount.
- Includes vandal-resistant bubblers, pushbutton activation, automatic stream height regulator, inlet strainer, water inlet, drain outlet, and access panel.
- Size: 42" height, 31" width overall
- Color: Submit color options for approval by Owner's Representative.
- Basis of Design: Elkay Bi-Level, Tubular Pedestal Barrier-Free Fountain with Pet Fountain, Model LK4420DB.

### (e) Trash Receptacle – Provide trash receptacles meeting the following requirements:

- Material: All-steel, welded construction with vertical slats, fully assembled, surface mounted with tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 42" H x 29-1/2" outer diameter
- Basis of Design: OCC Outdoors Products, 36-Gallon Colonial Trash Receptacle with Side Access

## Construction

**01095.40 General** - Submit product information for site furnishings for approval in advance of installation. Install all benches, bike racks, and trash cans as shown and according to the manufacturer's recommendations.

**01095.41 Specialty Signage** – Includes Interpretive Panels and Pedestrian Directional Signage.

### (a) Fabrication

- Shop Drawings – Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Notify Engineer of conflicts.
- Product Data – Submit manufacturers product specifications for all products.
- Quality – Sign fabricator shall have a minimum of five year of experience completing similar work. Sign panels shall show no visual distortion, gaps or defects when viewed from a normal viewing distance in the installed position. Provide color and material samples prior to fabrication.
- Aluminum Fabrication – Provide aluminum in the form indicated complying with the following American Society for Testing Materials ASTM B 209, 5052-H32 for sheets. Aluminum shall be new material, cut to shape and size shown. Welds shall



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be concealed and ground smooth at sign exterior. Sign shall be free of buckles, warps, dents, burrs and defects resulting from fabrication.

- Steel Fabrication – Provide steel in form indicated complying with the American Society for Testing Materials ASTM A 500, Grade B for tube supports.
- Powder Coated Aluminum Graphic Panel – Provide graphic embedded in clear powder coat as provided by the following manufacturers:
  - SH Immersive, Alto Product
  - Direct Embed Coating Systems
  - Gopher Sign Company
- Manufactured Units – Sternberg banner arm & sign blade as shown
- Fasteners – Of same basic metal and alloy as fastened metal, unless indicated. Do not use metals which are corrosive or otherwise incompatible with metals joined. Conceal fasteners when possible. Where exposed to view match adjacent material finish.
- Graphics – Graphics, symbols, text and colors shall be executed in such a manner that all edges and corners are true, clean and match provided artwork.

### (b) Installation

- Obtain all necessary permits and inspections required by the governing authorities having jurisdiction over this work. Include associated fees in proposal. Furnish a certificate of approval from the inspection authority at the completion of the work prior to the application of payment.
- Construct stone veneer base per drawings and Section 00596C.
- Deliver completed signs to project site when adjacent finishes are complete and ready for immediate installation.
- Protect finished products to not damage or mar surfaces in transit or installation.
- Protect adjacent materials prior sign installation. Repair adjacent materials if damaged during installation.
- Erect all signs at the locations as staked or directed on site. Signs not mounted as directed will not be accepted.
- Install directional sign panels to align sign face with pathways.
- Provide cleaning and maintenance data including field paint repair and graffiti removal.

**01095.43 Drinking Fountain** – Install per manufacturer’s requirements.

### Measurement

**01095.80 Measurement** - The quantities of site furnishings will be measured on the unit basis.

### Payment

**01095.90 Payment** - The accepted quantities of site furnishings will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Benches .....	Each
(b) Bicycle Racks .....	Each

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- (c) Interpretive Panel ..... Each
- (d) Pedestrian Directional Signs.....Each
- (e) Drinking Fountain ..... Each
- (f) Trash Can.....Each

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

### SECTION 01120 - IRRIGATION SYSTEMS

Comply with Section 01120 of the Standard Specifications modified as follows:

**01120.11(b) Polyvinyl Chloride Pipe and Fittings** – Modify the table after the first paragraph to read:

Used For	Class or Schedule
Main lines .....	Schedule 40 PVC
Lateral lines .....	Class 200 PVC
Irrigation Sleeves.....	Schedule 40 PVC
Caps.....	Schedule 80 PVC
Direct bury pipe, not in sleeves, placed under road beds or other paved areas .....	Schedule 40 PVC

**01120.42 Excavation** – Add the following to the end of the fourth paragraph:

Vibratory pipe pulling shall only be allowed on 3/4 inch and 1-inch diameter piping only. Solvent weld joints shall be thoroughly cured prior to pipe pulling.

The Contractor shall ensure, by means of an open pit or trench at the beginning, middle, and the end of pull, that pipe and wire is installed at the specified burial depths throughout the entire length of the pull. Burial depths shall be the same as specified for trenching. Allow a minimum of five chain links between plow blade and pulling grip/bullet.

Pulling grip/bullet shall be a minimum of two-inch in diameter greater than the combined diameters of pipe joints and wire to be pulled. Wire pulling shall only occur with proper wire blade feed attachment.

**01120.43 Piping** – Add the following to the end of the first paragraph:

Trench bottoms shall have uniform slopes with one percent minimum slope towards drain valves. Trench bottom shall be free of rocks or sharp-edged objects. Stones larger than one-inch in diameter are not allowed in the backfill material. Trench backfill material shall be compacted to match adjacent soil density. Keep trenches free of debris, during construction.

**01120.45(a) Sprinkler Heads** – Add the following paragraph at the end of this subsection:

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Install all underground sprinklers on flexible risers, using flexible polyethylene pipe or PVC swing joints. Sprinklers located on slopes which are less than three percent shall be installed plumb. Those that are located on slopes greater than three percent shall be installed at an angle midway between plumb and perpendicular to the slope. Temporary Irrigation heads shall be placed on upright fixed pipe staked with #4 rebar per drawings.

**01120.45(d) Controllers** – Add the following paragraph at the end of this subsection:

Provide grounding and lightning protection for all controllers per manufacturer's specifications.

**01120.45(f) Valves** – Add the following paragraph at the end of this subsection:

Install one manual drain valve at discharge side of each remote control valve and at all low points in main line pipe to allow for complete drainage of all main lines. Install drain valves as shown on drawings. Install Automatic valves as shown on drawings. Install specified quick coupling valve, in specified box, at point of connection, and as shown and noted on plans. Valves and valve box locations shall be located in a manner so as not to interrupt plant massing or groups, hedge lines, or otherwise alter the character of the proposed plantings. Place valves and valve boxes in low growing ground cover areas offset from adjacent paving by a minimum of 2 times the specified ground cover spacing. In public areas where valves or valve boxes may be readily visible to the public, verify their location with Owner's Representative prior to installation. Backflow prevention devices shall comply with state and local codes. Conceal in planting beds where possible.

**01120.46 Low Voltage Electrical Installation** – Add the following sentence at the end of the last paragraph:

All controllers and other devices requiring grounding shall be grounded in accordance with manufacturer's specification.

**01120.60 System Operation** - Add the following paragraph at the end of the first paragraph:

System programming: Calculate three irrigation programs: Spring / Early Summer, Summer, Late Summer/ Fall. System operation requirements shall be based on annual precipitation rates, plant material maturation requirements, solar exposure, and topography and soil conditions. Submit seasonal controller operation program with as-built record drawings and include laminated copy of program at controller location in controller cabinet. Include total application quantities in inches per week for all zones, for establishment period and normal system operation.

### **SECTION 01140 - POTABLE WATER PIPE AND FITTINGS**

Comply with Section 01140 of the Standard Specifications modified as follows:

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**01140.90 Payment** - In the paragraph that begins “No separate or additional payment will be...”, add the following bullet to the bullet list:

- pipe reconnections

### **SECTION 01150 - POTABLE WATER VALVES**

Comply with Section 01150 of the Standard Specifications modified as follows:

**01150.10 Materials** - Delete “Ball Valves” from the list of materials.

**01150.90 Payment** - Replace the paragraph that begins “No separate or additional...” with the following paragraph:

No separate or additional payment will be made for:

- earthwork not covered under other Pay Items
- jointing
- blocking of valves
- protective coatings
- valve boxes
- valve box extensions
- valve operator extensions
- valve reconnections
- hydrostatic testing

### **SECTION 01160 - HYDRANTS AND APPURTENANCES**

Comply with Section 01160 of the Standard Specifications.

### **SECTION 01170 - POTABLE WATER SERVICE CONNECTIONS, 2 INCH AND SMALLER**

Comply with Section 01170 of the Standard Specifications.

### **SECTION 02001 - CONCRETE**

Comply with Section 02001 of the Standard Specifications modified as follows:

#### **02001.02 Abbreviations and Definitions:**

Add the following definition:

**Lightweight Concrete** - Structural concrete having a specified density using lightweight Aggregates.

Replace the sentence that begins “**Pozzolans** - Fly ash, silica fume...” with the following sentence:

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**Pozzolans** - Fly ash, natural Pozzolans, silica fume, and high-reactivity Pozzolans.

Replace the sentence that begins “**Supplementary Cementitious Materials** - Fly ash, silica fume...” with the following sentence:

**Supplementary Cementitious Materials** - Pozzolans and ground granulated blast furnace slag.

**02001.15(a) Current Mix Designs** - Replace this subsection, except for the subsection number and title, with the following:

Mix designs that meet the requirements for the specified class of concrete and are currently being used or have been used within the past 24 months on any project, public or private, may be submitted for review. Provide individual test results that comprise the average if more than one data point exists. For paving designs the flexural strength testing must be from within the last two years. For HPC designs the length change and permeability tests must be from within the last two years.

**02001.15(b)(1) Trial Batch Plastic Properties** - Replace this subsection, except for the subsection number and title, with the following:

For each trial batch, test according to the following test methods:

<b>Test</b>	<b>Test Method</b>
Sampling Fresh Concrete	WAQTC TM 2
Concrete Temperature	AASHTO T 309
Slump	AASHTO T 119 <sup>1</sup>
Air Content	AASHTO T 152 or T 196 <sup>2</sup>
Density	AASHTO T 121
Yield	AASHTO T 121
Molding Concrete Specimens	AASHTO T 23 or R 39 <sup>3</sup>
Water Cement Ratio	<sup>4</sup>

<sup>1</sup> For drilled shaft concrete test the slump retention by subsequent tests at half-hour intervals for the duration of the estimated drilled shaft placement, including temporary casing extraction. Report in table or graphical format.

<sup>2</sup> Use AASHTO T 196 for lightweight concrete.

<sup>3</sup> Cast cylinders in single use plastic molds.

<sup>4</sup> Use ODOT's Field Operating Procedure for AASHTO T 121 in the MFTP.

### **SECTION 02030 – SUPPLEMENTARY CEMENTITIOUS MATERIALS**

Comply with Section 02030, of the Standard Specifications modified as follows:

**02030.00 Scope** - Replace this subsection, except for the subsection number and title, with the following:

This Section includes the requirements for fly ash, natural pozzolans, silica fume, ground granulated blast furnace slag and high reactivity pozzolans used in portland cement concrete.

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**02030.10 Fly Ash** - Replace this subsection, except for the subsection number and title, with the following:

Furnish Class C and Class F fly ash from the QPL and conforming to AASHTO M 295 (ASTM C618).

Add the following subsection:

**02030.15 Natural Pozzolans** - Furnish Class N natural pozzolans from the QPL and conforming to AASHTO M 295 (ASTM C618).

**02030.50 Metakaolin** - Replace this subsection with the following:

**02030.50 High Reactivity Pozzolans** - Furnish high-reactivity pozzolans from the QPL and conforming to AASHTO M 321.

### **SECTION 02050 - CURING MATERIALS**

Comply with Section 02050 of the Standard Specifications modified as follows:

**02050.10 Liquid Compounds** - Replace the paragraph that begins "Furnish liquid membrane-forming curing..." with the following paragraph:

Furnish liquid membrane-forming curing compounds from the QPL and meeting the requirements of ASTM C309. Before use, submit a one quart sample from each lot for testing. Samples will be tested according to ODOT TM 721. Samples are not required for curing compounds used on Commercial Grade Concrete.

### **SECTION 02415 - PLASTIC PIPE**

Comply with Section 02415 of the Standard Specifications modified as follows:

**02415.40 Polypropylene Pipe** - Replace the sentence that begins "Dual wall polypropylene pipe ..." with the following sentence:

Dual wall polypropylene pipe and fittings ..... ASTM F2764

### **SECTION 02560 - FASTENERS**

Comply with Section 02560 of the Standard Specifications modified as follows:

**02560.30(b) High Strength Tie Rods, Anchor Bolts and Anchor Rods** - Add the following paragraph to the end of this subsection:

End stamp all ASTM F1554, Grade 105 according to ASTM F1554 Supplementary Requirements S2 and S3. If the end of the bolt is to be embedded in concrete, the projecting end from the concrete shall be the marked end.

### **SECTION 02690 - PCC AGGREGATES**

Comply with Section 02690 of the Standard Specifications modified as follows:

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**02690.20(e) Grading and Separation by Sizes for Prestressed Concrete** - Replace this subsection with the following subsection:

**02690.20(e) Grading and Separation by Sizes** - Sampling shall be according to AASHTO R 90. Sieve analysis shall be according to AASHTO T 27 and AASHTO T 11. Provide aggregates meeting the gradation requirements of Table 02690-1 for structural concrete. Provide a CAgT to perform sampling and testing when required.

**Table 02690-1**  
Gradation of Coarse Aggregates  
Percent passing (by Weight)

Size Number	Nominal Size Square Openings	Sieve Size											
		(2½ in.)	(2 in.)	(1½ in.)	(1 in.)	(¾ in.)	(½ in.)	(¾ in.)	(No. 4)	(No. 8)	(No. 16)	(No. 50)	(No. 200)
3	(2 to 1 in.)	100	90 to 100	35 to 70	0 to 15	—	0 to 5	—	—	—	—	—	**
357*	(2 in. to No. 4)	100	95 to 100	—	35 to 70	—	10 to 30	—	0 to 5	—	—	—	**
4	(1½ to ¾ in.)	—	100	90 to 100	20 to 55	0 to 15	—	0 to 5	—	—	—	—	**
467*	(1½ to No. 4)	—	100	95 to 100	—	35 to 70	—	10 to 30	0 to 5	—	—	—	**
5	(1 to ½ in.)	—	—	100	90 to 100	20 to 55	0 to 10	0 to 5	—	—	—	—	**
56	(1 to ¾ in.)	—	—	100	90 to 100	40 to 85	10 to 40	0 to 15	0 to 5	—	—	—	**
57	(1 to No. 4)	—	—	100	95 to 100	—	25 to 60	—	0 to 10	0 to 5	—	—	**
6	(¾ to ¾ in.)	—	—	—	100	90 to 100	20 to 55	0 to 15	0 to 5	—	—	—	**
67	(¾ to No. 4)	—	—	—	100	90 to 100	—	20 to 55	0 to 10	0 to 5	—	—	**
68	(¾ to No. 8)	—	—	—	100	90 to 100	—	30 to 65	5 to 25	0 to 10	0 to 5	—	**
7	(½ to No. 4)	—	—	—	—	100	90 to 100	40 to 70	0 to 15	0 to 5	—	—	**
78	(½ to No. 8)	—	—	—	—	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	—	**
8	(¾ to No. 8)	—	—	—	—	—	100	85 to 100	10 to 30	0 to 10	0 to 5	—	**
89	(¾ to No. 16)	—	—	—	—	—	100	90 to 100	20 to 55	5 to 30	0 to 10	0 to 5	**

\* Use two or more separated sizes which when combined meet these gradation limits.

\*\* See 02690.20(a). Do Not evaluate material passing the No. 200 sieve according to 00165.40.

**02690.20(f) Grading and Separation by Sizes for Other Concrete** - Delete this subsection.

**02690.30(g) Grading** - In the paragraph that begins “Sampling shall be according to...”, replace the words “AASHTO T 2” with the words “AASHTO R 90”.

### SECTION 02910 - SIGN MATERIALS

Comply with Section 02910 of the Standard Specifications modified as follows:

**02910.33(a) General** - Replace this subsection, except for the subsection number and title, with the following:

Permanent legends consist of white retroreflective screened, red retroreflective screened, black screened or cut-out white retroreflective sheeting. The letters and numerals of all permanent legends shall conform to the design of the FHWA Standard Rounded Capital Letter Alphabets.

Add following subsection:

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**02910.50 Digitally Printed Signs, Temporary** - Temporary traffic control signs may use digitally printed signs from an integrated engineered match component system on the QPL and applied to furnished substrate according to 00222.10(b).

### SECTION 02926 - HIGHWAY ILLUMINATION MATERIALS

Comply with Section 02926 of the Standard Specifications modified as follows:

Add following subsection:

**02926.41(f) Electrical Splice Materials** - Furnish electrical splice materials meeting the following requirements:

- **Split bolt** - Made of silicon bronze to securely join the wires both mechanically and electrically.
- **Heat-shrink tubing** - Split-resistant and adhesive-lined tube made of polyolefin complying with UL 224 or UL 486D, temperature range -67 °F to 230 °F, with 600 V rated inner melting wall or liner to provide void-free encapsulated insulation.
- **Insulating rubber tape** - Electrical grade, nondrying, rubber based, elastic type complying with ASTM D4388.
- **Insulating vinyl plastic tape** - Low temperature (0 °F) resistant, vinyl chloride plastic, electrical insulating tape with pressure-sensitive adhesive. Comply with ASTM D3005.



Part 6

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# **Supplementary Information**



## BIDDER'S CHECKLIST

- Bids are considered valid only if Bidder is listed on the City of St. Helens Official Plan Holder List. Contact the City's Administration Department at (503) 397-6272 to be placed on the Plan Holder List.
- Have you signed the bids for both the S. 1st and Strand Street Road and Utilities Extension Project and the S. 1st Street at St. Helens Street Intersection Improvements Project and included all the required bidder information?
- Have you acknowledged all issued addendums for both the S. 1st and Strand Street Road and Utilities Extension Project and the S. 1st Street at St. Helens Street Intersection Improvements Project?
- Has the Bidder information on the Bid Forms been completed?
- Are the prices on the Bid Schedules for both the S. 1st and Strand Street Road and Utilities Extension Project, and S. 1st Street at St. Helens Street Intersection Improvements Project been correctly computed? Have the prices of the Bid Schedules been stated in both written and numerical form on the Bid Forms?
- Is the amount of the Bid Bonds written in Item No. 12 of the Bid Forms?
- Have you included the required 10% Bid Bonds (Bond Surety)?
- Have you included the First-Tier Subcontractor Disclosure forms? Please note that forms must be submitted even if you do not have a first-tier subcontractor(s).
- Have you read and familiarized yourself with the Instruction to Bidders, Exhibit I of the Public Improvement Contract?

**This checklist is provided as guidance and assistance to bidders to avoid technical mistakes resulting in rejection of a bid. It is not intended to be all-inclusive and does not alleviate the Bidder from the responsibility of becoming familiar with all aspects of the Bid Documents and the proper completion and submission of the bid. Bidders should not rely solely on this checklist. It is the Bidder's responsibility to review all contract bid documents, including but not limited to all contract specifications, special provisions, supplemental information, addenda, notice to contractors, etc.**

**This Check List is For Reference Only. It is Not Part of the Bid Forms and Does Not Have To Be Submitted With Your Bid.**

# GENERAL PROJECT DOCUMENTATION CHECKLIST



City of St. Helens  
Department of Public Works – Engineering Division  
265 Strand Street, St. Helens, OR 97051  
Phone: 503.397.6272 Fax: 503.366.3782

Documentation	Reference	When Required
<b>BID OPENING</b>		
Firm Offer (Bid) and Schedule of Prices and Bid Schedule	Bid Forms	At bid opening
Acknowledged Addenda	Bid Forms	At bid opening
First-Tier Subcontractor Disclosure Form	Bid Forms	Not later than 2 hours after bid opening
Bid Bond (Surety Bond)	Bid Forms	At bid opening
<b>PROJECT AWARD</b>		
Contractor Data, Certification, and Signature	Public Improvement Contract	Within 10 business days of project award
St Helens business license	Public Improvement Contract	Within 10 business days of project award
Proof of filing \$30,000 Public Works Bond with BOLI	Public Improvement Contract, Exhibit J	Within 10 business days of project award
Certificates of Insurance per Contract Requirements	Public Improvement Contract, Exhibit B	Within 10 business days of project award
Certification Statement for Corporation or Independent Contractor	Public Improvement Contract, Exhibit C	Within 10 business days of project award
Payment Bond in amount equal to 100% of awarded contract	Public Improvement Contract, Exhibit D	Within 10 business days of project award
Performance Bond in amount equal to 100% of awarded contract	Public Improvement Contract, Exhibit D	Within 10 business days of project award
<b>PRIOR TO START OF CONSTRUCTION</b>		
Construction Schedule	Special Provisions and Technical Specs	10 Days after Notice to Proceed
Designation of Superintendent / Competent Person Designation with	Special Provisions and Technical Specs	Submit at Pre-Construction Meeting
Designation of Emergency Maintenance Supervisor with 24-hour	Special Provisions and Technical Specs	Submit at Pre-Construction Meeting
Documentation to be sent to residents in project area	Special Provisions and Technical Specs	Prior to start of construction
Project Safety Plan	Special Provisions and Technical Specs	Prior to start of construction
Pre-Construction jobsite conditions (digital photo or video)	Special Provisions and Technical Specs	Prior to start of construction
Location of dump site	Special Provisions and Technical Specs	Prior to start of construction
24-Hours - 7 Day Contact Information (Contractor / Subcontractor)	Special Provisions and Technical Specs	Prior to start of construction
Product Data, including product literature, application, installation	Special Provisions and Technical Specs	Prior to start of construction
Shop drawings, schedules, and drawings	Special Provisions and Technical Specs	Prior to start of construction
MSDS on all materials to be used on site	Special Provisions and Technical Specs	Prior to start of construction
Materials and equipment list	Special Provisions and Technical Specs	Prior to start of construction
Traffic Control Plan	Special Provisions and Technical Specs	Prior to start of construction
Other required submittals as stated elsewhere in Contract Document	Special Provisions and Technical Specs	Prior to start of construction
<b>DURING CONSTRUCTION</b>		
Updated Construction Schedule, as required	Special Provisions and Technical Specs	Whenever schedule falls behind by 10+ Days
Required Testing	Special Provisions and Technical Specs	During construction, as required
<b>WEEKLY BASIS</b>		
Weekly certified payroll	Special Provisions and Technical Specs	Submit Before or with Pay Requests
<b>MONTHLY BASIS</b>		
Pay Requests	Special Provisions and Technical Specs	Submit on a monthly basis at a maximum
<b>AT SUBSTANTIAL COMPLETION</b>		
Exhibit E - Certificate of Substantial Completion	Exhibit E	*
<b>PRIOR TO FINAL ACCEPTANCE</b>		
Maintain and submit redline drawings showing all changes	Special Provisions and Technical Specs	Before Final Completion
Exhibit F - Certificate of Compliance submitted by Contractor	Exhibit F	After punchlist items are completed
Exhibit G - Release of Liens & Claims	Exhibit G	After punchlist items are completed
Exhibit H - Certificate of Final Completion issued by City	Exhibit H	After all documentation have been submitted & punchlist items are complete

*This project submittal list may be incomplete and may or may not list all submittals required on this project. This list shall be considered minimum and may be expanded during the course of the work at the direction of the Engineer. \*Work is considered substantially complete when, in accordance with the Contract Documents, the Owner can occupy or utilize the work for its intended use.*

Part 7

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# **Construction Drawings**

**(Separately Bound)**