CEDARRIVER
WATER & SEWER DISTRICT

CEDAR RIVER WATER & SEWER DISTRICT

FAIRWOOD NO. 2 RESERVOIR

Bidding Solicitation and General Conditions
Technical Specifications
Contract Drawings
Addenda

May 2026

CEDARRIVER
WATER & SEWER DISTRICT

CEDAR RIVER WATER & SEWER DISTRICT

18421 SE Petrovitsky Rd,
Renton, WA 98058

PROJECT MANUAL FOR
FAIRWOOD NO. 2 RESERVOIR

Bid Opening June 18th, 2026

RH2 Engineering, Inc.
1201 Pacific Avenue, Suite
1750 Tacoma, WA 98402

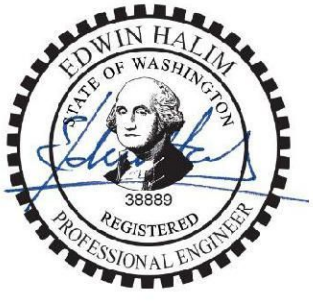
(253) 240-0243
FAX (425) 951-5401

Prepared by: David J. Matz, PE

Checked by: Edwin Halim, PE

Date: 05/26/2026

Signed: 05/26/2026



Signed: 05/26/2026

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Appendix A – Coating Inspection Report
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Cedar River Water & Sewer District
18421 SE Petrovitsky Road
Renton, WA 98058

ADVERTISEMENT FOR BIDS

Notice is hereby given that sealed bids will be received by the Cedar River Water & Sewer District, until 11:00 AM on June 18th, 2026 for construction of the Fairwood No. 2 Reservoir.

Work to be performed is described in the Contract Documents and includes:

- Increase the outside diameter of the foundation to 98 feet and 1 inch (4 foot increase) to meet allowable bearing pressure
- Install sixty 2-inch diameter anchors to prevent shell uplift
- Install anchor bases around screen vent
- Reservoir Coating
- Add drain holes near base of guardrail posts
- New inlet/outlet piping, inlet manifold with duckbill valves
- Install anchor points at top of tank
- Install sample lines
- New roof vent, ladder, and guardrail
- Relocate overflow pipe outside of tank and associated catchment system

All bidding and work will be performed in accordance with the project bid documents described below. Engineers Estimate for the project is $1.7 Million to $1.9 Million.

It is highly recommended that all interested bidders attend the on-site pre-bid meeting and walk-through of the project on June 3rd, 2026, commencing promptly at 10:00 a.m., to inspect the existing reservoir and discuss the construction and bidding process. This meeting will be at 16501 Parkside Way SE (project site).

Bid proposals will be received only at, 18421 SE Petrovitsky Road Renton, WA 98058 by 11: 00 AM on June 18, 2026 at which time they will be opened, read, and tabulated publicly. Proposals received after the time fixed for opening will not be considered.

Free-of-charge access to project bid documents (Plans, Specifications, Addenda, and Bidders List) is provided to Prime Bidders, Subcontractors, and Vendors by going to www.bxwa.com and clicking on "Posted Projects", "Public Works", and "Cedar River Water & Sewer District". This online plan room provides Bidders with fully usable online documents with the ability to: download, view, print, order full/partial plan sets from numerous reprographic sources, and a free online digitizer/take-off tool. It is recommended that Bidders "Register" in order to receive automatic e-mail notification of future addenda and to place themselves on the "Self-Registered Bidders List". Bidders that do not register will not be automatically notified of addenda and will need to periodically check the on-line plan room for addenda issued on this project. Contact Builders Exchange of Washington at (425) 258-1303, should you require assistance with access or registration.

An informational copy of the contract documents is on file for inspection at the Cedar River Water

& Sewer District.

The Cedar River Water & Sewer District hereby notifies all bidders that it will affirmatively ensure that in any contract entered into, pursuant to this advertisement, minority and women's business enterprises will be afforded full opportunity to submit bids in response to the invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

Each bid proposal shall be accompanied by a bid proposal deposit in cash, certified check, cashier's check, postal money order, or surety bond in an amount equal to at least 5 percent of the amount of such bid proposal. Checks shall be made payable to the Cedar River Water & Sewer District. Should the successful bidder fail to enter into such contract and furnish satisfactory performance and payment bond within the time stated in the Specifications, the bid proposal deposit shall be forfeited to the Cedar River Water & Sewer District.

The Cedar River Water & Sewer District reserves the right to reject any or all bids and to waive irregularities in the bid or in the bidding.

No bidder may withdraw his proposal after the time set for the opening thereof, or before award of contract, unless said award is delayed for a period exceeding 60 calendar days.

PUBLISHED:
Builders Exchange of Washington, Inc.; Daily Journal of Commerce
Publish Date:
May 26, 2026

INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

01. General

Plans and Specifications are on file at the Cedar River Water & Sewer District 18421 SE Petrovitsky Road, Renton, WA 98058. Plans and Specifications may be obtained from http://www.bxwa.com.

02. Location

Project site is located at: 20029 SE 206th Street, Renton, WA.

03. Examination of Plans, Specifications and Site

Bidders shall satisfy themselves as to construction conditions by personal examination of Plans, Specifications and site of proposed work, and by any other examination and investigation which they may desire to make as to the nature of difficulties to be encountered.

04. Proposals

Proposals shall be made on the forms included herewith and shall be addressed to Cedar River Water & Sewer District, 18421 SE Petrovitsky Road, Renton, WA 98058. Proposals shall be in a sealed envelope and shall be delivered to the above address to arrive not later than on June 18, 2026 by 11:00 a.m.

No proposal may be withdrawn after the time set for the bid opening or before award of contract unless said award is delayed for a period exceeding 60 calendar days.

05. Bid Proposal Deposit

As a guarantee of good faith and as required by law, each bid shall be accompanied by a bid proposal deposit in the form of a certified check, cashier's check, or surety bond, payable to the order of the Cedar River Water & Sewer District, for an amount not less than 5 percent of the total amount of bid. Deposits of the three low bidders will be retained until a contract has been entered into between the successful bidder and until a performance and payment bond in an amount of 100 percent of the contract price has been filed as required under these contract documents.

Deposits of other bidders will be returned as soon as it is determined that they are not one of the three low bidders.

06. Award of Contract

Award of contract, if made, will be made to the lowest responsible bidder for Base Bid and Schedules A. Schedule B will be used to determine FEMA's share for interior coatings work and will replace

Schedule A if coating costs exceed available funding but Schedule B cost will not determine lowest responsible bidder. Contract will not be awarded until the Cedar River Water & Sewer District is satisfied that successful bidder is reasonably familiar with the class of work contemplated and has the necessary capital, tools and experience to satisfactorily perform the work within the time stated. Completion of the work within the time stated is essential and prior commitments of the bidder, failure to complete other work on time, or reasonable doubt as to whether the bidder would complete the work on time would be cause for the rejection of any bid. In addition, the Owner may determine any bidder not to be responsible in accordance with RCW 39.04.350 and/or any other legal authority including Bidder's Qualification Certificate. The right is reserved by Owner to waive any informalities in the bidding, to correct mathematical errors in any bid, to reject any or all proposals, to accept any proposal, to re-advertise for new proposals, or to otherwise carry out the work.

All information required of the bidder in this contract and included in the Bid Forms section must be provided with the submitted bid at the time of bid opening, with the exception of the items listed below:

1. Subcontractor's information required under RCW 39.30.060, which may be submitted within the timeframe identified in the RCW. See the form *Subcontractor List* in the Bid Forms section.

2. The *Certification of Compliance with Wage Payment Statutes* form is required prior to award of contract.

3. List of similar project experience (see *Bidders Qualification Certificate*) must be received within 3 working days after bid opening.

07. Failure to Execute Contract

In the event the successful bidder fails to furnish an approved bond and to sign the contract within ten (10) calendar days after notification of award, an amount equal to five (5) percent of the amount of the bid shall be forfeited to Owner as liquidated damages. Said liquidated damages shall be paid from the check or bid bond filed by the bidder. Other proposals will then be reconsidered for award by Owner.

08. Corrections, Interpretations and Addenda

Any omissions, discrepancies or need for interpretation should be brought in writing to the attention of Engineer. Written addenda to clarify questions which arise will then be issued.

All interpretation or explanations of the contract documents shall be in the form of an addendum and no oral statements by Owner, Engineer, or other representative of Owner shall, in any way, modify the contract documents, whether made before or after awarding the contract.

A bidder may request review of a proposed product or procedure substitution prior to bid opening. Follow the procedures in the Technical Specifications section 1.25.00.

09. Project Engineer

Notices as required in the General Conditions shall be mailed to RH2 Engineering, Inc., 1201 Pacific Avenue South Suite 1750, Tacoma WA 98402, Attention: David Matz PE

10. Chemical Hazard Communication

Before starting work under this contract, Contractor is required to supply information to the owner on all chemical hazards that Contractor is bringing into the work place and thereby creating exposure to the CRWSD employees.

11. Completion Time

Contractor is required to have substantial and contract completion within 304 calendar days from Notice to Proceed. The proposed schedule for the work will be done between January 1st, 2027 and November 1st, 2027.

Work hours are defined in the General Conditions.

12. Bidder's Responsibility Statement

It is the responsibility of each bidder to ascertain if all the documents listed on the attached index are included in their copy of the bid specifications.

If documents are missing, it is the sole responsibility of the bidder to contact the Cedar River Water and Sewer District to obtain the missing documents prior to bid opening time.

13. Non-Resident Contractors

Pursuant to RCW 39.04.380, non-resident contractors will be evaluated for out-of-state bidder preferences. If the state of the non-resident contractor provides an in-state contractor preference, a comparable percentage disadvantage will be applied to their bid prior to contract award.

14. Apprentice Utilization Goals

Apprentice utilization requirements set forth in RCW 39.04.320 apply to this Contract. These requirements apply to public works projects awarded by municipalities after July 1, 2024, and which are estimated to cost two million dollars or more. No less than 15% of the labor hours constituting the Work shall be performed by apprentices. The Contractor shall be solely responsible for meeting apprentice utilization requirements and use and demonstrate good faith efforts to comply with RCW 39.04.320 and any applicable rules, regulations, and policies of the Department of Labor & Industries ("LNI"). There will be no monetary incentives for meeting the 15% requirement. If the Contractor fails to meet apprentice utilization requirements and LNI or any other agency levies fines or penalties and/or a court awards damages and costs as a result, the Contractor shall be solely responsible for payment.

15. Davis Bacon Act

By accepting this contract, the contractor acknowledges and agrees to the terms provided in the Davis-Bacon and Related Acts Requirements for Contractors and Subcontractors.

Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of $2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141- 3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

16. Disadvantaged Business Enterprise Provisions

The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR part 33 in the award and administration of contracts awarded under FEMA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

17. Inventions

If the Federal award meets the definition of "funding agreement" under 37 C.F.R. Part §401.2 (a) and the contractor or sub-contractor wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the contractor must comply with the requirements of 37 C.F.R. Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

18. Clean Air Act

Contractors shall comply with all applicable standards, orders or regulations issued pursuant to the Clear Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

19. Procurement of Recovered Materials

A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 C.F.R. Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds $10,000 or the value of the quantity acquired during the preceding fiscal year exceeded $10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

20. Debarment and Suspension

A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies as well as authority other than Executive Order 12549.

21. Anti-Lobbying Amendment

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

22. Certified Payroll

Contractor shall provide certified weekly payroll records per Department of Labor form WH-347 (or State equivalent) per Davis-Bacon and Related Acts.

23. Anti Kickback

The contractor must maintain compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 C.F.R. Part 3). (All contracts and subgrants for construction or repair.)

24. Discrimination

P.L. 93-112, STAT 355; REHABILITATION ACT OF 1973 AND AGE DISCRIMINATION ACT OF 1975. The contractor and any subcontractors shall not on the grounds of race, color, national origin, or sex, exclude from participation in, deny the benefits of, or subject to discrimination any person under any program or activity funded in whole or in part with Federal funds. Any prohibition against discrimination on the basis of age under the Age Discrimination Act of 1975, or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1073 shall also apply to any such program or activity. The contractor shall carry out applicable requirements of 40 C.F.R. Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

25. Domestic Preference

1. As appropriate and to the extent consistent with law, the non-Federal entity should, to the greatest extent practicable under a Federal award, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subawards including all contracts and purchase orders for work or products under this award.

2. For purposes of this section:

a) "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

b) "Manufactured products" means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

26. Equal Employment Opportunity

41 C.F.R. Part 60-1.4(b) in accordance with Executive Order 11246 as amended by Executive Order 11375.

During the performance of this contract, the contractor and all subcontractors agree to the

following.

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

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

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

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

6. The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

7. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part, and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with

procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

27. Legal Remedies

Contracts for more than the simplified acquisition threshold, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

28. Non-segregated Facilities

Bidders and offerors are cautioned as follows: By signing this bid or offer, the bidder or offeror will be deemed to have signed and agreed to the provisions of the "Certification of Nonsegregated Facilities" in this solicitation. The certification provides that the bidder or offeror does not maintain or provide for their employees facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a de facto basis. The certification also provides that the bidder will not maintain such segregated facilities.

29. Contract Work Hours

Where applicable, all contracts awarded by the non-Federal entity in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 C.F.R. Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

30. Drug Free

For every contract over $10,000 the contractor must maintain a drug-free workplace. During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

31. Bid Package Checklist

The Following are required as a minimum for a complete bid:

- ☐ Non-Collusion Certificate
- ☐ Bidder's Qualification Certificate
- ☐ Subcontractor List
- ☐ Bid Bond Form
- ☐ Bid Bond
- ☐ Signed Proposal Form
- ☐ Schedule of Prices
- ☐ Acknowledgement of Receipt of Addenda

BID FORMS

Cedar River Water & Sewer District

NON-COLLUSION CERTIFICATE

State of Washington)
) ss.
County of King)

The undersigned, being duly sworn, deposes and says that the person, firm, association, co-partnership or corporation herein named, has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in the preparation and submission of a proposal to Cedar River Water & Sewer District for consideration in the award of a contract on the improvement described as follows:

Fairwood No. 2 Reservoir

_____
(Name of Firm)

By: _____
(Authorized Signature)

Title:

Sworn to before me this _____ day of _____, 20_____.

_____
Notary Public

Corporate Seal:

BIDDER'S QUALIFICATION CERTIFICATE

The undersigned hereby certifies they are qualified to perform the contract work with basis of qualifications listed on this certificate. Failure of the bidder to provide documentation of qualifications may be cause for rejection of the bid. Should the Owner notify the bidder that they are considered non-responsive due to lack of qualifications, the bidder will have 3 working days after such notification to provide supplemental information showing qualifications for review. Any such supplemental information will not be cause for modifying any portion of the contract, the bid price, or schedule.

1. Name and Address

_____

_____

_____

2. Primary contact name and phone for questions _____

3. State of Washington Registration Number and expiration _____

4. Number of years in contracting business under present firm name _____

5. Particular types of construction work performed by your company:

_____

_____

_____

_____

6. List of recent construction projects performed. Attach separate pages if desired.

   List at least four (4) projects of similar nature which have been completed by the contractor within the last five (5) years, and the gross dollar amount of each project.

Amount	Type	Owner	Name	Phone

7. Gross dollar amount of contracts now in hand:

_____

8. Bank reference(s):

_____

_____

By (Authorized Signature): _____

Title _____

RCW REQUIRED SUBCONTRACTOR LIST

As required by the Revised Code of Washington 1999 (RCW 39.30.060), bids of $1,000,000 or more for any public works contract require each bidder to submit the names of the subcontractors who will be performing the work in the areas of structural steel installation, rebar installation, heating, ventilation, air conditioning, plumbing (as described in chapter 18.106 RCW), and electrical (as described in chapter 19.28 RCW), or to name itself for the work. As required by RCW 39.30.060, if the subcontractor names are not submitted with the bid, or within 1 hour of the bid time for HVAC and electrical and 48 hours of the bid time for structural steel and rebar, the bid shall be considered non-responsive (void).

The following subcontractor(s) subcontract for work listed below. Bidder shall indicate one of the following:

- Bidder is naming themselves for the work, or
- There is no work related to the item identified, or
- The subcontractor who will be performing the work

Electrical	**Yes**	**No**
Bidder is naming themselves for the work	☐	☐
There is no permanent work product related to this item. Any ancillary heating work required during the execution of this contract will be performed by the Contractor.	☐	☐
Bidder is subcontracting the work (if so, complete the following items)	☐	☐
Bid Item(s) _____		
Subcontractor Name _____		
Address _____		
Phone No. _____ State Contractor's License No. _____		

Other Type: _____	**Yes**	**No**
Bidder is naming themselves for the work	☐	☐
There is no permanent work product related to this item. Any ancillary heating work required during the execution of this contract will be performed by the Contractor.	☐	☐
Bidder is subcontracting the work (if so, complete the following items)	☐	☐
Bid Item(s) _____		
Subcontractor Name _____		
Address _____		
Phone No. _____ State Contractor's License No. _____		

Other Type: ______________________	**Yes**	**No**
Bidder is naming themselves for the work	☐	☐
There is no permanent work product related to this item. Any ancillary heating work required during the execution of this contract will be performed by the Contractor.	☐	☐
Bidder is subcontracting the work (if so, complete the following items)	☐	☐
Bid Item(s) ______________________		
Subcontractor Name ______________________		
Address ______________________		
Phone No. ____________ State Contractor's License No. ____________		

Other Type: ______________________	**Yes**	**No**
Bidder is naming themselves for the work	☐	☐
There is no permanent work product related to this item. Any ancillary heating work required during the execution of this contract will be performed by the Contractor.	☐	☐
Bidder is subcontracting the work (if so, complete the following items)	☐	☐
Bid Item(s) ______________________		
Subcontractor Name ______________________		
Address ______________________		
Phone No. ____________ State Contractor's License No. ____________		

Other Type: ______________________	**Yes**	**No**
Bidder is naming themselves for the work	☐	☐
There is no permanent work product related to this item. Any ancillary heating work required during the execution of this contract will be performed by the Contractor.	☐	☐
Bidder is subcontracting the work (if so, complete the following items)	☐	☐
Bid Item(s) ______________________		
Subcontractor Name ______________________		
Address ______________________		
Phone No. ____________ State Contractor's License No. ____________		

BID BOND FORM

Herewith find deposit in the form of a certified check, cashier's check, or cash in the amount of $_____which is not less than five percent (5%) of the total bid.

Sign Here: _____

BID BOND

Know all men by these presents, that we _____ as Principal and _____ as Surety, are held and firmly bound unto the Cedar River Water & Sewer District Washington, as obligee in the penal sum of _____ dollars, for the payment of which the principal and the surety binds themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by these presents.

The condition of the obligation is such that if the obligee shall make any award to the principal for _____, according to the terms of the proposal or bid made by the principal therefore, and the principal shall duly make and enter into a contract with the obligee in accordance with the terms of said proposal or bid award and shall give bond for faithful performance thereof, with surety or sureties approved by the obligee; or if the principal shall, in case of failure to do so, pay and forfeit to the obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the surety shall forthwith pay and forfeit to the obligee, as penalty and liquidated damages the amount of this bond.

Signed, sealed and dated this _____ day of _____, 20_____.

Principal_____

Surety_____

Return of deposit in the amount of $_____

Date _____

By _____

PROPOSAL

Contractor: _____

City: _____, Washington

Date: _____, 20_____

The Board of Commissioners/Trustees or City Council

Cedar River Water & Sewer District
18421 SE Petrovitsky Road

Renton, WA 98058

Pursuant to and in compliance with your invitation for bids and all other documents relating thereto, the undersigned bidder, having familiarized himself with the terms of the contract, the local conditions affecting the performance of the contract, the cost of the work at the place where the work is to be done, proposes and agrees to perform, within the time stipulated, the contract, if this project is accepted, including all its component parts and everything required to be performed, and to provide and furnish any and all labor, materials, tools, expendable equipment, an all utility and transportation services necessary to perform the contract, complete, in a workmanlike manner, of all the work covered by the contract in connection with Cedar River Water & Sewer District's project, designated as Fairwood No. 2 Reservoir all as required by and in strict conformance with the Specifications, contract Plans and the Standard Plans for the following unit prices.

Note: Unit prices of all items, all extensions and total amount of bid must be shown. Show unit prices in both words and figures and, where conflict occurs, the written or typed words prevail.

SCHEDULE OF PRICES

BASE BID

Cedar River Water & Sewer District Central Reservoir Seismic Retrofit					
Item	**Description**	**Units**	**Quantity**	**Unit Cost**	**Sub-Total Cost**
1	Mobilization, Demobilization, Site Preparation, and Clean-up _____ Unit Price in Words	LS	1	= $	= $
2	Force Account Twenty-Five Thousand Unit Price in Words	FA	1	= $ 25,000	= $ 25,000
3	Reservoir Site Work _____ Unit Price in Words	LS	1	= $	= $
4	Non-FEMA Site Work _____ Unit Price in Words	LS	1	= $	= $
5	Reservoir _____ Unit Price in Words	LS	1	= $	= $
6	Reservoir Mechanical _____ Unit Price in Words	LS	1	= $	= $
7	Non-FEMA Reservoir Mechanical _____ Unit Price in Words	LS	1	= $	= $
8	Reservoir Electrical _____ Unit Price in Words	LS	1	= $	= $
9	Reservoir Automatic Control _____ Unit Price in Words	LS	1	= $	= $
10	Reservoir Testing, Startup and Training _____ Unit Price in Words	LS	1	= $	= $

Cedar River Water & Sewer District Central Reservoir Seismic Retrofit					
Item	**Description**	**Units**	**Quantity**	**Unit Cost**	**Sub-Total Cost**
11	Apprentice Utilization Goals _____ Unit Price in Words	LS	1	= $	= $
12	Exterior Coating Repairs _____ Unit Price in Words	LS	1	= $	= $
				SUBTOTAL (items 1-12)	= $
				Sales Tax @ 8.9%	= $
				TOTAL BASE BID AMOUNT	= $

SCHEDULE A

Cedar River Water & Sewer District Central Reservoir Seismic Retrofit					
Item	**Description**	**Units**	**Quantity**	**Unit Cost**	**Sub-Total Cost**
1	Interior Coating Replacement _____ Unit Price in Words	LS	1	= $	= $
				SUBTOTAL	= $
				Sales Tax @ 8.9%	= $
				TOTAL SCHEDULE A AMOUNT	= $

TOTAL AMOUNT

Cedar River Water & Sewer District Central Reservoir Seismic Retrofit	
TOTAL BASE BID AND SCHEDULE A AMOUNT	$

SCHEDULE B

Cedar River Water & Sewer District Central Reservoir Seismic Retrofit					
Item	**Description**	**Units**	**Quantity**	**Unit Cost**	**Sub-Total Cost**
1	Interior Coating Repairs _____ Unit Price in Words	LS	1	= $	= $
				SUBTOTAL	= $
				Sales Tax @ 8.9%	= $
				TOTAL SCHEDULE B AMOUNT	= $

All bidders shall sign the proposal in the space provided.

The successful bidder shall execute and furnish the attached (no substitution allowed) performance bond within ten (10) calendar days after the date of award of contract unless a written extension is granted by the Cedar River Water & Sewer District

The Contractor agrees to perform the complete contract work as specified, including corrections, finish and cleanup within 304 calendar days, beginning the date given in the notice to proceed by the Cedar River Water & Sewer District. Failure to complete within the specified completion time may result in liquidated damages in the amount of $1800 for each working day beyond the substantial completion date.

The proposal, together with the Agreement, a Work Schedule Chart, Contract Documents, Standard Specifications, Special Provisions, Addenda and Plans, when endorsed by the Cedar River Water & Sewer District shall become a contract binding on both parties thereto, whereby the Contractor agrees to perform the complete contract work, as specified, and the Cedar River Water & Sewer District agrees to make payment to the Contractor, as specified, for said completed and accepted work.

Dated this _____ day of _____, 20_____.

Contractor_____

Address_____

_____

Telephone_____ License No._____

By: _____

Title: _____

Attest: (If Corporation)

_____

_____

Witness: (If Individual or Partnership)

_____

_____

Acknowledgement of Receipt of Addenda:

No._____ Date_____ Initials_____

No._____ Date_____ Initials_____

CERTIFICATION OF COMPLIANCE WITH WAGE PAYMENT STATUTES INSTRUCTIONS

Effective July 23, 2017, before award of a public works contract, the bidder under consideration for award of a public works project must submit the following form stating that they have not willfully violated wage payment laws within the past three (3) years in order to be considered a responsible bidder *and receive the contract.* (See RCW 39.04.350 as modified by SSB 5301, Laws of 2017, ch. 258.)

The following form is not required to be provided with the bid package. It must be provided once the bidder has been notified that they are the lowest responsible bidder. Notice of Award will not be provided until the form has been received, reviewed, and approved by the Owner.

CERTIFICATION OF COMPLIANCE WITH WAGE PAYMENT STATUTES

The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date, the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.
I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

_____
Bidder's Business Name

_____
Signature of Authorized Official*

_____
Printed Name

_____
Title

_____ _____ _____
Date City State

Check One:

Sole Proprietorship ☐ Partnership ☐ Joint Venture ☐ Corporation ☐

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

_____

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

_____

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

CONTRACT FORMS

AGREEMENT

THIS AGREEMENT is entered into by and between Cedar River Water and Sewer District (hereinafter called the Owner) and _____ (hereinafter called the Contractor).

The Owner and the Contractor agree as follows:

ARTICLE 1. CONTRACT DOCUMENTS.
This Agreement comprises the entire agreement between the Owner and the Contractor concerning the Work and consists of the Contract Documents described in the General Conditions of which this Agreement is a part including any change orders issued after the date of this Agreement. Capitalized terms contained herein shall have the same definitions as set forth in the Contract Documents unless otherwise defined herein. There are no other agreements between the Owner and Contractor.

ARTICLE 2. WORK.

Work to be performed is described in the Contract Documents and includes:

- Increase the outside diameter of the foundation to 98 feet and 1 inch (4 foot increase) to meet allowable bearing pressure
- Install sixty 2-inch diameter anchors to prevent shell uplift
- Install anchor bases around screen vent
- Reservoir Coating
- Add drain holes near base of guardrail posts
- New inlet/outlet piping, inlet manifold with duckbill valves
- Install anchor points at top of tank
- Install sample lines
- New roof vent, ladder, and guardrail
- Relocate overflow pipe outside of tank and associated catchment system

ARTICLE 3. CONTRACT TIME.
The Contractor shall substantially complete the Work required by the Contract within 304 calendar days ("Substantial Completion Date") and fully complete the Work within 319 calendar days ("Completion Date").

ARTICLE 3. LIQUIDATED DAMAGES.
The Owner and the Contractor recognize that time is of the essence and that the Owner will suffer financial loss if the Work is not completed within the time, plus any extensions thereof, allowed in accordance with the Contract. They also recognize the inconvenience, expense, and difficulties involved in a legal proceeding to prove the actual loss suffered by the Owner if the Work is not completed within the time allowed in the Contract. Accordingly, the Owner and the Contractor agree that as liquidated damages for delay, and not as a penalty, the Contractor shall pay the Owner ($1,800) per day for each working day beyond the Substantial Completion Date until the Contractor

achieves substantial completion of the Work and ($750) per day for each working day beyond the Completion Date until the Contractor achieves physical completion of the Work.

ARTICLE 4. CONTRACT PRICE.
The Owner shall pay the Contractor the amount(s) set forth in the Proposal (in United States dollars) for completion of the Work in accordance with the Contract.

ARTICLE 6. MISCELLANEOUS.
For purpose of indemnifying and defending any workplace injury claims by employees of the Contractor and Subcontractors, the Contractor waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specifically negotiated between the parties and is hereby acknowledged by the Contractor.

_____(Contractor's initials)

The Agreement is binding upon the Owner and the Contractor, and their respective partners, successors, assigns and legal representatives.

IN WITNESS WHEREOF, Owner and Contractor have caused this Agreement to be executed the day and year indicated below.

IN FAITH WHEREOF, witness the hands and seals of both parties hereto on the day and year in this Agreement first above written.

Contractor _____

By _____

Title _____

Attest (If Corporation) Witness (If Individual or Partnership)

CERTIFICATE OF INSURANCE

PROTECTIVE, COMMERCIAL GENERAL LIABILITY, COMMERCIAL AUTOMOTIVE LIABILITY

Insert Acord Form (sample below) indicating coverages as required are met. Other forms may be submitted for the Owner to review.

ACORD™ CERTIFICATE OF LIABILITY INSURANC Clear Save DATE (MM/DD/YYYY)

PRODUCER	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
	INSURERS AFFORDING COVERAGE	**NAIC #**
INSURED	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$
		COMMERCIAL GENERAL LIABILITY				DAMAGE TO RENTED PREMISES (Ea occurrence)	$
		CLAIMS MADE OCCUR				MED EXP (Any one person)	$
						PERSONAL & ADV INJURY	$
						GENERAL AGGREGATE	$
		GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS - COMP/OP AGG	$
		POLICY PRO-JECT LOC					
		AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$
		ANY AUTO					
		ALL OWNED AUTOS				BODILY INJURY (Per person)	$
		SCHEDULED AUTOS					
		HIRED AUTOS				BODILY INJURY (Per accident)	$
		NON-OWNED AUTOS					
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY				EACH OCCURRENCE	$
		OCCUR CLAIMS MADE				AGGREGATE	$
							$
		DEDUCTIBLE					$
		RETENTION $					$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				WC STATU-TORY LIMITS OTH-ER	
		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?				E.L. EACH ACCIDENT	$
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$
						E.L. DISEASE - POLICY LIMIT	$
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Sample

Sample

CERTIFICATE HOLDER	CANCELLATION
	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE

ACORD 25 (2001/08) © ACORD CORPORATION 1988

CERTIFICATE OF INSURANCE

TO: Cedar River Water & Sewer District

Return this certificate to:

Cedar River Water & Sewer District
18421 SE Petrovitsky Road
Renton, WA 98058

This certifies to Cedar River Water & Sewer District the following described policies have been issued to the Insured named below and are in force at this time:

Insured

_____

Address

_____

Description of operations/locations/products (show contract name and/or number, if any)

Policies and Insureds	Limits		Policy Number	Expiration Date	Best's Rating
	Bodily Injury	Property Damage			

GENERAL LIABILITY ENDORSEMENT

Cedar River Water & Sewer District
18421 SE Petrovitsky Road
Renton, WA 98058

Policy Information

1. Insurance Company _____
   Policy Number _____
2. Policy Term: From _____ To _____
   Effective Date _____
3. Named Insured _____
4. Address of Named Insured _____
5. Limit of Liability Any One Occurrence/Aggregate: $ _____
6. Deductible of Self-Insured Retention (Nil unless otherwise specified) _____

B. Policy Amendments

This endorsement is issued in consideration of the policy premium. Notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto, it is agreed as follows:

1. INSURED. Owner, its elected or appointed officials, employees or volunteers are included as insureds with regard to damages and defense of claims arising from (a) activities performed by or on behalf of the Named Insured, (b) products and completed operations of the Named Insured, or (c) premises owned, leased or used by the Named Insured.

2. CONTRIBUTION NOT REQUIRED. As respects (a) work performed by the Named Insured for or on behalf of Owner, or (b) products sold by the Named Insured to Owner; or (c) premises leased by the Named Insured from Owner, the insurance afforded by this policy shall be primary insurance respects Owner, its elected or appointed officials, employees or volunteers; or stand in an unbroken chain of coverage excess of the Named insureds scheduled underlying primary coverage. In either event, any other insurance maintained by Owner, its elected or appointed officials, employees or volunteers shall be excess of this insurance and shall not contribute with it.

3. SCOPE OF COVERAGE. This policy: (1) if primary, affords coverage at least as broad as Insurance Services Office form number GL 0001 (Ed.07/98), Comprehensive General Liability Insurance and (2) if excess, affords coverage which is at least as broad as the primary insurance forms referenced in the preceding section (1).

4. SEVERABILITY OF INTEREST. The insurance afforded by this policy applies separately to each insured who is seeking coverage or against whom a claim is made or a suit is brought, except with respect to the Company's limit of liability.

5. PROVISIONS REGARDING THE INSURED'S DUTIES AFTER ACCIDENT OR

LOSS. Any failure to comply with reporting of the policy shall not affect coverage provided to Owner, its elected or appointed officials, employees or volunteers.

6. CANCELLATION NOTICE. The insurance afforded by this policy shall not be suspended, voided, canceled, reduced in coverage or in limits except after forty-five (45) days prior written notice by Certified Mail Return Receipt requested has been given to Owner. Such notice shall be addressed as shown in the heading of this endorsement.

C. Signature of Insurer or Authorized Representative of the Insurer

I, _____ (print/type), warrant that I have authority to bind the below listed insurance company and by my signature hereon do so bind this company.

Signature of_____
Authorized Representative (original signature required on endorsement furnished to the Cedar River Water & Sewer District.)

Organization _____

Title _____

Address _____

Telephone _____

WORKER'S COMPENSATION
EMPLOYER'S LIABILITY ENDORSEMENT

Cedar River Water & Sewer District
18421 SE Petrovitsky Road
Renton, WA 98058

A. Policy Information

1. Insurance Company_____

   Policy Number_____

2. Effective Date of This Endorsement_____

3. Named Insured_____

4. Employer's Liability Limit (Coverage B)_____

B. Policy Amendments

In consideration of the policy premium and notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto, it is agreed as follows:

1. **Cancellation Notice.** The insurance afforded by this policy shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days prior written notice by Certified Mail Return Receipt Requested has been given to Owner. Such notice shall be sent to the address given in the heading of this endorsement.

2. **Waiver of Subrogation.** The Company agrees to waive all rights of subrogation against Owner, its elected or appointed officials, agents and employees for losses paid under the terms of this policy which arise from work performed by the Named Insured for Owner.

C. Signature of Insurer or Authorized Representative of the Insurer

I, _____ (print/type), warrant that I have authority to bind the below listed insurance company and by my signature hereon do so bind this company.

Signature of_____
Authorized Representative (original signature required on endorsement furnished to the Cedar River Water & Sewer District)

Organization _____

Title _____

Address _____

Telephone _____

AUTOMOTIVE LIABILITY ENDORSEMENT

Cedar River Water & Sewer District
18421 SE Petrovitsky Road

Renton, WA 98058

A. Policy Information

1. Insurance Company _____
   Policy Number _____
2. Policy Term: From _____ To _____
   Effective Date _____
3. Named Insured _____
4. Address of Named Insured _____
5. Limit of Liability Any One Occurrence/Aggregate: $ _____
6. Deductible of Self-Insured Retention
   (Nil unless otherwise specified) _____

B. Policy Amendments

This endorsement is issued in consideration of the policy premium. Notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto, it is agreed as follows:

1. INSURED. Owner, its elected or appointed officials, employees or volunteers are included as insureds with regard to damages and defense of claims arising from (a) activities performed by or on behalf of the Named Insured, (b) products and completed operations of the Named Insured, or (c) premises owned, leased or used by the Named Insured.

2. CONTRIBUTION NOT REQUIRED. As respects (a) work performed by the Named Insured for or on behalf of Owner, or (b) products sold by the Named Insured to Owner; or (c) premises leased by the Named Insured from Owner, the insurance afforded by this policy shall be primary insurance respects Owner, its elected or appointed officials, employees or volunteers; or stand in an unbroken chain of coverage excess of the Named Insured's scheduled underlying primary coverage. In either event, any other insurance maintained by Owner, its elected or appointed officials, employees or volunteers shall be excess of this insurance and shall not contribute with it.

3. SCOPE OF COVERAGE. This policy requires Insurance Service Office Form CA0001 (07-97) or equivalent covering Automotive Liability, Symbol 1 (any auto).

4. SEVERABILITY OF INTEREST. The insurance afforded by this policy applies separately to each insured who is seeking coverage or against whom a claim is made or a suit is brought, except with respect to the Company's limit of liability.

5. PROVISIONS REGARDING THE INSURED'S DUTIES AFTER ACCIDENT OR LOSS. Any failure to comply with reporting of the policy shall not affect coverage provided to Owner, its

elected or appointed officials, employees or volunteers.

6. CANCELLATION NOTICE. The insurance afforded by this policy shall not be suspended, voided, canceled, reduced in coverage or in limits except after forty-five (45) days' prior written notice by Certified Mail Return Receipt requested has been given to Owner. Such notice shall be addressed as shown in the heading of this endorsement.

C. Signature of Insurer or Authorized Representative of the Insurer

I, _____ (print/type), warrant that I have authority to bind the below listed insurance company and by my signature hereon do so bind this company.

Signature of_____
Authorized Representative (original signature required on endorsement furnished to Cedar River Water & Sewer District.)

Organization _____

Title _____

Address _____

Telephone

PERFORMANCE AND PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: THAT whereas Cedar River Water & Sewer District, Renton, Washington a municipal corporation has awarded to:

_____

(Contractor)

hereinafter designated as the "Principal" a contract for work items, which contract consists of the Proposal/Agreement, together with the Contract Documents, Specifications, Addenda and Plans, all as hereto attached and made a part hereof, and more particularly described as:

Fairwood No. 2 Reservoir

and whereas said principal is required under the terms of said contract to furnish a bond for the faithful performance of said contract:

NOW, THEREFORE, we the Principal and _____, a corporation, organized and existing under and by virtue of the laws of the State of Washington, and duly authorized to do business in the State of Washington as surety, are firmly bound unto Cedar River Water & Sewer Districty in the sum of _____ dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that if the above bonded principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in said contract, and shall faithfully perform all the provisions of such contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, at the time and in the manner therein specified; and shall pay all laborers, mechanics, subcontractors and materialmen, and all persons who shall supply such person or persons, or subcontractors, with provisions and supplies for the carrying on of such work on his or their parts; and shall indemnify and save harmless the Owner's Engineer, its officers and agents, from any loss or damage occasioned to any person or property by reason of any carelessness or negligence on the part of said principal, or any subcontractor, in the performance of said contract or any modifications thereof; and shall further indemnify and save harmless Cedar River Water & Sewer District, its officers and agents, from any damage or expense by reason of failure of performance as required by said contract, or any modifications thereof, or from defects appearing or developing in the material or workmanship provided or performed under said contract, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

And the said surety, for value received, hereby further stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any change, extension of time, alternations or additions to the terms of the Contract or the work or to the Specifications. This Bond is provided pursuant to and shall be construed in accordance with Ch. 39.08 RCW.

IN WITNESS THEREOF, the said Principal and the said surety caused this bond and three (3) counterparts thereof to be signed and sealed by their duly authorized officers, this _____ day of _____, 20__.

_____
Principal

By _____

Title _____

ATTEST (If Corporation) WITNESSES (If Individual or Partnership)

_____ _____

_____ _____

CORPORATE SEAL

By _____

Title _____

APPROVED AS TO FORM

Surety _____ _____

By _____ By _____

(Attorney for _____)

Address of local office and agent of Surety Company is:

_____

_____

_____

CERTIFICATION OF INDUSTRIAL INSURANCE PAID AND REQUEST FOR RELEASE

Prior to beginning the project the following shall be completed and copied to the Owner:

- "**Statement of Intent to Pay Prevailing Wages**" (Actual form shall be obtained from the State)
- If Contractor is self-insured, provide proof via letter correspondence from *Labor and Industries Self-Insured Certification Services* stating self-insurance is in good standing and will be for duration of the project.

Prior to project closeout and release of retainage the Contractor shall provide the Owner with the following information for all work on the project *including* subcontractors work:

- Complete and submit the State form "**Affidavit of Wages Paid**" (Actual form shall be obtained from the State)
- Provide a copy of the **Worker's Compensation Rate Notice** from the Washington State Department of Labor and Industries
- Complete and submit the statement provided below certifying that all industrial insurance has been paid for all work performed on this project

Certification of Industrial Insurance Paid

I _____ (Contractor) hereby certify that all industrial insurance has been paid to the State of Washington as required by law for all work on this project including the work of subcontractors and that the Owner shall be indemnified and held harmless from any and all claims arising from disputes over payment of industrial insurance with the State or any other person or entity.

Signature _____ ***Date*** _____

Business Name_____

L & I Account ID_____

Unified Business ID (UBI)_____

PREVAILING WAGES

PREVAILING WAGES

Prevailing wage rates for this project area and size can be found at the Washington State Department of Bureau of Labor Industries or on the internet at:

https://secure.lni.wa.gov/wagelookup/

The January 1, 2026 prevailing wage rates for public works contracts in Washington are contained in the following publications: The January 1, 2026 Prevailing Wage Rates for Public Works Projects in the state of Washington. Such publications can be reviewed at the above-listed website and are hereby incorporated as part of the contract documents by reference.

This project is located within King County.

A printed version of the wage rates is available for viewing in the District office at 18421 SE Petrovitsky Rd., Renton, WA, 98058; and a hard copy can be provided upon request.

Federal Davis-Bacon wage rates for this project area and size shall follow WA 20250125 or equal.

GENERAL CONDITIONS

GENERAL CONDITIONS

01. Scope

These are general conditions to all contracts.

02. Definitions

The following terms as used in this Contract shall be defined and interpreted as follows:

A. "Approximate": Generally as shown or described, but has not been verified, or may require adjustment. No level of accuracy is implied or should be assumed.

B. "Conflict of provisions": In the event of any conflict between any provision or requirement of the component parts of this Contract, the component part having the highest order of sequence, as established in paragraph B, shall govern.

C. "Contract" or "this Contract": The particular contract executed by Contractor and Owner, of which these General Conditions are integral parts.

D. "Contract Documents": Contract Documents shall consist of the following, and in case of conflicting provisions, the first mentioned shall have precedence:

- Change Orders or Supplemental Drawings and Instructions After the Agreement is Signed
- Addenda
- Agreement
- Instructions to Bidders
- Special Provisions or Supplemental Provisions to the Standard Specifications
- Plans
- Technical Specifications
- Owner's Standard Details (See also section 05 of these General Conditions)
- General Conditions
- Performance and Payment Bond

E. "Contract price": Either the unit price, the unit prices, or lump sum price or prices named in the proposal, or in properly executed change orders.

F. "Contractor": The person, partnership, firm or corporation contracting to do the work under these Contract Documents. Term shall also include Contractor's agents, employees, and subcontractors. Legal address is shown in the proposal.

G. "Contractor's equipment": All items of materials or equipment remaining in Contractor's ownership and removed from the site upon completion of the project.

H. "Engineer": The Owner's utilities Engineer or his duly authorized assistants, which includes chief Engineer and project Engineer and/or inspectors, acting as agents for Owner in the administration of this Contract, for the benefit of Owner in accordance with Contract Documents. Legal address of Engineer and the names of the chief Engineer and project Engineer are shown in the information for bidders.

I. "Equipment": The machinery, accessories, appurtenances, and manufactured articles to be furnished and/or installed under the Contract.

J. "Final Acceptance": When the contract work is complete and the Owner has full use and benefit of the facilities, and all minor incidental work including replacement of temporary substitute facilities, correction or repair and all punch list items are complete to the satisfaction of the Owner, the Owner may determine Final Acceptance of the contract work. The Engineer or Owner may notify the Contractor in writing of the Final Acceptance date.

K. "Item": A convenient subdivision of work under these Specifications, as herein separately described.

L. "Lowest Responsive Bidder": In addition to price, the Owner shall determine the lowest responsible bidder taking into consideration factors such as:
(a) The **ability, capacity, and skill** of the bidder to perform the contract or provide the service required;
(b) The character, integrity, **reputation**, judgment, **experience**, and **efficiency** of the bidder;
(c) Whether the bidder can perform the contract within the time specified;
(d) The **quality of performance of previous contracts** or services;
(e) The previous and existing compliance by the bidder with laws relating to the contract or services;
(f) Such **other information** as may be secured **having a bearing on the decision** to award the contract

M. "Major contract (bid) item": Any item whose contract price exceeds 10% of the total contract price, as determined by original proposed quantities and unit contract prices.

N. "Material or materials": Machinery, manufactured articles, materials of construction (fabricated or otherwise) and any other classes of material to be furnished in connection with the Contract.

O. "Owner": The entity that is a part of this Contract, contracting under the official name set forth in the agreement.

P. "Or equal": Any manufactured article, material, method, or work which, in the opinion of Engineer, is equally desirable or suitable for the purposes intended in these Specifications and Contract, as compared with similar articles specifically mentioned herein.

Q. "Plans": All official drawings or reproductions of drawings made or to be made pertaining to the work provided for in the Contract, or to any structure connected therewith.

R. "Points": Marks, benchmarks, reference points, stakes, hub, tacks, etc., established by Engineer for maintaining horizontal and vertical control of the work.

S. "Project": The structure or improvement to be constructed in whole or in part through the performance of the Contract.

T. "Proposal": The approved proposal form upon which the bidder is to submit, or has submitted, his proposal or bid for performing the work contemplated.

U. "Proposed": When used in the Contract documents including the plans, technical specifications or special provisions, the word refers to work that is part of the Contract and to be performed by the Contractor.

V. "Reference Specifications": The Technical Specifications of other agencies incorporated or referred to herein.

W. "Specifications": The prescribed directions, requirements, explanations, terms and provisions pertaining to the various features of the work to be done, or manner and method of performance, and the manner and method of measurements and payments. They also include directions, requirements, and explanations as set forth on the Plans.

X. "Standard Specifications": The Standard Specifications for Road, Bridge and Municipal Construction as prepared by the Washington State Department of Transportation, most current version at the time of the bid advertisement.

Y. "Substantial Completion": When the contract work has progressed to the extent that the Owner has full use and benefit of the facilities, both from the operational and safety standpoint, and only minor incidental work, replacement of temporary substitute facilities, or correction or repair remains to physically complete the total contract, the

Engineer may determine the contract work is substantially complete. The Engineer will notify the Contractor in writing of the substantial completion date.

Z. "Supplemental drawings and instructions" All details or drawings prepared and issued by the Engineer subsequent to the signing of the Contract, providing further explanation or amplifications of the Contract Drawings, or for the revision of the same, all as herein provided. The Engineer may furnish, at their sole discretion, upon written request of Contractor, with reasonable promptness, additional instructions by means of drawings or documents necessary, in the opinion of the Engineer, for the proper execution of the work. All such drawings and instructions shall be consistent with the Contract Documents.

AA. "Surety": Any firm or corporation executing a surety bond or bonds payable to Owner, securing the performance of the Contract either in whole or in part.

BB. "Time limits": All time limits stated in Contract Documents are of the essence of the Contract.

CC. "Work": All efforts necessary to procure, purchase, manufacture and deliver the machinery, equipment and material and/or the furnishings of all labor, tools, materials, equipment, construction equipment, working drawings, where required, and other necessities for the construction or erection of the improvements shown and called for in the Plans, Specifications and Contract, and the act of constructing or erecting said improvements complete.

DD. "Working Days": Every day will be counted as a working day unless it is a nonworking day or an Engineer determined unworkable day. A nonworking day is defined as a Saturday, a Sunday, a day on which the contract specifically suspends work, or one of the following holidays:

January 1
Third Monday of January
Third Monday of February
Memorial Day
July 4
Labor Day
November 11
Thanksgiving Day
The day after Thanksgiving
Christmas Day

If any of these holidays fall on a Saturday, the preceding Friday shall be a nonworking day. If the any of the holidays fall on a Sunday, the following Monday shall be a nonworking day.

The days between December 25 and January 1 will be classified nonworking days, provided that the Contractor actually suspends work on the project.

An unworkable day is defined as a partial or whole day the Engineer declares to be unworkable because of weather, conditions caused by the weather, or such other conditions beyond the control of the Contractor that prevents satisfactory and timely performance of the work, and such performance, if not hindered, would have otherwise progressed toward physical completion of the work. Unless the contract specifically states elsewhere that weather conditions will not affect the number or working days, or that an allowance for weather conditions is already provided in the number of working days.

EE. "Words and phrases": Whenever the words, "as directed", "as required", "as permitted", or words of like effect are used, it shall be understood that the direction, requirements or permission of Owner and Engineer is intended. Words, "sufficient", "necessary", "proper", and the like shall mean sufficient, necessary, or proper in the judgment of Owner and Engineer. Words, "approved", "acceptable", "satisfactory", or words of like importance shall mean approved by, or acceptable to, the Owner and Engineer.

03. Abbreviations

Whenever the following abbreviations are used on the Plans, Specifications, Proposals and Contracts, they shall be construed to mean the words and terms as listed below:

A	acre
AC	asbestos cement or acre
AF	acre-feet
ADJ	adjust
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AITC	American Institute of Timber Construction
ANSI	American National Standard Institute
Asp. Pav.	asphalt pavement
Asp. Conc. Pav.	asphalt concrete pavement
ASTM	American Society for Testing and Materials
ATB	asphalt treated base
ave	avenue
AWS	American Welding Society
AWWA	American Water Works Association
bk	book
blvd	boulevard
bo	blow off
cb	catch basin
cb. Inlet	curb inlet
ci	cast iron
cip	cast iron pipe
civb	cast iron valve box
cl	centerline
cmp	corrugated metal pipe
cmu	concrete masonry unit
conc.	concrete
conc. Cb.	concrete curb
conc. Pav.	concrete pavement
conc. Ret. Wall	concrete retaining wall
conc. Sew.	concrete sewer
cond.	conduit
conn	connect
cr	cross
ctb	cement treated base
c to c	center to center
cu	cubic
ddwsp	double dipped and wrapped steel pipe
DFPA	Douglas Fir Plywood Association
dw	drive or driveway
e	east
elev.	elevation
ex, exist.	existing
exc	excavation
fbm	foot board measure
fh	fire hydrant
fl	flange
ft, ft2, ft3	foot, square feet, cubic feet
ga	gauge
gip	galvanized iron pipe
gpad	gallons per acre day

gph	gallons per hour
gpm	gallons per minute
g stl p	galvanized steel pipe
gv	gate valve
hyd	hydrant
hyd ext	hydrant extension
id or dia	inside diameter
in, in2, in3	inch, square inch, cubic inch
inl	inlet
l	length
lbs	pounds
lf	lineal feet
LTF	length to fit
max	maximum
mb	mail box
mc	monument case
min	minimum
mgd	million gallons per day
mh	manhole
mj	mechanical joint
n	north
nic	not in contract
no.	number
nrs	non rising stem
od	outside diameter
pav	pavement
pc	point of curvature
pjm	premolded expansion joint material
pl	property line
pl	place
plk	planking
pos	position
pp	power pole
pri	primary
prop	proposed
psf	pounds per square foot
psi	pounds per square inch
pt	point of tangency
r	radius
rc	reinforced concrete
rcp	reinforced concrete pipe
rem	remove
repl	replace
rs	rising stem, resilient seat
s	south
sec	secondary
s	sewer
sp	special
sq	square
ss	side sewer or sanitary sewers
SSPC	Steel Structure Painting Council
std	standard
temp	temporary
trans	transformer
USAS	U.S.A. Standards
vc	vertical curve
v ch	valve chamber

vg	vertical grain
w	west or watermain
wm	water meter
APWA	American Public Works Association
WSDOT	Washington State Department of Transportation
wsp	wood stave pipe
yd	yard

04. Execution, Correlation and Intent of Documents

A. Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. Intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work except where material or equipment is specifically excepted. Materials or work described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

B. It is intended that work not covered under any heading, section, branch, class or trade of the Specifications shall be supplied if it is shown on the drawings or is reasonably inferable as being necessary to produce the intended results. Minor items of work or material omitted from the original Plans or Specifications, but clearly inferable from the information presented and which are called for by accepted good practice shall be provided and/or performed by Contractor as part of his original cost.

C. Where Contract Documents refer to referenced Specifications, such specifications shall be applicable to technical provisions only, unless otherwise designed.

05. Plans and Specifications - Omissions and Discrepancies

Upon receipt of award of Contract, Contractor shall carefully study and compare all Plans, Specifications and other instructions, and shall, prior to ordering material or performing work, report in writing to Engineer any error, inconsistency or omission in respect to design, mode of construction or cost which he may discover. If Contractor, in the course of this study or in the accomplishment of the work, finds any discrepancy between the drawings and the physical condition of the locality as represented in the drawings, or any such errors or omissions in respect to design, mode of construction or cost in drawings or in the layout given by points and instructions, it shall be his duty to inform Engineer immediately in writing and Engineer shall promptly check the same. Any work done after such discovery, until correction of drawings or authorization of extra work is given, if Engineer finds that extra work is involved, will be done at Contractor's risk. If extra work is involved, the procedure shall be as provided in changes in the work.

The Owner's standard construction plans and details are incorporated into the contract documents by reference, whether physically included in the contract set or not. It is the bidder's responsibility to contact the Owner to obtain a set of standard details. Order of precedence is identified in Section 02 of these General Conditions.

06. Examination of Site of Work

Before submitting his bid, the bidder shall examine the site of the work and ascertain for himself all the physical conditions in relation thereto. Failure to do this shall not relieve the bidder from entering into a contract nor excuse him from performing the work in strict accordance with the terms of the Contract and Specifications. The bidder will not be entitled to additional compensation if he subsequently finds the conditions to require other methods or equipment that he did not anticipate in making his unit contract bid prices.

Any statement or representation made by an officer, agent or employee of Owner with respect to the physical conditions pertaining to the site of the work shall not be binding upon Owner.

07. Status of Engineer

A. Engineer shall act as advisor and consultant to represent Owner in engineering matters relating to the Contract, provided, however, nothing contained herein or elsewhere in Contract Documents shall be construed as requiring Engineer to direct the method or manner of performing any work by Contractor under this Contract. Owner, or his duly authorized official, has authority to stop the work whenever, in his opinion, such stoppage may be necessary to ensure the proper execution of the Contract. Engineer may reject all work and materials which, in his opinion, do not conform to the Contract.

B. It is understood and agreed by and between the parties hereto that the work included in the Contract is to be done to the complete satisfaction of Engineer, or his duly authorized representative, and that the decision of Engineer as to the true construction and meaning of the Contract, Plans, Specifications, and estimates, and as to all questions arising as to proper performance of the work shall be final. Engineer shall determine the unit quantities and the classification of all work done and materials furnished under the provisions of this agreement and his determination thereof shall be final and conclusive and binding upon Contractor.

C. Engineer shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the rate of progress of the work, and all questions as to acceptable fulfillment and performance of the Contract on the part of Contractor and as to compensation. Decision of Engineer in such matters shall be final.

D. Engineer may direct the sequence of conducting work when it is in locations where Owner is doing work either by Contract or by his own forces, or where such other works may be affected by the contract, in order that the conflict may be avoided and the work under these Specifications be harmonized with that under other contracts, or with other work being done in connection with, or growing out of, operations of Owner. Nothing herein contained, however, shall be taken to relieve Contractor of any of his obligations or liabilities under the contract.

E. Neither Engineer nor his representatives have authority to waive the obligation of Contractor to perform the work in accordance with Contract Documents. Failure or omission on the part of Engineer or his representatives to condemn unsuitable, inferior or defective work and/or labor or material or equipment furnished under the Contract shall not release Contractor or his bond from performing the work in accordance with Contract Documents.

F. All correspondence from the Contractor shall be directed to the Project Engineer. All correspondence from the Contractor constituting any notice of protest, notice of dispute, or other correspondence constituting notification required to be furnished under the Contract, must be in paper format, hand delivered or sent via mail delivery service to the Project Engineer's office. Electronic copies such as e-mails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract. Electronic correspondence may be used for other communications unless explicitly prohibited elsewhere in the contract. The Contractor is responsible for following up with the recipient to verify that any electronic correspondence has been received. Neither the Engineer nor Owner is responsible for failure of electronic correspondence to reach the desired destination.

08. Engineer's Decision

A. Engineer shall, within a reasonable time after presentation of written claims by Contractor to him, make decisions in writing on all claims and on all matters relating to the execution and progress of the work or the interpretation of Contract Documents. Contractor must make all claims in writing. Notice of all claims shall be addressed to the Engineer at the address of Engineer given in the Contract Documents.

B. All the decisions of Engineer shall be final, except in cases where disputed time and/or increase of the contract price is involved, which, if no agreement in this regard thereto is reached, shall be subject to determination by a court of competent jurisdiction. In respect to performance of the work prior to any such determination, if Contractor does proceed with the work which is the subject of dispute, he does so at his own risk pending such determination.

09. Contractor's Representations and Warranty

In making a proposal under these Contract Documents, Contractor represents and warrants that he has satisfied himself as to construction conditions by personal examination of the Plans, Specifications, site of the proposed work, and by appropriate examination and investigation as to the nature of the soil and construction problems which may be encountered by reason thereof. Contractor also warrants and represents himself to be experienced and an expert in the construction contemplated. Contractor further understands that in making the contract award, Owner is relying upon the representations and warranties of Contractor herein contained.

10. Inspection and Tests

A. Engineer and his representatives shall at all times have access to the work to observe the progress and quality wherever it is in preparation or progress, and Contractor shall provide proper facilities for such access and for necessary inspection testing. If any work shall be covered up without approval or consent of Engineer, it must, if required by Engineer, be uncovered for inspection at Contractor's expense. After inspection, a reexamination of questioned work may be ordered by Engineer, and if so ordered, the work shall be uncovered by Contractor. If such work is found by Engineer to be in accordance with Contract Documents, Owner shall pay the cost of reexamination and replacement. If such work is not found in accordance with Contract Documents, Contractor shall pay such costs.

B. Contractor shall make reasonable tests of the work at Contractor's expense upon Engineer's request, and shall maintain a record of such tests. Prior to the time scheduled for a performance test to be observed by Engineer, Contractor shall make whatever preliminary tests are necessary to assure that the material and/or equipment are in accordance with the Specifications. If, for any reason, the test observed by Engineer is unsatisfactory, Contractor shall pay all costs incurred by Engineer for the inspection of the unsatisfactory test in the manner specified for liquidated damages.

C. Should Contractor elect to work more than 8 hours per day, or more than 5 days per week, or on holidays, during the course of the stated contract time limit, all costs of Engineering and inspection thus entailed will be charged to Contractor, at 2 times payroll costs. Such charges will be billed directly to Contractor by Owner and said cost shall be a lien against Contractor's work. In the event Contractor fails to pay said bill or bills by the 30th day of the month billed, such payments may be handled in accordance with the *Payments Withheld* section of these Specifications. In addition to the above, where the inspector furnished for the project is an employee of Owner, Contractor shall reimburse Owner for all inspection time required on holidays which are a part of Owner's normal holiday schedule.

D. Where specifications, Engineer's instructions, laws, ordinances or any government authority require any work to be specially tested, or inspected, Contractor shall give Engineer timely notice that such test of completed work is ready for inspection. If the inspection is by another authority than Engineer, Contractor shall give Engineer timely notice of the date fixed for such inspection. Required certificates of inspection by authority other than Engineer shall be secured by Contractor.

11. Final Inspection and Acceptance

All materials and completed work are subject to final inspection by Engineer before acceptance by Owner. Engineer may require and shall have the right to subject all machinery and equipment and work to such test, as in his opinion, will assist in determining whether the Contract has been performed in accordance with Contract Documents. All such tests shall be at the expense of Contractor.

See Definitions section above for definition of Final Acceptance.

12. Plans and Specifications

A. Contractor will be furnished three copies of the Plans and Specifications and shall keep at least one copy of the same constantly accessible at the construction site.

B. Where shop drawings are required to be submitted for acceptance, one copy of the approved shop drawings shall be kept constantly accessible at the construction site.

13. Ownership of Drawings

All Plans, Specifications and copies thereof prepared or furnished by Engineer are his or owner's property. They are not to be used on other work, and with the exception of the signed contract set, upon request are to be returned to him upon completion of the work.

14. Notice of Award

A. A notice of award will be forwarded by the Owner to the successful Contractor, which notice will also state the date of a pre-construction conference to be held between Engineer and Contractor. Notice of award will be accompanied by the agreement to be signed by Contractor and returned to Owner within ten (10) days from receipt, along with the following items:

- Progress schedule
- Public liability insurance policy
- Performance bond
- Materials list
- Schedule for values of lump sum work

B. Award of contract, if made, will be made to the lowest responsible bidder. No award will be made until necessary investigations are made by Owner as to the responsibility of the apparent low bidder. Owner shall be the sole judge as to the responsibility of the bidder to satisfactorily perform the work as specified and within the time limit set. Upon failure of Contractor to enter into a Contract and to submit documents listed above within ten (10) days after receiving notice of award, the bid deposit shall be forfeited to Owner. Award may then, at the discretion of Owner, be made to the next lowest responsible bidder or the work may be re-advertised, or may be constructed by Owner, in any legal manner.

15. Notice to Proceed

Notice to proceed is the official notice from Engineer on behalf of Owner to Contractor to commence prosecution of the work, and commences the running of the time for completion of the work. Notice to proceed will generally be given within two weeks of notice to Contractor of award of contract. No work shall be commenced by Contractor prior to receipt of notice to proceed.

16. Work Hours

Except in the case of emergency or unless otherwise approved by the Contracting Agency, the normal straight time working hours for the contract shall be any consecutive 8-hour period between 7:00 a.m. and 3:00 p.m. of a working day with a maximum 1-hour lunch break and a 5-day work week. The normal straight time 8-hour working period for the contract shall be established at the preconstruction conference or prior to the Contractor commencing the work.

If a Contractor desires to perform work on holidays, Saturdays, Sundays, or before 7:00 a.m. or after 3:00 p.m. on any day,

the Contractor shall apply in writing to the Engineer for permission to work such times. Permission to work longer than an 8-hour period between 7:00 a.m. and 3:30 p.m. is not required. Such requests shall be submitted to the Engineer no later than noon on the working day prior to the day for which the Contractor is requesting permission to work.

Permission to work between the hours of 10:00 p.m. and 7:00 a.m. during weekdays and between the hours of 10:00 p.m. and 9:00 a.m. on weekends or holidays may also be subject to noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the Contracting Agency's noise control regulations or complaints are received from the public or adjoining property owners regarding the noise from the Contractor's operations. The Contractor shall have no claim for damages or delays should such permission be revoked for these reasons.

Permission to work Saturdays, Sundays, holidays or other than the agreed upon normal straight time working hours Monday through Friday may be given subject to certain other conditions set forth by the Contracting Agency or Engineer. These conditions may include but are not limited to: requiring the Engineer or such assistants as the Engineer may deem necessary to be present during the work; requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency employees who worked during such times, on non Federal aid projects; considering the work performed on Saturdays, Sundays, and holidays as working days with regards to the contract time; and considering multiple work shifts as multiple working days with respect to contract time even though the multiple shifts occur in a single 24-hour period. Assistants may include, but are not limited to, survey crews; personnel from the Contracting Agency's material testing lab; inspectors; and other Contracting Agency employees when in the opinion of the Engineer, such work necessitates their presence.

17. Progress Schedule

A. Progress schedule shall set forth the order in which Contractor plans to perform the work. Schedule may be in graph or tabular form, and shall include the date of submission for approval of drawings as may be required, starting dates for construction of the several parts of the work, and estimated completion dates of such parts, and completion date of the project.

B. Progress schedule shall coordinate the work of Contractor with the work of other contractors in respect to the availability of job sites upon completion of other work to be performed by other contractors. Progress schedule may be altered or revised by Engineer in the interest of public safety, welfare or the interest of Owner, or for coordination with any other activity of other contractors, the availability of all or portions of the job site, or special provisions of this contract, or to reasonably meet the completion date of the project.

C. Contractor shall promptly report to Engineer any conditions which Contractor feels will require revision of the schedule and shall promptly submit proposed revisions in the progress schedule for acceptance by Engineer. Revised schedule shall be followed by Contractor.

D. Progress schedule will be reviewed at the pre-construction conference between Engineer and Contractor. Contractor shall furnish Engineer with three (3) copies of the accepted progress schedule prior to commencement of the work.

18. Schedule for Values of Lump Sum Work

If payments are to be made on lump sum items, Contractor shall submit a preliminary schedule of values of the various parts of work, including quantities, aggregating the total sum of the contract, made out in such form as Owner may require, and if required, supported by such evidence as to its correctness as Owner or Engineer may direct. Owner shall further modify the schedule at their discretion to adequately account for work progress. Owner finalized schedule shall be final and used as the basis for certificates for payments for lump sum work. Contractor shall submit estimates of the percentage of work completed, and payment will be based upon the Owner finalized schedule of values for the work.

19. Pre-Construction Conference

A. A pre-construction conference shall be held at a time and place fixed by Engineer which will be within two weeks from date of notice of award. Contractor must be prepared for a thorough discussion and review, as well as revision which may be deemed necessary in the opinion of Engineer, of the following:

- Progress schedule
- Materials list
- Product data
- Equipment list
- Job procedures
- Inspection procedures
- Plans and Specifications
- Shop drawings
- Supplemental drawings
- Preliminary Schedule of value of lump sum work
- Subcontractor lists
- Other matters pertaining to performance of the work

B. Acceptance by Engineer of the progress schedule shall not in any event excuse Contractor of the obligation to complete the work within the time specified in the agreement or of complying with all terms, conditions and provisions of Contract Documents. Failure of Contractor to follow the progress schedule submitted and accepted, including revisions thereof, shall relieve Owner of any and all responsibility for furnishing and making available all or any portion of the job site from time to time, and will relieve Owner of any responsibility for delays to Contractor in the performance of the work.

C. The following personnel must attend the Conference:
- The person representing the Contractor with contract authority
- The project site superintendent
- Major subcontractor site superintendents
- The Owner and their representative shall be present

D. The Owner may require that some subcontractors attend a pre-construction conference prior to beginning work on this project. In the event that subcontractors have not been selected prior to the general pre-construction conference, or various subcontractors do not attend the general pre-construction conference, a second pre-construction conference will be scheduled for these subcontractors. If requested, a subcontractor may not begin work until attending a pre-construction conference.

20. Material and Equipment - Material and Equipment List

A. All materials and equipment shall be new and shall be as specified in Contract Documents, or, if not specified, shall be of a quality approved by Engineer. All materials and equipment furnished are warranted by Contractor as new and in accordance with the Plans and Specifications, if specified therein, and as suitable for the intended purpose. In addition thereto, Contractor shall furnish Owner with copies of the supplier's warranty, and adopt the same as the warranty of Contractor, and shall also be liable thereon to Owner.

B. For each proposed substitution Contractor shall submit samples, descriptive and technical data, and reports of tests to Owner for approval. Contractor shall also indicate the difference in contract cost by reason of the proposed substitution. No substitute items shall be furnished or installed without Owner's written approval. Contractor shall reimburse Owner for any additional Engineering charges and for any charges for changes in the work of other contractors resulting from substitutions.

C. Contractor shall file three (3) copies of a material and equipment list with Engineer prior to the pre-construction conference. This list shall include the quantity, manufacturer, and model number, if applicable of materials and equipment to be installed under the contract. This list will be checked by Engineer as to conformity with the Plans and Specifications. Engineer will pass upon the lists with reasonable promptness, indicating required corrections. Contractor shall make any required corrections and file two (2) corrected copies with Engineer within one week after receipt of the required corrections. Engineer's review and acceptance of the lists shall not relieve Contractor from responsibility for suitability for the intended purpose nor for deviations from the Plans and Specifications unless Contractor has in writing called Engineer's attention to such deviations at the time of submittal, and secured Engineer's written approval for such deviation.

D. In the event that Contractor shall request, or submit, an alternate design, or designs for some portions of his work, Engineer will consider such alternate designs with reasonable promptness. Such request for either a design review from alternate plans submitted by Contractor, or request for a redesign initiated by Contractor as set forth above shall be made in writing to Engineer. When Contractor submits plans for an alternate design it shall be in the form of reproducible drawings.

Provided that such proposed alternate design or requested redesign appears reasonable and satisfactory to Engineer, Engineer will perform an Engineering review of the proposed alternate design or if requested by Contractor, Engineer will perform an Engineering redesign of the work to assure its compatibility within the framework of the complete operating unit or system ready for use between the contract limits.

Cost of Engineering review of the proposed alternate, or the cost of an Engineering redesign as requested by Contractor will be billed to Contractor by Engineer at the rate of two times Engineer's direct payroll costs, plus direct expenses directly attributable to the work.

E. Hourly rates for each piece of equipment used on the job shall be provided to the Owner. Equipment rates shall be per the most recent AGC/bluebook compilation.

21. Shop Drawings

Shop drawings shall be per Division 1 of the Technical Specifications.

Engineer's acceptance of such drawings or schedules shall not relieve Contractor from responsibility for deviation from Plans or Specifications, unless Contractor has in writing called Engineer's attention to such deviation at the time of submission, and secured Engineer's written approval, nor shall it relieve Contractor from responsibility for errors in shop drawings or schedules.

22. Cutting and Fitting

Contractor shall do all cutting and fitting of his work that may be required to make its several parts come together properly, and fit it to receive or be received by work of other contractors shown or reasonably implied by the Plans and Specifications for the completed structure. Contractor shall restore all surfaces damaged by cutting and fitting as Engineer may direct.

23. Labor, Materials, Equipment, Facilities, and Workmen

A. Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary for the execution and completion of the work, except as otherwise stipulated in Contract Documents.

B. Contractor shall satisfy himself as to the character of the work and quantities of materials required to complete the project. Quantities in the bid documents are approximate and payment will be made for the exact quantities measured in accordance with the measurement and payment section of this contract.

C. Contractor shall, at all times, enforce strict discipline and good order among his employees and shall not employ on the work any person unfit or not skilled in the work assigned to him. Employees or agents of Contractor who, in the opinion of Engineer, may impair the quality of the construction shall forthwith be discharged by Contractor upon the written request of Engineer.

D. During the term of this contract, neither party shall employ nor hire any employee of the other party, nor of Engineer, without the written consent of the other party or of Engineer. Contractor shall not use any work performed or any information obtained from any employee hired in violation of this provision in making a claim against Owner or Engineer and shall also be liable to Owner as liquidated damages in an amount equal to double the amount of salary or wages paid to any such employee so hired in violation hereof.

E. Necessary sanitation conveniences for the use of workmen on the job, properly secluded from public observation, shall be provided and maintained by Contractor.

24. Materials and Equipment Furnished by Owner

Contractor shall receive, inspect and accept all Owner-furnished items of material and equipment, subject only to latent defects. Claims by Contractor to Owner shall be made in writing within five (5) days after discovery of any latent defect. In any event, the liability of Owner to Contractor for furnishing an item having a latent defect is limited to damages or loss resulting from use thereof only to extent that such loss or damage is recoverable by Owner against the supplier.

Contractor shall supply the Owner with a detailed account of any loss associated with the latent defect. Owner shall include in their claim the amount of damage identified by the Contractor. The Owner shall be responsible for pursuing the claim against the supplier of the materials provided to the Owner used/installed by the Contractor. The Contractor agrees to cooperate with Owner in furnishing facts or data to assist the Owner in prosecuting such action.

25. Samples

Contractor shall furnish for approval all samples as directed by Engineer. Finished work shall be in accordance with approved samples. Approval of samples by Engineer does not relieve Contractor of performance of the work in accordance with Contract Documents.

26. Determination of "Or Equal"

Engineer shall be the sole judge in the question of "or equal" of any supplies or materials proposed by Contractor. Contractor shall pay Owner the cost of tests and evaluations by Engineer to determine acceptability of alternates proposed by Contractor, in accordance with the established rates of Engineer for time and expense work, the total cost of which may be offset by Owner against the contract price.

27. Royalties and Patents

Contractor shall be liable for all suits brought against Owner by reason of infringement of patent rights or licenses on any materials, machine, appliance or process he may use on the work or incorporate into the finished job, except where specifically exempted by this Contract. Prices named in the proposal shall include payment of royalties, if any. Contractor shall defend and hold Owner harmless from any such suit, costs of defense and any judgment which may be made or entered against Owner thereon.

28. Lands for Work

Owner will furnish all lands and rights-of-way necessary for carrying out this Contract and completion of the work herein contemplated, and will use due diligence in acquiring said lands and rights-of-way as speedily as possible. It is possible that all lands and rights-of-way may not be obtained as herein contemplated before construction begins, in which event Contractor shall begin his work upon such land and rights-of-way as Owner may have previously acquired and no claim for damages whatever will be allowed by reason of the delay in obtaining the remaining land and rights-of-way. Should Owner be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the giving of notice to proceed by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for said work, Contractor shall not be entitled to any damages, costs, expenses, additional compensation or loss of profits by reason of said delay, or to withdraw from the Contract except by consent of Owner. Time for completion of the work due to the time lost by such delay shall be extended by Owner in writing if so requested by the Contractor. Contractor may terminate the Contract as provided in paragraph 45.

29. Surveys, Permits, Laws and Regulations

A. Owner shall furnish all property boundary surveys unless otherwise specified. Permits, permission under franchises, licenses and bonds of a temporary nature necessary for and during the prosecution of the work, and inspection fees in connection therewith shall be secured and paid for by Contractor as directed in the Technical Specifications. Where Owner is required to secure such permits due to Contractor's inability to secure such permits as directed in the Technical Specifications, permission under franchises, licenses and bonds and pay the fees, the costs incurred by Owner thereby shall be charged against Contractor and offset by Owner against the contract price.

B. Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work required by Contract Documents. If Contractor observes that Contract Documents or any part thereof are inconsistent or at variance therewith, he shall promptly notify Engineer in writing, and any necessary changes shall be made as provided in the Contract for changes in the work. If Contractor performs any work contrary to such laws, ordinances, rules and regulations, or prior to obtaining permits, permission under or obtained by Owner, he does so at his own risk and without payment or reimbursement therefore from Owner unless Owner shall have given written approval thereof to Contractor.

C. Wherever the law of the place of construction requires a sales, consumer, use or similar tax, Contractor shall pay such tax.

30. Points and Instructions

A. Contractor shall provide reasonable and necessary opportunities and facilities for setting points and making measurements by Engineer as set forth in the Technical Specifications. Contractor shall not proceed with the work until timely demand in writing has been made upon Engineer for, and Contractor has received from Engineer, such points and instructions. Work shall be done in strict conformity with such points and instructions.

B. Contractor shall preserve benchmarks, reference points and stakes, and, in case of destruction or removal thereof for any reason, Contractor is responsible for the resulting costs for replacement and shall be responsible for any mistakes and loss or damage arising there from which may be caused by the absence, destruction, removal or disturbance thereof.

31. Payment of Prevailing Wages

A. General

This contract is subject to the minimum wage requirements of RCW 39.12 and to RCW 49.28 (as amended or supplemented).

The Contractor, any subcontractor, and all individuals or firms required by RCW 39.12, WAC 296-17, to pay minimum prevailing wages, shall not pay any worker less than the minimum hourly wage rates and fringe benefits required by RCW 39. Higher wages and benefits may be paid.

By including the hourly minimum rates for wages and fringe benefits in the contract provisions, the Owner does not imply that the Contractor will find labor available at those rates. The Contractor shall be responsible for any amounts above the minimums that will actually have to be paid. The Contractor shall bear the cost of paying wages above those shown in the contract provisions.

B. Labor Class Not Listed

If employing labor in a class not listed in the contract, the Contractor shall request a determination of the correct wage rate for that class and locality from the Industrial Statistician, Washington State Department of Labor and Industries (State L&I). The Contractor shall provide a copy of these determinations to the Engineer.

C. Suppliers, Manufacturers, or Fabricators

The Contractor shall ensure that any firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition "Contractor" in WAC 296-127-010 complies with all the requirements of RCW 39.12.

The Contractor shall be responsible for compliance with the requirements of the DBRA and RCW 39.12 by all firms (Subcontractors, Lower Tier Subcontractors, Suppliers, Manufactures, or Fabricators) engaged in any part of the work necessary to complete this contract. Therefore, should a violation of this subsection occur by any firm that is providing work or materials for completion of this contract whether directly or indirectly responsible to the Contractor, the Owner will take action against the Contractor, as provided by the provisions of the contract, to achieve compliance, including but not limited to, withholding payment on the contract until compliance is achieved.

D. Errors in Listing Wages

In the event the Owner has an error (omissions are not errors) in the listing of the hourly minimum rates for wages and fringe benefits in the contract provisions, the Contractor, any subcontractor, any lower tier subcontractor, or any other firm that is required to pay prevailing wages, shall be required to pay the rates as determined to be correct by State L&I. A change order will be prepared to ensure that this occurs. The Owner will reimburse the Contractor for the actual cost to pay the difference between the correct rates and the rates included in the contract provisions, subject to the following conditions:

The affected firm relied upon the rates included in the contract provisions to prepare its proposal and certifies that it did so;

The allowable amount of reimbursement will be the difference between the rates listed and rates later determined to be correct plus only appropriate payroll markup the employer must pay, such as, social security and other payments the employer must make to the Federal or State Government;

The allowable amount of reimbursement may also include some overhead cost, such as, the cost for bond, insurance, and making supplemental payrolls and new checks to the employees because of underpayment for previously performed work; and

Profit will not be an allowable markup.

Firms that anticipated, when they prepared their proposals, paying a rate equal to, or higher than, the correct rate as finally determined will not be eligible for reimbursement.

E. Posting Notices

In a location acceptable to State L&I, the Contractor shall ensure the following is posted:

One copy of the approved "Statement of Intent to Pay Prevailing Wages" for the Contractor, each subcontractor, each lower tier subcontractor, and any other firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition of "Contractor" in WAC 296-127-010;

One copy of the prevailing wage rates for the project;

The address and telephone number of the Industrial Statistician for State L&I (along with notice that complaints or questions about wage rates may be directed there); and

FHWA 1495/1495A "Wage Rate Information" poster if the project is funded with Federal-aid.

F. Apprentices

Apprentice utilization requirements set forth in RCW 39.04.320 apply to this contract. If employing apprentices, the Contractor shall submit to the Engineer written evidence showing:

Each apprentice is enrolled in a program approved by the Washington State Apprenticeship and Training Council;

The progression schedule for each apprentice; and

The established apprentice-journey level ratios and wage rates in the project locality upon which the Contractor will base such ratios and rates under the contract. Any worker for whom an apprenticeship agreement has not been registered and approved by the Washington State Apprenticeship and Training Council shall be paid at the prevailing hourly journey level rate as provided in RCW 39.12.021. Contractor shall bear all costs, fees and penalties in complying with RCW 39.04.320.

G. Disputes

If labor and management cannot agree in a dispute over the proper prevailing wage rates, the Contractor shall refer the matter to the Director of State L&I. The Director's decision shall be final, conclusive, and binding on all parties.

H. Required Documents

On forms provided by the Industrial Statistician of State L&I, the Contractor shall submit to the Owner the following for itself and for each firm covered under RCW 39.12 that provided work and materials for completion of the contract:

A copy of an approved "Statement of Intent to Pay Prevailing Wages" State L&I's form number F700-029-000. The Owner will make no payment under this contract for the work performed until this statement has been received.

A copy of an approved "Affidavit of Prevailing Wages Paid", State L&I's form number F700-007-000. This form must be received by the Owner before the completion date can be established. The Owner will not release to the Contractor any funds retained under RCW 60.28.011 until the **Certification of Industrial Insurance Paid and Request for Release** form has been received by the Owner.

The Contractor shall be responsible for requesting these forms from State L&I and for paying any approval fees and insurance required by State L&I.

I. Certified Payrolls on Federal-aid Projects

Certified payrolls are required to be submitted by the Contractor to the Engineer, for the Contractor and subcontractors or lower tier subcontractors, on all Federal aid projects and, when required in writing by the Engineer, on projects funded with only District funds. If these payrolls are not supplied within ten calendar days of the end of the preceding weekly payroll period for Federal-aid projects or within ten calendar days from the dated of the written request on projects with only District funds, any or all payments may be withheld until compliance is achieved. Also, failure to provide these payrolls could result in other sanctions as provided by State laws (RCW

39.12.050) and/or Federal regulations (29 CFR 5.12) All certified payrolls shall be complete and explicit. Employee labor descriptions used on certified payrolls shall coincide exactly with the labor descriptions listed on the minimum wage schedule in the contract unless the Engineer approves an alternate method to identify the labor used by the Contractor to compare with the labor listed in the contract provisions. When an apprentice is shown on the certified payroll at a rate less than the minimum prevailing journey wage rate, the apprenticeship registration number for that employee from the State Apprenticeship and Training Council shall be shown along with the correct employee classification code.

J. Audits

The Owner may inspect or audit the Contractor's wage and payroll records.

32. Protection of Work and Safety

A. Contractor shall continuously maintain adequate protection of the work from damage and shall protect Owner's property from injury or loss arising in connection with or during the existence of this contract. He shall make good any such damage, injury, or loss, except such as may be directly due to errors in Contract Documents or caused by agents or employees of Owner. He shall adequately protect adjacent property from loss or damage occasioned by performance of the work. He shall provide and maintain all passageways, guard fences, lights and other facilities for protection required by public authority or local conditions.

B. Contractor shall bear the risk of loss or damage for all finished or partially finished work until the entire Contract is accepted by Owner.

C. The Contractor shall be responsible for the Safety of all workers on the project and shall comply with all applicable Health and Safety Standards including: Federal, State, and Local Codes as regulations. He shall erect and properly maintain, at all times, as required by the conditions and progress of the work, all necessary safeguards for protection of workmen and the public; shall post danger signs warning against known or unusual hazards; and he shall designate a responsible member of his organization on the construction site whose duty shall be the prevention of accidents. Name and position of such person so designated shall be reported in writing to Engineer by Contractor.

33. Work on Streets

Workmen shall wear proper safety equipment, hardhats, fluorescent vests, etc., in accordance with the Local Codes, WISHA and OSHA.

34. Existing Utilities or Obstructions

A. Contractor's work shall be confined to Owner's premises, including easements and construction permit limits, whenever possible. He shall not enter upon or place materials on other property except by written consent of the individual Owner and he shall save Owner harmless from all suits and actions of every kind and description that might result from his use of property other than that of Owner.

B. Contractor is directed to RCW 19.122 for responsibilities relating to locating, protecting, relocating and repair of existing underground utilities.

C. Existing utilities indicated on the drawings have been plotted from the best information available to Engineer. Source of information may consist of construction records, One-Call locates, and other data obtained verbally from officials associated with the particular utility. Verification by excavation of buried facilities has not occurred unless specifically noted. Vertical position of existing utilities, if not located or discernible from accessible structures (manholes, catch basins, valve boxes, etc.) are assumed to be in a normal depth range for such utility. Contractor shall expect to pothole ahead of main excavation to verify both horizontal and vertical locations of utilities.

Neither Owner nor Engineer guarantees the accuracy or completeness of this information and assumes no responsibility for improper locations or failure to show utility locations on the construction Plans; and it is to be understood that other above ground or underground facilities not shown on the drawings may be encountered during the course of the work. The Contractor shall carefully review the identified utilities on the Plans and compare to One-Call locates. If there are any discrepancies between the Plans and field locates, the Contractor shall bring such discrepancies to the attention of the Engineer and Utility Owner and excavation shall not commence until such discrepancies have been addressed.

Existing utilities shown on the Plans as a single line do not necessarily represent a single carrier. Where utilities are clustered, such as a dry utility duct bank, this may be represented on the Plans by a single line. No extra payment will be made for working around any such clustered utilities.

Existing utilities, whether shown on the drawings or not, shall be protected by the Contractor. Contractor shall notify Engineer and Utility Owner immediately upon determination of any conflict or disturbance. In the event that an existing utility must be removed, relocated, rerouted, is damaged or otherwise disturbed, such modification or repair shall be performed by the Utility Owner or at the Utility Owner's direction in compliance with RCW 19.122.050.

The Contractor is responsible for all costs and delays associated with damage or disturbance to an identified or located utility including unmarked services per RCW 19.122.030(5). Compensation for costs and delays attributed to utilities not located shall be settled between the Contractor and Utility Owner. The Contractor shall hold the project Owner and Engineer harmless for a utility company's failure to correctly locate their utility per RCW 19.122.

D. Right is reserved by owners of public utilities and franchises to enter upon any street, road, right-of-way or easement for the purpose of maintaining their property and for making necessary repairs or adjustments caused by Contractor's operations. Contractor shall cooperate with said owners and save Owner and Engineer harmless of any cost so incurred.

E. Pursuant to RCW 19.122, the Contractor shall call the utilities underground location center for full location of the utilities and shall not begin excavation until all known utilities have been located and marked. Contractor shall take adequate precautions to protect existing lawns, trees and shrubs outside rights-of-way, sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto. He shall, at this own expense, completely repair any damage thereto caused by his operations to the satisfaction of Engineer, unless otherwise agreed to in writing by the Engineer and affected Owner(s).

35. Replacing Improvements

Whenever it is necessary in the course of construction to remove or disturb culverts, driveways, roadways, pipelines, property stakes or other existing improvements, without limiting the generality thereof and whether on private or public property, they shall be replaced to a condition at least equal to that existing before they were so removed and disturbed, and all such costs for this replacement shall be borne by Contractor and considered incidental to the construction and work covered by these Specifications unless specific unit or lump sum pay items have been established in the Contract to cover any of the above work.

36. Traffic Maintenance and Protection

The following shall apply to traffic regulation during the extent of this contract:

- There shall be at all times adequate vehicle and pedestrian access to and egress from the properties adjacent to the project.

- During non-working hours, Contractor shall keep the existing traffic lanes clear for traffic without interference from his operations including all approaches and intersections.

- Where hazardous conditions exist, proper signing and barricading shall be provided by Contractor. Whenever directed by Engineer, supplemental signs and barricades, including lanterns and/or high rise warning devices, shall be provided at the expense of Contractor.

- Contractor shall notify the Traffic Engineering Department, Fire Department, Police Department, medic one, State Highway Department, and the school bus garage by phone or in writing before the beginning of his operations so that these agencies may re-route their emergency and service vehicles around the construction zone.

- Any asphalt concrete pavement, crushed surfacing or gravel base required for maintaining traffic during the life of this Contract shall be furnished and placed by Contractor immediately upon request by Engineer in amounts designated and shall be at no additional cost to Owner.

- Owner shall not be held liable for any claims resulting from accidents or damages caused by Contractor's failure to comply with traffic and public safety regulations during the construction period.

- If operations of Contractor are shown to significantly impede traffic flow during peak hours of traffic, Engineer shall have the authority to restrict Contractor's to time of operation on the street.

- The Contractor shall notify property owners a minimum of 24 hours in advance of a driveway closure. Driveway access shall be provided at all times during non-working hours.

37. Superintendence and Supervision

Contractor shall keep a competent superintendent on the construction site during the progress of the work and any necessary assistants, all satisfactory to Engineer. Superintendent shall not be changed except with the consent of Engineer, unless the superintendent proves to be unsatisfactory to Contractor and ceases to be in his employ. Superintendent shall represent Contractor in his absence. Instructions to Contractor shall be confirmed in writing upon his request in each case. Contractor shall give efficient supervision to the work, using his best skill and attention.

38. Changes in the Work

A. Except as limited by the section titled "Increase or Decrease of Work", Owner, without invalidating the contract, may order extra work or make changes by altering, adding to or deducting from the work, the Contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract, except that any claim by Contractor for extension of time caused thereby shall be made at the time such change is ordered.

B. In giving instructions, Engineer shall have authority to make minor changes in the work, not inconsistent with the purposes of the work. Except in any emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by Engineer and countersigned by Owner, and no claim for an addition to the Contract sum shall be valid unless so ordered.

C. Value of any such extra work shall be determined in one or more of the following ways:

1. By estimate and agreement on a lump sum.

2. By unit prices named in the Contract or subsequently agreed upon.

3. If, for any reason, method 1 or 2 cannot be agreed upon, such work will be paid for as described under the section titled “Force Account”.

39. Increase or Decrease of Work

A. Owner reserves the right to make such alterations in the Plans or in the quantities of work as may be considered necessary. Such alterations shall be in writing by Engineer and shall not be considered a waiver of any condition of the Contract nor invalidate any of the provisions thereof, provided, however, that the execution of a supplemental agreement acceptable to both parties of the Contract shall be necessary before any alteration is made which involves:

1. An extension or shortening of the physical length of the project by more than 25 percent,

2. An increase or decrease of more than 25 percent of the total cost of the work calculated from the original proposal quantities and the unit contract prices,

3. An increase or decrease of more than 25 percent in the quantity of any one major contract item (a "major contract item" is defined in 02. Definitions, unless otherwise indicated on the Plans or designated in the Specifications), or

4. A change in the nature of the design or in the type of construction which materially increases or decreases the cost of the performance of the work.

B. When an alteration requires the execution of a supplemental agreement, such agreement shall be signed by both parties before any work on the alteration is started. Alterations involving a change of more than 25 percent in the net of any one minor contract item will not require a supplemental agreement.

40. Claims for Extra Cost

A. If Contractor claims that the cost of construction under the Contract has been increased through instructions, by drawings or other acts of Owner, after the Contract has been made, he shall give Engineer written notice thereof within a 10 working days after the receipt of any such instructions, or occurrence of any other act, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for changes in the work and the parties shall use reasonable efforts to negotiate an adjustment in the amount due Contractor if they fail to agree within 10 days, then Contractor may proceed with the changed work (unless Owner withdraws the change) based on "Force Account" cost calculation as set forth herein. No claim for extra cost shall be valid without full compliance with this section.

B. Contractor shall not be entitled to claim against Owner for any damages, costs, expenses, additional compensation or lost profits due to work stoppage or delays caused by any governmental agency or by act of third parties, or inability of Owner to make the jobsite available, or for any other cause beyond the control of Owner.

41. Delays and Extension of Time

A. Should Contractor be delayed in the prosecution or completion of the work by the act, neglect or default of Owner, any of its officers or employees, any other contractor employed by Owner upon the work, or by any damage caused by fire or other casualty for which Contractor is not responsible, or by combined action of workmen, in no way caused by or resulting from default or collusion on the part of Contractor, then the time herein set for completion of the work shall be extended for a period equivalent to the work time lost by reason of any or all of the causes aforesaid. Extended time period shall be determined and fixed by Owner, which determination shall be final, but no such allowance shall be made unless a claim therefore is presented in writing to Owner within ten (10) days after the occurrence of such delay.

B. Time for the completion specified has taken into consideration the possibility of delay and work interruption resulting from acts of other contractors, whether or not a contractor for Owner, and no extension of time will be allowed because of such interruption or delay. Contractor shall cooperate with contractor of an adjoining or interdependent project to the full extent possible so that the operations of both will suffer a minimum of interference and delay. In case of disagreement between contractors, the decision of Engineer shall be accepted as final. Any unavoidable

delays to Contractor resulting there from shall be adjusted as to contract time in accordance with the specifications of this section.

C. Number of working days allowed for completion of the project is sufficient to provide for the procurement of all materials necessary for construction and, unless otherwise noted in the special provisions, failure to procure the materials involved is not reason for an extension of time. If no schedule or agreement is made between Engineer and Contractor stating the dates upon which instructions and/or drawings shall be furnished by Engineer, then no claim for delay shall be allowed by the Contractor on account of such failure to furnish drawings unless Contractor shall have given two (2) weeks' notice of the need for such drawings and not then unless claim of need for such drawings is reasonable.

D. When it has been determined that Contractor is entitled to an extension of time, the amount of such extension shall be only to compensate for direct delays and shall be based upon Contractor's energetically pursuing the work at a rate not less than that which would have been necessary to complete the basic contract on time. In determining the amount of extension, Engineer will consider that Contractor is applying efforts simultaneously on the several parts of the job to the maximum amount practicable.

42. Completion and/or Correction of Work and Remedies before Final Payment

A. If Contractor should neglect to prosecute the work properly and/or fail to perform any provision of this contract, Owner, upon certification by Engineer and after five (5) days' written notice to Contractor, may, without prejudice to any other remedy, make good such deficiencies and deduct the cost thereof from payments then or thereafter due to Contractor.

B. Contractor shall promptly remove from the construction site all materials condemned by Engineer as failing to conform to the contract, whether incorporated in the work or not and Contractor shall promptly replace and re-execute his own work in accordance with the intent of the Contract and without expense to Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. If Contractor does not remove such condemned work and materials and commence re-execution of the work within five (5) days of notice from Engineer, Owner may correct the same as otherwise provided herein.

C. If Contractor does not remove such condemned work and material within the period herein above described, Owner may remove and store any such materials at the expense of Contractor. If Contractor does not pay the cost of such removal within ten (10) days from the notice to Contractor of the fact of such removal, Owner may, upon an additional ten (10) days' written notice, sell such materials at public or private sale, and deduct all costs and expenses incurred, including costs of sale, accounting to Contractor for the net proceeds remaining, and Owner may bid at any such sale. Contractor shall be liable to Owner for the amount of any deficiency remaining between the costs incurred and the proceeds of sale. Owner may deduct the costs of such removal, storage and sale and/or remaining deficiency from any funds otherwise due to the Contractor.

43. Defects Arising in One Year and Remedies

A. Contractor shall be responsible for correcting all defects in workmanship and material within one year after acceptance of this work. When corrections of defects are made, Contractor shall be responsible for correcting all defects in workmanship and/or materials in the corrected work for one year after acceptance of the corrections by Owner. Contractor shall start work to remedy such defects within seven (7) days of mailing notice of discovery thereof by Owner and shall complete such work within a reasonable time. In emergencies where damage may result from delay or where loss of service may result, such corrections may be made by Owner, in which case the cost shall be borne by Contractor. In the event Contractor does not accomplish corrections at the time specified, the work will be otherwise accomplished and the cost of same shall be paid by Contractor.

B. Contractor shall be liable for any costs, losses, expenses or damages including consequential damages suffered by Owner resulting from defects in Contractor's work including, but not limited to, cost of Engineering, inspection and

supervision by Owner or Engineer. Contractor shall hold Owner harmless from any and all claims which may be made against Owner as a result of any defective work and Contractor shall defend any such claims at his own expense.

44. Suspension of Work

A. Owner may at any time suspend the work, or any part thereof, by giving notice to Contractor in writing. Work shall be resumed by Contractor within ten (10) days after the date fixed in the written notice from Owner to Contractor to do so. Owner shall not reimburse Contractor for expense incurred by Contractor in connection with the work under this Contract as a result of such suspension.

B. Suspension of the work by Owner shall not furnish any ground for claim by Contractor for damages or extra compensation, but the period of such suspensions shall be taken into consideration in determining the revised date for completion as hereinafter provided. Contractor shall not suspend work under the Contract without the written order of Owner as stated in the preceding paragraphs. Contractor will be required to work a sufficient number of hours per day in order to complete the project within the days specified. Question as to the necessity of discontinuing any portion of the work by reason of unfavorable weather conditions shall be determined by Engineer.

C. Upon failure of Contractor to carry out the orders of Engineer or to perform work under the Contract in accordance with its provisions, Owner may suspend the work for such period as he may deem necessary. Time lost by reason of such failure or in replacing improper work or materials shall not furnish any ground to Contractor for claiming an extension of time or extra compensation, and shall not release Contractor from damages or liability from failure to complete the work within the time prescribed.

45. Owner's Right to Terminate Contract

A. Owner may terminate the Contract and take possession of the premises and of all materials thereon and finish the work by whatever methods he may deem expedient, upon the occurrence of any one or more of the events hereafter specified, and receipt of the certificate by Engineer that sufficient cause exists to justify such action:

1. If Contractor should be adjudged a bankrupt.

2. If Contractor should make a general assignment for the benefit of his creditors.

3. If a receiver should be appointed on the account of insolvency of Contractor.

4. If Contractor should persistently or repeatedly refuse or fail to supply a sufficient number of properly skilled workmen or proper materials for completion of the work.

5. If Contractor should fail to complete the work within the time specified in the contract.

6. If Contractor should fail to make prompt payment to subcontractors or for material or labor.

7. If the Contractor should persistently disregard laws, ordinances, or regulations of federal, state or municipal agencies or subdivisions thereof.

8. If Contractor should persistently disregard instruction of Engineer, or otherwise be guilty of a substantial violation of the contract.

9. If Contractor fails to make progress in accordance with the Progress Schedule.

B. Owner shall give Contractor seven (7) calendar days' written notice to cure the default, and if not cured to the satisfaction of Owner as certified by Engineer, Owner may, upon two (2) days written notice terminate the Contract. Any such termination shall be without prejudice to any other right or remedy which Owner may have against Contractor.

C. In the event of the failure of Contractor to cure the default of which notice is given as above provided, or if Contractor abandons the work undertaken under the contract, Owner may, at his sole option, upon seven (7) days' written notice to the surety and without any written notice of Contractor, transfer the employment of said work from Contractor to surety. Upon receipt of such notice, the surety shall enter upon the premises and take possession of all materials, tools and appliances thereon for the purpose of completing the work included under this Contract and employ, by Contract or otherwise, any person or persons to finish the work and provide the material therefore, without termination of the continuing full force and effect of the contract. In case of transfer of such employment to the surety, the surety shall be paid in its own name on estimates covering the work subsequently performed under the terms of the Contract and according to the terms hereof, without any right of Contractor to make any claim for the same or any part thereof.

D. In the event that the Contract is terminated by Owner, Contractor shall not be entitled to receive any further balance of the amount to be paid under this Contract until the work shall have been fully finished. At such time, if the unpaid balance of the amount to be paid under this Contract exceeds the expense incurred by Owner in finishing the work, and all damages sustained or which may be sustained by Owner by reason of such refusal, neglect, failure of discontinuance of employment, such excess shall be paid by Owner to Contractor. If such expense and damages shall exceed the unpaid balance, Contractor and his surety and each thereof shall be jointly and severally liable therefore to Owner and shall pay the difference to Owner. Such expense and damage shall include all legal costs incurred by Owner in the employment of attorneys to protect the rights and interests of Owner under the contract; provided such legal costs shall be reasonable.

46. Contractor's Right to Stop Work or Terminate Contract

If the work should be stopped under an order of any court, or other governmental authority for a period of ninety (90) working days, through no act or fault of Contractor or of anyone employed by him, including subcontractors, or if payments due Contractor under this Contract are unreasonably delayed, or if Owner suspends this Contract for any reason other than act or neglect of Contractor for a period of one hundred eighty (180) consecutive calendar days, Contractor may stop work and terminate this Contract and recover from Owner payment for all work executed, but Contractor shall not be entitled to claim against Owner for damages, expenses, costs, additional compensation or lost profits due to the suspension or termination. Final payment to Contractor shall be made pursuant to the provisions of paragraphs 48 and 49.

47. Removal of Equipment

In case of the termination of this Contract before completion for any cause whatever, Contractor, if notified to do so by Owner, shall promptly remove any part or all of his equipment and supplies from the property of Owner; Owner shall have the right to remove such equipment and supplies at the expense of Contractor, deducting the cost thereof from any funds otherwise due Contractor.

48. Use of Completed Portion of Work

Owner shall have the right to take possession of and use completed, partially completed or substantially portions of the work, notwithstanding that the time may not have expired for completing the entire work. Such taking possession and use shall not be deemed to be completion of the Contract in respect to such work nor shall the same be deemed to be any acceptance of any work not completed in accordance with Contract Documents.

49. Application for Payment

A. At least five (5) working days before each payment falls due, Contractor shall submit to Engineer four (4) copies of an itemized application for payment, supported to the extent required by Engineer by receipts or other vouchers

showing payment for materials and labors, payments to subcontractors, and such other evidence of Contractor's right to payment as Engineer may direct.

B. Contractor shall be entitled to monthly progress payments corresponding to the stage of the work. Progress estimates will be prepared by Engineer not later than the twentieth day of the month after commencing work, and every thirty (30) days thereafter, if so entitled, for the duration of construction. These shall be based upon an approximate estimate of quantities of work completed and considered acceptable, as extended by the unit prices established in the Contract or as provided by the schedule of lump sum payments. Owner shall deduct from each monthly progress payment an amount of retainage of 5% by this Contract and also for any charges against Contractor authorized by this contract.

C. Cost of materials, properly stored, protected and insured at the site of the work will be paid on monthly estimates only when provided for in this Contract, and then only for specific materials listed therein for partial payment. In preparing the monthly estimates, advancement will be made therein for 90 percent of the cost of such materials, as evidenced by invoices to Contractor. Advances will not be made for any item of material amounting to less than five hundred dollars ($500.00). All materials must conform to the requirements of these Specifications. However, advancement for materials will not constitute acceptance, and any faulty material will be condemned although advancement may have been made for same in the estimates. Deductions at the same rates, and equal in amount to the advancements, will be made on the estimates as the material is used. All materials for which costs are allowed under this subparagraph must be substantiated by written documentation from the material supplier that the material has been paid for.

D. Quantities used for progress estimates shall be considered only as approximate and provisional, and shall be subject to recalculation, adjustment and correction by Engineer in subsequent progress estimates and in final estimates. Inclusion of any quantities in progress estimates, or failure to disapprove the work at the time of progress estimates, shall not be construed as acceptance of corresponding work or materials.

E. Retained amount shall be withheld by Owner for 60 days following final acceptance or termination of the Contract and shall be paid to Contractor at the expiration of 60 days if no claims have been filed against such funds as provided by law and if Owner has no unsatisfied claims against Contractor. No payments shall be made until the form **Certification of Industrial Insurance Paid and Request for Release** has been obtained from the Contractor. In the event claims are filed, Owner shall withhold, until such claims are satisfied, a sum sufficient to satisfy all claims and to defray the cost of foreclosing the liens of such claims and to pay attorney's fees. In addition, Owner shall withhold such amount as is required to satisfy any claims by Owner against Contractor, until such claims have been finally settled.

F. Neither the final payment nor any part of the retained percentage shall become due until Contractor, if requested, shall deliver to Owner a complete release of all liens arising out of this contract, or receipts in full in lieu thereof, and, if required in either case, an affidavit that so far as he has knowledge or information, the release and receipts include all labor and materials for which a lien could be filed; but Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to Engineer to indemnify Owner against any lien. If any lien remains unsatisfied after all payments are made, Contractor shall reimburse to Owner all moneys that the latter may be compelled to pay in discharging such lien, including all cost and reasonable Engineer's and attorney's fees.

50. Payments Withheld

Notwithstanding the issuance of any certificate, Owner may withhold any payment or portion of payment or recover any payment theretofore made, to such extent as may be necessary to protect Owner from loss on account of:

1. Defective work not remedied.

2. Claims filed or written notice that valid claims will be filed.

3. Failure of Contractor to make payments properly to subcontractors or suppliers of material or labor.

4. Reasonable doubt that the Contract can be completed for the balance then unpaid.

5. Liquidated damages, inspection and Engineering charges, or other claims against Contractor by Owner.

6. Damage to another contractor.

7. Failure of Contractor to furnish invoices to support application for payment for materials not incorporated in the work but delivered and suitably stored at the site.

8. Expenses, including court costs and legal fees, whether or not incident to suit, incurred by Owner due to any default of Contractor.

Notice of payment withholding shall be performed in accordance with RCW, Chapter 39.76.

51. Hold Harmless

The Contractor shall defend, indemnify and save harmless the Owner, its officers, employees, agents and Engineer, from any and every claim and risk and all losses, damages, demands, suits, judgments and attorney's fees, and other expenses of any kind, on account of injury to or death of any and all persons and/or on account of all property damage of any kind, whether tangible or intangible, including loss of use resulting therefrom, in connection with the work performed under this contract, or caused or occasioned in whole or in part by reason of the presence of the Contractor or its subcontractors, or their property, employees or agents, upon or in proximity to the property of the Owner, or any other property upon which the Contractor is performing any work called for or in connection with this Contract, except only for those losses resulting solely from the negligence of the Owner, its officers, employees, agents and Engineer.

Should a court of competent jurisdiction determine that this Contract is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and the Owner, its members, officers, employees, agents and Engineer, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes Contractor's waiver of immunity under industrial insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties.

If a lawsuit is filed in respect to this hold harmless provision, the Contractor shall appear and defend that lawsuit at its own cost and expense, and if judgment is rendered or settlement made requiring payment of damages by the Owner, its officers, agents, employees, volunteers and Engineer, the Contractor shall pay the same.

52. Insurance

Insurance shall meet the requirements of ***1-07.18 Public Liability and Property Damage Insurance*** of the Standard Specifications, APWA WSDOT latest edition, as a minimum. ACORD forms shall be provided to the Owner as indicated in the bid forms.

Subcontractors:

Contractor shall include all subcontractors as additional insureds under its policies or shall furnish separate certificates for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

Coverage shall be at least as broad as:

Insurance Services Office form No. CG0001 07 98 (occurrence form) covering comprehensive general liability or ISO form No. CG0002 07 98 (claims made form).

Insurance Services Office form No. CA 0001 (ed. 07 97) covering automobile liability, Symbol 1 "any auto".

Workers' compensation as required by the Workers' Compensation Act of Washington State.

Contractor shall maintain limits of insurance no less than:

Comprehensive general liability: $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage, and for those policies where aggregates are applicable, a $2,000,000 aggregate limit.

Automobile liability: $1,000,000 combined single limit per accident for bodily injury and property damage.

Workers' compensation and employers' liability: workers' compensation limits as required by the workers' compensation act of Washington.

Policies are to contain or be endorsed to contain, the following provisions:

General liability and automobile liability coverage:

Owner, its officials, employees, agents and volunteers are to be covered as an additional insured as respects: liability arising out of activities performed by or on behalf of Contractor; products and completed operations of Contractor; premises owned, leased, or used by Contractor; or automobiles owned, leased, hired or borrowed by Contractor. Coverage shall contain no special limitations on the scope of protection afforded to Owner, its officials, employees or volunteers.

Contractor's insurance coverage shall be primary insurance as respects Owner, its officials, employees and volunteers. Any insurance or self-insurance maintained by Owner, its officials, employees or volunteers shall be in excess of Contractor's insurance and shall not contribute with it.

Any failure to comply with reporting provisions of the policies shall not affect coverage provided to Owner, its officials, employees or volunteers.

Coverage shall state that Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

All Coverage:

Each insurance policy required by this clause shall state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to Owner.

Defense costs are to be provided as an additional benefit and not included within the limit of liability of the general liability policy.

No deductible or retention in excess of $5,000 shall apply to any coverage provided by the general liability insurance without the prior written approval of the Owner.

Should the Contractor maintain commercial umbrella insurance, it shall be excess over all coverage described herein. This policy shall have the same inception and expiration dates as underlying liability policies and shall provide coverage no less broad than those in the primary policies or program.

Any and all deductibles or retentions in the policies described herein shall be paid for, assumed by, for the account of and at the Contractor's sole risk. The Owner shall not be responsible for the payment of any deductible or retention.

Owner shall have the right, but not the obligation, of prohibiting the Contractor from entering the Project site until such certificates or other evidence that insurance has been placed in complete compliance with these requirements is received and approved by the Owner.

Commencement of work on the Project site without the required Certificates of Insurance, or without compliance with any other provision of this Agreement, shall not constitute a waiver by the Owner of any rights in this Agreement.

Acceptability of Insurers:

Insurance is to be placed with insurers with a Bests' rating of no less than A:XIII, as shown in the most current issue of A.M. Best's Key Rating Guide or with an insurer acceptable to Owner.

Verification of Coverage:

Contractor shall furnish Owner with certificates of insurance and with CG 2010 (03 97) naming the owner as an additional insured with original endorsements affecting coverage required by this clause. Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. Certificates are to be received and approved by Owner before work commences. Owner reserves the right to require complete, certified copies of all required insurance policies, at any time.

Subcontractors:

Contractor shall include all subcontractors as additional insured under its policies or shall furnish separate certificates for each subcontractor. All coverage for subcontractors shall be subject to all of the requirements stated herein.

Waiver of Transfer:

Contractor shall provide CG 2404 (10 93) Waiver of Transfer of Rights of Recovery against other to us if not included in General Liability coverage form already.

53. Performance and Payment Bond

A. Contractor shall furnish a surety bond or bonds covering faithful performance of the Contract and the payment of all obligations arising thereunder. Bond shall be in the full amount of the Contract and shall be upon the form of bond set forth herein. Surety shall be a firm qualified to conduct business as a surety in the state in which the work is done.

B. Performance for this Contract shall not only indemnify Owner for the usual performance provisions of the contract, but in addition shall be a bond to guarantee payment of any and all tax liability of any type, kind, nature or description due as a result of work performed pursuant to the contract.

54. Damages

Any claim against Owner for damages, expenses, costs, lost profits, or extra compensation arising out of the performance of this Contract shall be made in writing to Owner within a reasonable time after the discovery of such damage, and in no event later than the time of approval by Owner of final payment. Contractor, upon making application for final payment, shall be deemed to have waived his right to claim for any other damages for which claim has not been made, unless such claim for final payment includes notice of additional claim and fully describes the alleged damage.

The amount of liquidated damages shall be as identified in the Proposal for failure to complete the work as described in the contract documents within the contract time. The parties agree that it is difficult to forecast the damages that Owner may incur if the work is not completed on time but they agree that the designated per diem amount is a reasonable estimate.

Accordingly, Contractor agrees:

1. To pay liquidated damages for each working day beyond the contract deadline date for Substantial Completion, and

2. To authorize Engineer to deduct these liquidated damages from any money due or coming due to Contractor.

Liquidated damages will not be assessed for any days for which an extension of time is granted. No deduction or payment of liquidated damages will, in any degree, release Contractor from further obligations and liabilities to complete the entire contract.

The Owner reserves the right to collect Engineering and Legal fees incurred as a result of delays or efforts for resolution of disputes, liens, liquidated damages or any other issues requiring Engineering or Legal services beyond the normal progression of the contract, if such expenses are deemed to have been initiated by the Contractor's failure to properly execute any provision of the Contract.

55. Subletting and Subcontracting

A. Contractor shall not assign or sublet the Contract in whole or in part without the written consent of Owner, nor shall Contractor assign any monies due or to become due to him hereunder without the prior written consent of Owner.

B. Contractor shall not subcontract more than 40 percent of the dollar value of the work without the written consent of Owner. In any event, Contractor shall, at least five (5) days prior to start of a subcontractor's work, notify Engineer in writing of the name of the subcontractor proposed for the work, and shall not employ any which Engineer may object to as incompetent or unfit.

C. The Engineer has the right to request proof of experience for any subcontractor proposed by the Contractor. Upon such request, the subcontractor shall provide the same information requested on the **Bidders Qualification Certificate** in the bid forms. No work may be performed by any subcontractor until the subcontractor is approved by the Engineer. Rejection of a subcontractor by the Engineer shall not be cause for claim of delay or cost.

D. Contractor agrees that he is fully responsible to Owner for the acts and omissions of the subcontractor and persons either directly or indirectly employed by subcontractors, as well as for the acts and omissions of persons directly employed by Contractor. Consent to subcontracting part of the work shall in no way release Contractor from responsibility for performance of the work and he will be held in all respects accountable for the same as if no consent has been given. Contractor shall be required to give his personal attention to the work which is sublet. Nothing contained in Contract Documents shall create any contractual relation between any subcontractor and Owner.

56. Subcontractor Identification

Every invitation to bid on a contract that is expected to cost in excess of one hundred thousand dollars for the construction, alteration, or repair of any public building or public work of the state or a state agency or municipality as defined under RCW 39.04.010 shall require each bidder to submit as part of the bid, or within one hour of the bid, the names of the subcontractors whose subcontract amount is more than ten percent of the contract price with whom the bidder, if awarded the contract, will subcontract for performance of the categories of work designated on the list to be submitted with the bid or to indicate by naming itself that a category of work on the list shall not be subcontracted. Failure to name such subcontractors or itself shall render the bidder's bid non-responsive and, therefore, void.

57. Separate Contract - Interference with Other Contractors

Owner reserves the right to perform work with its own forces or to let other contracts for work under similar general conditions in connection with this project, of which the work awarded to one or more Contractors under separate contract is a part. Contractor shall afford Owner and other contractors' reasonable opportunity for the introduction and storage of their materials and the execution of their respective work, and shall properly connect and coordinate his work with theirs.

A. Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be or is now being performed, and Contractor shall employ, as far as possible, such methods and means in the carrying out of his work as will not cause any interruption or interference with any other contractor or agency. If any part of Contractor's work depends, for proper execution or results, upon the work of any other contractor,

Contractor shall inspect and promptly report in writing to the Engineer any defect in such work which renders it unsuitable for such proper execution and result. His failure to so inspect and report shall constitute an acceptance of the other contractor's work after the execution of his work. (To insure proper execution of his subsequent work, Contractor shall measure work already in place and shall report at once to Engineer any discrepancy between the executed work and the drawings.)

B. If the performance of any contract for the project is likely to be interfered with by the simultaneous execution of some other contract or contracts, Engineer shall decide which contractor shall cease work temporarily and which contractor shall continue, or whether the work under the contracts can be coordinated so that contractors may proceed simultaneously. Owner shall not be responsible for any damages suffered or extra costs incurred by Contractor resulting directly or indirectly from the award or performance or attempted performance of any other contract or contracts on the project or caused by any decision or omission of Engineer respecting the order of precedence in the performance of the contracts other than for an extension of time.

58. Cleanup

A. Contractor shall clean up frequently all refuse, rubbish, scrap material and debris caused by his operations, to the end that at all times the site of the work shall present a neat, orderly, and workmanlike appearance.

B. Upon completion of the work, Contractor shall remove all rubbish, scrap material, tools, scaffolding and surplus materials, false-works, temporary structures, including foundations thereof, plants of any description, and debris of every nature, resulting from his operations, shall clean out all ditches that may have been filled during the work, replace damaged surfacing, and put the site in a neat, orderly condition and, in respect to structures, shall clean all windows and leave buildings broom clean.

59. Washington State Sales Tax

Revenue Act of 1935 as amended requires Owner to pay Contractor for transmittal to the state a sales tax on the total charges made for construction unless otherwise exempt by rule 171. Rule 171, issued by the Excise Tax Division of the State of Washington, provides for certain exemptions and compensating tax in regard to public roadway improvements.

In case of a public roadway improvement contract, Contractor shall include any applicable compensating tax in the bid item and Owner shall make no payment of any sales tax.

60. Force Account

The actual cost of labor, payroll taxes, material, equipment rental and field supervision required, with the addition of 15 percent to cover profit, overhead, use of small tools, taxes, insurance, bookkeeping and all other incidental costs. In such cases Contractor shall keep and present in such form as Engineer may direct a correct account of such costs, together with supporting time cards and vouchers. In any case, Engineer shall review, and if reasonable, certify the amount due Contractor. Pending final determination of value, payments on account of changes shall be made on Engineer's estimate.

61. Dispute Resolution

If any dispute, controversy or claim arises out of or relates to this contract, or the breach thereof, and if the dispute cannot be settled through direct discussion, the parties agree first to try to settle the dispute by mediation under the Commercial Mediation Rules of the American Arbitration Associates, before resorting to arbitration, litigation or some other dispute resolution procedure.

In the event any action is filed in connection with the Contract, the substantially prevailing party shall be entitled to recover its costs and a reasonable sum for attorney fees. The parties further agree that the substantially prevailing party shall be

entitled to recover its costs and a reasonable sum for attorney fees incurred through any Final Order as a result of any Appeal.

62. Street Cleaning, Dust, Mud, Erosion and Siltation Control

The contractor shall be responsible for controlling dust and mud within the project limits, and all streets used by the Contractor during the execution of this contract shall be maintained in a clean condition. The Contractor shall be prepared to use watering trucks equipped with high-velocity water jets and low-head sprinkling devices, power sweepers, and any other pieces of equipment necessary to render the streets free of all mud, debris, and foreign materials. Any damage caused by dust and/or mud accumulation on the streets or in the storm sewer system shall be the sole responsibility of the Contractor.

Cut slopes or embankment areas shall be restored per the Plans and details shown thereon. The Contractor shall provide straw and/or straw bales as required to control erosion and siltation.

Watering trucks may be used on paved streets with an adequate storm drainage system. Watering trucks shall not be used on streets where, in the opinion of the engineer, mud is created, causing a nuisance. Where water flushing is not allowed, street sweepers (not power brooms) shall be used.

The Contractor shall provide for sweeping, or flushing all surfaced roadways upon completion of each day's activities. Equipment required for this operation shall be on the job site or available at all times. Failure to have this equipment on the job site or available will necessitate a shutdown of the project.

Payment for street cleaning, dust, mud, erosion and siltation control will be considered incidental to the project and as such included in the various bid items, and no separate payment will be made.

63. "As-Built" or "Record" Drawings

Prior to receiving final payment for the work, the Contractor shall deliver a complete set of acceptable "as-built" drawings to the engineer. Drawings shall be made on clean, unmarked prints for this project in accordance with the following standards:

Yellow markings or highlights = deleted items
Red markings = new or modified items

It shall be the Contractor's responsibility to record the location, by centerline station, offset, and depth below pavement, of all existing utilities uncovered or crossed during his work as covered under this project.

It shall be the Contractor's responsibility to have his surveyor locate by centerline station, offset and elevation, each major item of work done under this contract.

Items of work shall be defined to include such items as:

- Fittings
- Valves
- Pipe
- Hydrants
- Services
- Manholes
- Vaults
- Structures
- PRVs
- Air/Vacs

After the completion of the work covered by this contract, the Contractor's surveyor shall provide to the owner the hard cover field book(s) containing the construction staking and as-built notes.

TECHNICAL SPECIFICATIONS

1.10 GENERAL

Sections in these specifications titled "*Common Work for . . .*" shall apply to all following subsections whether directly referenced or not.

Sections in these specifications titled "*Related Sections*" shall be read as integral to the specification as if they were fully detailed within. All work and materials described in such sections shall be provided and performed by the Contractor.

1.10.16 Definitions

[CSI 01 42 16]

Approximate: Generally as shown or described, but has not been verified, or may require adjustment. No level of accuracy is implied or should be assumed.

Calculation(s): When the contract documents require the Contractor to provide calculations, those calculations must be prepared and stamped by a Professional Engineer licensed to practice in the State where the project is constructed or where components requiring calculations are fabricated.

Or Equal (Or Approved Equal): An alternate product, assembly, or method that the Owner's Representative has reviewed based on information provided by the Contractor and determined to provide functional equivalence, or better, than that specified. Such determination does not relieve the Contractor from responsibility should the product, assembly, or method fail to perform as needed.

Owner's Representative: Person(s) authorized by the Owner to observe the work, administer the contract, approve tests, make decisions, and otherwise act as an agent of the Owner. The terms Engineer, Owner's Observer, Owner's Inspector, and Owner are generally interchangeable with the term Owner's Representative.

Proposed: The word refers to work that is part of the Contract, to be performed by the Contractor. The word "proposed" does not need to show up to indicate work by the Contractor. Unless work is specifically noted to be performed by others, all work is to be performed by the Contractor.

1.11.00 Summary of Work

[CSI 01 11 00]

The Fairwood No. 2 Reservoir consists of the construction of a reservoir upgrades, foundation, appurtenances, anchor chair and anchor bolts

- Increase the outside diameter of the foundation to 98 feet and 1 inch (4 foot increase) to meet allowable bearing pressure
- Install sixty 2-inch diameter anchors to prevent shell uplift
- Install anchor bases around screen vent

- Add drain holes near base of guardrail posts
- New inlet/outlet piping, inlet manifold with duckbill valves
- Install anchor points at top of tank
- Install sample lines
- Reservoir coatings
- New roof vent, ladder and guardrail
- Relocate overflow pipe outside of tank and associated catchment system

1.11.02 Reuse of Documents

[CSI 01 11 30]

Contractor and any Subcontractor or Supplier shall not:

1. Have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
2. Reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
3. The prohibitions of this Paragraph will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

1.11.03 Electronic Data

[CSI 01 31 26]

1. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner to Contractor, or by Contractor to Owner, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
2. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 30 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 30-day acceptance period will be corrected by the transferring party.
3. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents

resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

4. Computer Aided Design (CAD) files will not be made available to the Contractor. This includes AutoCAD™, Civil3D™, or other similar file types. Only printed hard copies or electronic representations of hard copies (e.g. PDF) will be provided.

1.13 Permits and Licenses

[CSI 01 41 26]

The Contractor shall acquire and pay all costs for all other necessary permits which may include:

- Haul Route Permit
- Electrical Permit
- Disposal Permit

1.14 Work Restrictions

[CSI 01 14 00]

1.14.19 Use of Site

[CSI 01 14 19]

The Contractor shall not perform work activities, store materials or equipment, move equipment through, or disturb in any way the areas outside the "Project Site" unless approved by the Owner in writing.

1.20 PRICE AND PAYMENT PROCEDURES

[CSI 01 20 00]

1.21.29 Quantity Allowances

[CSI 01 21 29]

If more or fewer materials are needed when the construction quantity is within plus or minus 25 percent of the bid quantity, costs for restocking of unused materials, or handling and delivery costs on additional materials shall be incidental to the bid price and no additional payment will be made.

1.21.55 Cost Increases for Materials

[CSI 01 21 55]

There will be no allowance for additional payment should the cost of any materials go up during the original contract timeframe, or during any approved contract time extensions. The Contractor is responsible for securing prices at the time of bid.

1.25.00 Substitution Procedures

[CSI 1 25 00]

Any product or construction method that, in the opinion of the Owner, does not meet these specifications will be considered a substitution. Substitutions must be approved prior to incorporation into the project. The Owner has the right to reject any request for substitution. Incomplete requests will not be reviewed.

Requests shall include an explanation of why the request is being made along with drawings, details, specifications, and samples sufficient to allow the Owner to evaluate the proposed substitute. Requests shall include any change necessary in construction methods with a detailed description and related drawings of the proposed methods. Provide an itemized comparison of each proposed substitution with the specified product or method. If the Contractor believes there are no variations from the bid documents, include a statement to that fact in the request for substitution.

In making a request for a substitution, the Contractor represents that they have investigated the proposed product or method and has determined that it provides equal or superior form and function to the product specified. The Contractor shall coordinate incorporation of accepted substitutions into the work, making changes that may be required for the work to be completed.

The Contractor waives all claims for additional costs and time related to substitutions. The Owner reserves the right to charge the Contractor for the Owner's time required for incorporating the substitution into the work which may include but not be limited to observation, requests for information, and commissioning.

No guarantee is made that product model numbers included in the specifications or on the plans are current at the time of bidding. The bidder shall provide pricing in their proposal for current versions of discontinued models. If the bidder is uncertain of the correct replacement model, or feels there is a price discrepancy, the bidder shall request a substitution following the requirements of section 1.25.13.10 Substitutions Prior to Bid Opening. Requests for price increases after award will not be accepted.

1.25.13.10 Substitutions Prior to Bid Opening

[CSI 1 25 13 10]

Before opening bids, the Owner may consider written requests from product suppliers or prime bidders for substitutions. All requests for substitution must be received by Owner a minimum of 7 working days prior to bid opening. Approval of substitutions will be only by addendum. The bidder shall include in their proposal all costs for any modifications required to adopt the substitute.

1.25.13.15 Substitutions After Contract Execution

[CSI 1 25 13 15]

After contract execution, the Owner will consider requests for a substitution of products or methods in place of those specified. Submit electronically, or two hard copies of each request for a substitution. Submit requests early enough for the Owner to review the request without

affecting the schedule. The Owner will review with reasonable promptness and will provide a response within 15 working days after receipt of all information required for the review, unless the complexity of the proposed substitution requires, in the Owner's sole opinion, additional review time.

If the Owner approves a request for substitution, and the Contractor subsequently requests an alternate substitution for the same or similar work, the Owner reserves the right to charge the Contractor for the costs required to review the alternate substitution.

1.30 ADMINISTRATIVE

[CSI 01 30 00]

1.31 Project Management and Coordination

[CSI 01 31 00]

1.31.01 Contractor's Responsibility

[CSI 01 31 01]

The work included in this contract is shown on the contract plans and described in these project specifications. All work incidental and necessary to the completion of the work described and shown shall be performed by the Contractor. In submitting a bid for this project, the Bidder warrants that they are an expert in this and related work, that they understand the process and functions shown, and that various work and processes not shown but necessary for the successful operation of this project will be provided by the Contractor.

The General (or Prime) Contractor is fully responsible for providing the subcontractors and suppliers with all relevant portions of the plans and specifications necessary to bid and construct the improvements.

Damage to existing utilities or property shall be repaired or replaced by the Contractor at the discretion of the Owner.

The Contractor and each of the Subcontractors are responsible for coordinating the required inspections. There are specific requirements for inspection responsibilities and the advance notice that must be given to minimize construction delays. It is the Contractor's responsibility to be familiar with these requirements, include the coordination necessary in this estimate of project costs and schedule, and to comply with the requirements during construction. Failure to follow proper inspection and notification procedures may result in on-site work stoppages and removal or demolition of unapproved structures or systems, all at the Contractor's expense. See Starting and Adjusting section for details.

Do not start work on this project or on any public or private right-of-way or easement until clearance is given by the Owner. It will be the responsibility of the Contractor to comply with the requirements of any permit for the project. Do not hinder private property access without a 24-hour notice to the private property owner, and do not hinder access for more than an 8-hour period. Do not disrupt emergency aid access to private property.

The Contractor is solely responsible for all elements of site safety. Inspections performed by the Owner are only to monitor and record that project plans and specifications are being complied with and construction is consistent with the design intent.

The Contractor is responsible for managing, coordinating, and overseeing its subcontractors, suppliers, manufacturers' representatives, or any other persons performing Work. The Contractor shall designate and have a competent person, familiar with the project and work being performed, on site at all times when work is being performed..

1.31.19 Progress Meetings

[CSI 01 31 19 23]

The Contractor shall schedule and hold regular on-site progress meetings at least every two weeks and at other times as requested by the Owner or as required by progress of the work. The Contractor, Owner, and all Subcontractors active on the site must attend each meeting.

1.32.16 Construction Progress Schedule

[CSI 01 32 16]

Contractor is responsible for providing an up to date construction schedule with each monthly pay estimate and at other times as requested by the Owner or as required by progress of the work. If the current schedule is still in-line with the previous schedule, the Contractor shall inform the Owner with each pay estimate. Non-working day requests shall also be submitted by the Contractor with each monthly pay estimate. Owner may delay monthly progress payments if Contractor fails to submit updated schedule and non-working day requests.

1.32.29 Periodic Work Observation

[CSI 01 32 29]

The Owner may elect to have an observer on site to monitor, observe and record construction progress. The Contractor maintains complete responsibility to verify construction is meeting the design intent and is being constructed in accordance with the plans and specifications. It is not the responsibility of the Owner's observer to address neither means and methods issues nor direct safety issues. The Owner's observer does not have the authority to stop work if unsafe conditions are observed.

1.33 Submittals

[CSI 01 33 00]

1.33.23 Shop Drawings, Product Data, and Samples

[CSI 01 33 23]

Submittals are required for all items installed on this contract. Address submittals to:

RH2 Engineering, Inc.
1201 Pacific Ave S, Suite 1750
Tacoma, WA 98402

Attn: _David Matz_

Email: _dmatz@RH2.com_

Submittals may be provided in electronic format (preferred) or hard copy. Owner reserves the right to require the Contractor to provide hard-copy submittals at no additional cost to the Owner. When hard-copy submittals are provided, submit three (3) copies; one set will be returned to the Contractor after review.

Electronic submittal via email is acceptable, however the Contractor shall follow up with the Owner to verify that the submittal was received. The Owner assumes no responsibility for emails that do not make it to the recipient. In the case of electronic submittals, only one copy will be returned to the Contractor, either electronically or hard copy at the Owner's discretion.

Submittal data shall contain sufficient information on each item to determine if it complies with the contract requirements. Submittal cutsheets and datasheets shall be annotated by the Contractor to clearly indicate the equipment and materials that will be provided, including any options or additive items. No generic cutsheets or datasheets will be accepted.

Items installed in the work that have not been approved through the submittal process shall be removed and an approved product shall be furnished, all at the Contractor's expense.

Shop drawing review will be limited to general design requirements only and shall not relieve the Contractor from responsibility for errors or omissions, or responsibility for consequences due to deviations from the contract documents. No changes may be made in any submittal after it has been reviewed except with written notice and approval from the Owner.

Shop drawings shall be submitted on 8½-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch sheets and shall contain the following information:

- Project Name as it appears on the Document Cover.
- Prime Contractor and Applicable Subcontractor.
- RH2 Engineering.
- Owner's Name (Cedar River Water and Sewer District).
- Applicable Specification and Drawings Reference.
- A stamp or statement that the Contractor has checked the equipment for conformance with the contract requirements, coordination with other work on the job, and dimensional suitability.
- A place for the Engineer to respond. (Engineer may elect to respond using the Engineer's standard forms.)

Submittals that do not comply with these requirements may be returned to the Contractor for re-submittal. The Contractor shall revise and resubmit as necessary. Acceptable submittals will be reviewed as promptly as possible and transmitted to the Contractor not later than 20 working days after receipt by the Engineer. Delays caused by the need for re-submittal shall not be a basis for an extension of contract time or delay damages.

Shop drawings and submittals shall contain the following information:

1. Drawings, dimensions, and weights.

2. Catalog information.
3. Model number, including descriptions for option and accessory codes.
4. Manufacturer's specifications.
5. Special handling instructions.
6. Maintenance requirements.
7. Wiring and control diagrams.
8. List of contract exceptions.

For integrated or package systems (see also 1.61.31), the components, shop drawings, instructions, and other elements may be submitted and reviewed individually. But the initial submittal must include the complete proposed system, and the final submittal must also be for the complete system clearly indicating all changes made during the submittal process.

The Contractor warrants that they have determined and verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, and have checked and coordinated each submittal with the requirements of the work and of the contract documents.

The Owner will pay the costs and provide review services for a first and second review of each submittal item. Additional reviews shall be paid by Contractor by deducting up to $200 for each hour of review time from the next scheduled payment.

For follow-up submittals, the Engineer will review only those items noted for revision in the preceding review. If the Contractor has modified the submittal in any other way, such modifications must be clearly identified both on a cover transmittal and within the submittal itself.

The Contractor is responsible for identifying the shop drawings and submittals required for this project. Specific submittal requirements may be listed in each section of these specifications. Contractor shall keep a complete and up to date copy of all submittals and review responses at the job site readily available to the Owner for inspection.

1.40 QUALITY REQUIREMENTS

[CSI 01 40 00]

1.43.20 Warranty

[CSI 01 43 20]

The Contractor shall warrant all work and products for a period of one (1) year following the warranty start date except for those components and listed warrantees below.

The warranty start date is the date the Owner accepts the completed project by resolution.

Warranty does not cover damage due to misuse by the Owner or conditions outside of the Owner or Contractor's control or exceptional events (force majeure) including war, strikes, floods (water exceeding normal high water mark), rainfall in excess of 100 year storm event, fire, earthquakes, high winds (over 85 mph for 3 seconds peak gust), freezes below 10 degrees Fahrenheit (Western Washington), freezes below minus 10 degrees Fahrenheit (Eastern

Washington), governmental restrictions, vandalism, utility power failures, or utility power surges (unless due to Contractor provided surge suppressor failure). The Contractor has control over workmanship, third party subcontractors and parts and materials used to complete the project.

Warranties in addition to this warranty are listed in the following sections:

- Division 9.98.1 Steel reservoir coating systems

1.45.16 Field Quality Control Procedures

[CSI 01 45 16]

Unless otherwise noted on the plans or within these specifications, provide 48-hour notice to the Owner and appropriate reviewing agency for all inspections required. 48-hour notice is defined as two complete working day notice. Time is not counted on weekends and holidays (inspections required on a Monday or the day after a holiday shall be scheduled a minimum of 48 hours in advance not including the holiday hours or weekend hours.)

Contractor shall schedule and arrange for the following inspections and tests with the appropriate reviewing agency and testing company.

- Special Inspections as required per IBC Division 17 and as noted on the drawings
- Steel tank welds
- Steel tank coatings
- Paint thickness and finished quality
- Water quality testing

1.50 TEMPORARY FACILITIES AND CONTROLS

[CSI 01 50 00]

1.51 Temporary Utilities

[CSI 01 51 00]

Provide all necessary water for construction-related fire protection and utilities required by this contract, or by laws and regulations. Sanitary facilities adequate for all workers shall comply with all codes and regulations.

At the close of this contract, the Contractor shall pay all utility bills that are outstanding, remove all temporary electrical, sanitary, gas, telephone and water facilities, and any other temporary service equipment that may remain. In addition, the Contractor shall arrange for the transfer of electrical and water accounts to the Owner's name.

Temporary electrical power is available at the site. The Contractor may use existing power facilities as shown on the plans.

Temporary water is available at the site. The Contractor may use existing water as shown on the plans.

1.52.00 Construction Facilities

[CSI 01 52 00]

Construct and locate all field offices, all necessary gates and barricades, fences, handrails, guard rails, and securities required by this contract, or by laws and regulations. Provide shelters and dry facilities for the workers as required. Provide all guards, marks, shields, protective clothing, rain gear, and other equipment required by law, ordinance, labor contracts, Occupational Safety and Health Administration (OSHA) regulations, and other regulations for the maintenance of health and safety. Provide first aid kits and equipment as required by law.

1.52.20 Locks and Keys

[CSI 01 52 20]

Contractor may provide temporary locks at their discretion. Contractor shall provide Owner with two construction key(s) for all temporary locks. Owner may "double lock" any padlocks at their discretion.

If the Owner provides a key to the Contractor for existing Owner locks, the Contractor will be responsible for the key until returning it to the Owner. If the Contractor loses the key, the Contractor will pay for re-coring of all Owner locks that use that key.

1.54 Construction Aids

[CSI 01 54 00]

The Contractor or product manufacturer may include work, materials, or components to aid in shipping, storage, installation, or other work for their convenience. Such items shall be removed prior to final project acceptance if they may interfere with the operation or maintenance of permanent work. Some examples include, but are not limited to:

- Lifting eyes: Remove only if a safety concern, obstruction, or directed by Owner.
- Picking holes: Plug holes of buried and exterior items, or if safety concern.
- Intermediate or shipping bracing: Remove and dispose.
- Protective shipping adhesives, coatings, or covers: Remove and clean residue.

1.70 EXECUTION AND CLOSEOUT REQUIREMENTS

[CSI 01 70 00]

1.71 Examination and Preparation

[CSI 01 71 00]

1.71.23.20 Surveying Requirements for Reservoir Site

[CSI 01 71 23 20]

The Contractor shall provide a construction benchmark in a location that will not be disturbed during construction.

1.74 Cleaning and Waste Management

[CSI 01 74 00]

1.74.13 Progress Cleaning

[CSI 01 74 13]

If an area of the project will be left idle, or minimal work performed for more than two weeks, the Contractor shall clean up the area prior to moving. In this context, clean-up means: stockpiles and materials shall be removed so as not to be obstructions or hazards; surfaces graded smooth as to their purpose; traffic control systems removed, and traffic restored to the satisfaction of the local road agency.

1.74.23 Final Cleaning

[CSI 01 74 23]

All areas impacted by the work shall be restored to at least original condition, unless specifically identified otherwise in the plans or specifications. All costs are incidental.

Clean up debris and unused material and remove from the site and any buildings. If vehicle traffic causes ruts, repair asphalt (new or existing) in paved areas. In non-traffic areas back track with dozer or excavator and repair to final surface condition including necessary hydroseed, mulch, gravel, and landscaping. Eliminate weeds within the construction area prior to project closeout.

Buildings shall be broom clean and all foreign damage or markings removed or repaired.

Equipment shall be washed clean using appropriate methods.

Unpainted exposed concrete structures shall be cleaned to a consistent bare concrete surface finish. Remove extraneous substances such as efflorescence, leakage residue, and excess repair materials.

Remove existing equipment or materials identified in the contract documents or that interfere with the work. Dispose of all such existing equipment or materials unless the Owner requests items to be salvaged for their use. Owner has first right of salvage.

1.75 Starting and Adjusting

[CSI 01 75 00]

1.75.16 Startup Procedures

[CSI 01 75 16]

1.75.16.10 Startup

[CSI 01 71 16 10]

See the Automatic Control section for control system startup.

Startup shall consist of a simulated operation of all equipment and controls. The purpose of startup shall be to check that all equipment will function under operating conditions, that all interlocking controls and sequences are properly set, and that the facility will function as an operating unit.

Startup shall not occur on a Saturday, Sunday, Monday, Friday, on an Owner recognized holiday, or the day before or after an Owner recognized holiday unless approved in advance by the Owner.

Technically qualified product representatives shall be present for the startup phase. All representatives shall be trained, qualified, and have experience in troubleshooting and fixing field issues. The startup shall continue until it is demonstrated that all functions, controls, and equipment are functioning correctly.

1.75.16.12 Startup and Testing Coordination

[CSI 01 75 16 12]

The Contractor shall conduct all testing and startup. Testing and startup shall not be a cause for claims for delay by the Contractor and all expenses for testing and startup shall be incidental to this contract.

The placing of all improvements in service shall consist of three parts: "testing", "startup", and "operation". Not less than 21 calendar days before the anticipated time for beginning testing, the Contractor shall notify and submit to the Owner for approval, a complete plan for the following:

1. Schedules for tests:
   A. Control system
2. Detailed schedule of procedures for startup.
3. Complete schedule of events to be accomplished during testing.
4. An outline of work remaining under the contract that will be carried out concurrently with the operation phases.

Failure to provide proper notification to the Owner may lead to liquidated damages if schedule cannot be maintained. If rescheduling is required because components are not ready for testing, the notification requirements are reset as needed to provide 21 calendar days advance notice to reserve the Owner Representatives' time.

The Contractor shall arrange for all materials, supplies, and labor necessary to efficiently complete the testing, startup, and operation. Measuring devices must be functional, accurate, legible, and scaled appropriately for the test. The Owner has the right to reject or require verification for any measuring device the Owner suspects in its accuracy.

1.75.16.20 Testing

[CSI 01 75 16 20]

The Contractor may periodically request preliminary testing for items that must be covered or tested before other work can proceed. In these cases, do not cover up or test the work without timely notice to the Owner of its readiness for testing. Should any work be covered up without notice, approval, or consent, it must, if required by the Owner, be uncovered for examination at the Contractor's expense. All necessary equipment shall be set up and the work given a preliminary test so that defects may be discovered and repaired prior to calling out the Owner to witness the test.

Final testing consists of individual tests and checks made on equipment intended to provide proof of performance, operation, and control in the presence of the Owner. Assure proper alignment, size, condition, capability, strength, adjustment, lubrication, pressure, hydraulic test, leakage test, and all other tests deemed necessary by the Owner to determine that all materials and equipment are of specified quality, properly situated, anchored, and in all respects ready for use. Any certificates required in these specifications by the manufacturer's representatives shall be supplied to the Owner prior to startup.

All piping shall be tested as required by specifications and applicable codes. Tests on individual items of equipment shall be as necessary to show proper system operation. During testing, the Contractor shall correct any defective work discovered. Startup shall not begin until all tests required by these specifications have been completed and approved by the Owner.

Not less than five working days before the anticipated time for beginning the testing, the Contractor shall provide a list of representatives that will be attending the testing. The Owner may request additional representatives at no additional cost if said representatives are identified in these specifications.

Qualified product representatives are to be on site for startup and testing of specific pieces of equipment. Representatives required are listed in the relevant specification sections.

1.75.16.22 Scheduling of Owner Review for Testing

[CSI 01 75 16 22]

See Division 1.75.16.12 for scheduling and notification requirements.

The Contractor shall provide notification two working days and two working hours (to confirm readiness) of the scheduled test(s) to the Owner confirming that the Contractor has successfully completed all preliminary testing and that all equipment, tools, materials, labor, subcontractors, manufacturer's representatives, and all other items required for witnessed testing are available and fully functional. Failure to provide advance notification and confirmation or meet any of the testing requirements will constitute a failed test in accordance with the section Inspection and Tests of the General Conditions.

A detailed testing schedule shall be provided by the Contractor and updated as needed to be at least 48 hours ahead of actual testing. If testing requires downtime in order to perform repairs due to failed test, the Contractor shall pay the Owner in the amount of $200 per hour per Owner Representative on site (minimum of $400 per scheduled visit) for downtime lasting longer than 2-hours required to complete repairs to verify the complete construction is ready for startup and operation. This amount will be deducted from the appropriate bid item that relates to the finished construction and documented by the Owner at their discretion. The Contractor must have all systems pre-tested prior to calling the Owner for formal testing.

Schedule shall include control system testing starting on Mondays or Tuesdays so that the remainder of the week can be used to identify the stability of the control system for the SCADA system, pump station, or treatment plant. Control system testing shall not start on a Thursday, Friday, or the day before an Owner recognized holiday.

1.75.16.40 Electrical and Control Systems Testing

[CSI 01 75 16 40 or 25 08 00 or 26 08 00]

See also the applicable electrical sections for electrical system testing.

See also the applicable automation sections for automatic control system testing.

The following is a list of components that shall be tested prior to project completion. This list is intended as a general guide and is not necessarily complete:

- Pressure sensors and alarms
- Flow sensors and alarms
- Intrusion sensors and alarms
- Automatic control

1.75.16.50 Reservoir Testing and Disinfection

[CSI 33 16 05.11]

Part 1 – General

Scheduling

The following is a brief overview of the sequence.

1. Submit a Disinfection, Testing, and Dechlorination Plan.
2. Curing of coatings (if applicable).
3. Clean the interior free of debris, dirt, films, form-release agents, etc.
4. Disinfection.
5. Filling.
6. Soak test per the **Reservoir Soak Test** section.
7. Chlorine residual and coliform tests.
8. Leakage test per the **Reservoir Leakage Test** section. Can be done simultaneously with soak test and/or water quality testing.
9. Additional water quality samples after soak test. See **Reservoir Soak Test** section.

It will take up to 8 days to fill and 8 days to drain the reservoir. These time periods are included in the contract timeframe, assuming that the initial testing passes. Should a test fail and require repeated work, the contractor must anticipate these time periods during scheduling and understand that they may result in liquidated damages.

Submittals

Submit a Disinfection, Testing, and Dechlorination Plan at least fifteen (15) working days prior to initiation of work. The Plan shall include:

- Schedule with specific dates.
- (If applicable) Interior coating curing times per the coating manufacturer's recommendations.
- Cleaning methods.
- Disinfection methods. If the project includes pipelines outside of the tank, describe those separately.
- Disposal methods of discharging chlorinated water.
- Water quality sampling methods.
- Estimate of time for each laboratory water quality test. Contact a testing lab used by the Owner for assistance.
- Any proposed deviations from procedures described in these specifications.

Part 3 – Execution

Preparation

The Owner will provide water for the initial filling of the reservoir at no cost to the Contractor.

Following curing of coatings (if applicable) and prior to disinfection, clean all surfaces and permanent equipment to the satisfaction of the Owner with pressurized potable water and/or scrubbing as appropriate for the reservoir size and type of equipment. After cleaning the surface shall be free of visible dust, dirt, oil, grease, blast media, and similar substances.

Sweep up debris. Do not wash any debris into the drainpipe. Suspended sediment may be washed through the drainpipe if allowed by the Owner, but the drainpipe must be cleared of sediment and sediment may not leave the site by storm water transport.

Disinfection

Follow the procedures of AWWA C652 (Chlorination Method 2) Disinfection of Water Storage Facilities, at a minimum. The descriptions below are a synopsis of C652 but are not comprehensive and may include modifications to C652. Follow all relevant procedures in C652 and as modified herein.

Filling the reservoir from the water system shall only be performed by the Owner or under the Owner's supervision. Coordinate with the Owner sufficiently in advance. Filling is only allowed Tuesday through Thursday unless coordinated otherwise with the Owner.

1. Chlorination Method 2 (modified).
    a. Disinfect all interior surfaces including walls, floor, piping, ceiling, rafters, columns, ladders, stairs, hatches, overflow funnel/weir, and other appurtenances. Apply a solution containing not less than 200 PPM of chlorine using spray equipment or brushes. Liquid chlorine, sodium hypochlorite, or calcium hypochlorite may be used. Disinfected surfaces shall remain in contact

with the strong chlorine solution for at least 30 minutes. Fill the drainpipe with 10 ppm to 50 ppm solution.

b. If it will be more than 24 continuous hours between initial disinfection and filling, wash the chlorine solution off any stainless steel using potable water no less than 30 minutes nor more than 12 hours after disinfection.

c. Following initial disinfection, fill the reservoir to overflow with potable water. Filling must occur as soon as practical after disinfection and the 30-minute waiting period. If filling is delayed for more than one week, the disinfection shall be repeated. Purge the water in the drainpipe prior to complete filling of the reservoir (dechlorinate if necessary). Record the free chlorine residual immediately after filling.

Flushing and Dechlorination

Water with a chlorine residual shall be neutralized until it can be safely disposed of in accordance with all applicable regulations. All disposal is the responsibility of the Contractor. Water containing a chlorine residual shall not be conveyed into the sanitary sewer, stormwater system, or any surface watercourse. Control and monitor the drainage rate to prevent damage.

Field Tests

After 24 hours, the water must have a chlorine residual no less than 2.0 mg/L or 50-percent of the chlorine residual when the tank was filled, whichever is lower. If the value is less, the reservoir shall either be re-dosed with chlorine, or drained and re-disinfected, at the Owner's discretion.

After the tank has been full for 24 hours, the Owner will take water samples from the reservoir and from the existing water supply for reference. The number of samples will be decided by the Owner. A laboratory certified by the Washington State Department of Ecology will be retained by the Owner to perform tests on the samples.

Absence of coliforms is required for acceptance.

See **Reservoir Soak Test** section for additional test parameters.

Tests shall be performed for the following parameters. Measured values shall be approximately equal to that of the water used for filling. The Owner shall determine exact acceptance criteria.

- pH
- Alkalinity
- Turbidity
- Conductance

The reservoir may be placed in service when:

- All test results have been received, passed, approved by the Owner, and the necessary documents have been submitted to the Washington State Health Department.

- The chlorine residual is appropriate for the water system as determined by the Owner. If the residual is high, reduce by partially draining and blending with system water. If the residual is low, discuss approaches with the Owner.
- The water temperature is appropriate for the water system as determined by the Owner. If the temperature is high, discuss approaches with the Owner.

The Contractor may take their own water quality tests and pay for the testing services. If so, note on all lab submittal forms that the tests are "Investigative". Such tests are for the sole benefit of the Contractor and the Owner reserves the right to accept or reject the results.

Non-Conforming Work

If any test does not pass on the first attempt, all costs for remediation and retesting are the responsibility of the Contractor. Should any test fail that, in the Owner's sole opinion, requires draining the reservoir, the Contractor will be charged for additional water necessary at the Owner's unit rate for service.

If putting the reservoir into service is delayed more than 4 calendar days following receipt of acceptable test results, the Owner may elect to take follow-up samples before placing the reservoir in service. If the delay is due to the Contractor's actions, the Contractor will be responsible for all costs of remediation should any follow-up tests fail, or if in the sole opinion of the Owner the delay caused unacceptable aesthetic degradation (taste, temperature, etc.).

1.75.16.51 Reservoir Leakage Test

[CSI 33 16 05.13]

Part 1 – General

Warranty

The Contractor shall repair any leaks, running water, wet spots, etc., appearing within the warranty period stated in Division 1.43.20. Leakage standards are described in the **Field Tests** section. All repairs are subject to an additional 1-year warranty starting the date the Owner accepts the repair.

Part 3 – Execution

Preparation

A leakage test shall be performed by the Contractor following disinfection. The Owner may elect to take their own measurements and, at their sole discretion, use those measurements to determine compliance. It is recommended that the Contractor coordinate with the Owner so the parties are present (if available) at the same time for each test.

All exterior surfaces of walls and top of footing shall remain exposed for the full duration of the test, and during any repairs and retesting periods. Surfaces shall not be backfilled, covered, or otherwise obscured until the Owner determines that the reservoir has passed the leak test.

1. Close all valves.
2. Seal vents and overflow outlet with plastic sheeting to reduce evaporation.

3. Fill the reservoir with potable water to the overflow elevation.
4. (Concrete Reservoirs) Let stand for 24 hours to allow the concrete to absorb moisture.

Field Tests

Steel Reservoir

The Contractor shall provide a watertight steel tank with no leakage. Any water appearing outside of the tank will not be accepted.

Non-Conforming Work

See also the **Non-Conforming Work** section under **Reservoir Disinfection and Testing**.

If leak rate exceeds the allowable rate, the leakage shall be considered excessive and repaired by the Contractor.

1.75.16.56 Reservoir Soak Test

[CSI 33 16 05.15]

Part 1 – General

Summary

Perform a soak test to check the level of chemical contaminants in the field.

Scheduling

Follow the **Schedule** section in the **Reservoir Disinfection and Testing** section. Allow time for coatings to cure per the manufacturer's recommendations before filling.

Fill the reservoir to the overflow elevation.

The soak test period may begin once the reservoir is filled to at least 50-percent of the surface area wetted, and the filling period continues uninterrupted. The Owner has sole discretion to change this percent based on field conditions, such as slow or inconsistent fill rates. Use the following equation to calculate the fill height for 50-percent coverage.

$$h = H \times [\ 50\% - (\ 12\% \times D/H)\ ]$$

h = water height at earliest sample (feet)

H = maximum water height (floor to overflow) (feet)

D = Inside diameter (feet)

If (D/H) is 3.5 or greater, h is no less than 5% of H.

The soak test period is 7-calendar days minimum, 10-calendar days maximum.

Part 3 – Execution

Field Tests

Following the soaking period, the water in the reservoir shall be sampled by the Owner to determine the level of any leached chemicals. Samples of the water shall be analyzed by a laboratory certified by the Washington State Department of Ecology. Cost of initial test shall

be borne by the Owner. The samples shall be tested for normal domestic water quality plus the following additional constituents.

- Complete Inorganic Chemical analysis (IOC)
- Volatile Organic Chemical analysis (VOC)

IOCs and VOCs listed in Washington WAC 246-290-310 must be below the MCL before water can be released to the system.

A report of the test results will be sent to the Washington Department of Health regional office for evaluation and approval before delivering water from the reservoir. The report shall include the word "Investigative" in the title or purpose section.

Re-testing is required when contamination exceeds the maximum contaminant level or trigger level. At the Owner's discretion, the Owner may elect to put the facility in operation if the trigger level is exceeded but the maximum contaminant level is not. See **Non-Conforming Work** in the **Reservoir Disinfection and Testing** Section should tests fail.

1.78 Closeout Submittals

[CSI 01 78 00]

1.78.23 Operation and Maintenance Data

[CSI 01 78 23]

Failure to provide acceptable final documentation including operation and maintenance (O&M) manuals and as-built drawings will result in non-payment of the appropriate bid item in the schedule of prices.

See also the Automatic Controls section for additional requirements for automatic control systems manuals. Detailed requirements for specific equipment and systems may also be included in their respective specification sections.

Remove and preserve all tags and instructions that come packaged with or attached to equipment. Deliver all such documents to the Owner bound in a three-ring binder or with the O&M Manual. Insert documents in sleeves if they cannot be punched. Scan all such documents to Adobe PDF format and provide with the O&M Manual.

Prior to the receipt of payment for more than 90 percent of the work, deliver to the Owner acceptable manufacturer's instructions covering equipment and systems O&M procedures, for coatings furnished under this contract, and any additional items indicated by the Owner.

The operating and maintenance instructions shall include, as a minimum, the following data for each coating and equipment item:

Products

A. Identification including brand name, model number, and serial numbers.

B. Date of manufacture and date of installation on job site.

C. Complete as-built elementary wiring and one-line diagrams.

D. Complete parts list, by generic title and identification number, complete with exploded views of each assembly.

Maintenance

A. Recommended spare parts.

B. Lubrication schedule including the applicable lubricant designation available from the Standard Oil Company of California.

C. Recommended preventive maintenance procedures and schedules. Schedule shall be provided for daily, weekly, monthly, quarterly, semi-annually and annually maintenance.

D. Disassembly and re-assembly instructions including parts identification and a complete parts breakdown for all equipment.

E. Weights of individual components of each item of equipment weighing over 50 pounds.

F. Name, location, and telephone number of the nearest suppliers and spare parts warehouses.

G. All manufacturers' warranties. Include name, address, and telephone number of the manufacturer's representative to be contacted for warranty, parts, or service information.

H. Cleaning, repair, and maintenance instructions for each coating system.

I. Provide new USB flash drive or DVDs utilized in the manufacturer's instruction program.

Operation

A. Recommended trouble-shooting and startup procedures.

B. Recommended step-by-step operating procedures.

C. Emergency operation modes, if applicable.

D. Normal shutdown procedures.

E. Long term shutdown (mothballing) procedures.

F. Equipment specifications and guaranteed performance data.

G. General manuals which describe several items not in the contract will not be accepted unless all references to irrelevant equipment are neatly eradicated or blocked out.

Provide 3 hard copies of O&M manuals (2 for Owner, 1 for RH2). A duplicate USB or DVD copy may be provided but shall not substitute for a hard copy unless approved by the Owner.

Bind each set of instructions into multiple volumes; each volume to be complete with an index and bound in a suitable, hard-covered binder. Binders shall be hardback construction with full-length metal hinge. 3-inch to 5-inch width as appropriate for the quantity of O&M documentation. More than one binder may be required for large projects. Binders equal to

Wilson-Jones WLJ344 series or WLJ369 series or Specialty Loose Leaf models 87784, 98085, 98086, or 98984.

Manuals shall be assembled and indexed so that information on each coating and piece of equipment can be readily found.

At the Owner's discretion, progress payments for more than 90-percent of the total contract work may not be made until the O&M manual has been delivered and approved by the Owner.

The Contractor shall secure and deliver to the Owner all equipment warranties and other warranties and guarantees required for all equipment and processes. Delivery shall be done at one time covering all major and minor equipment warranties. Copies of the warranties shall be included in each O&M Manual.

See Division 1.43.20 for details regarding required warranties for specific components.

1.78.39 Project Record Documents

[CSI 01 78 39]

Prior to receiving final payment for the work, deliver a complete set of "As-Constructed" records (also called as-built, or record plans) to the Owner. The Owner has sole discretion to determine if the records provided are legibly and accurately presented and may request revisions, which shall be provided by the Contractor at no additional cost. Records shall be made as follows or as approved by the Owner:

- Yellow markings or highlights = deleted items
- Red markings = new or modified items

Records shall be provided in PDF format.

Provide "as-constructed" information on all items and work shown on the plans showing details of the finished product including dimensions, locations, outlines, changes, manufacturers, etc. The information must be in sufficient detail to allow the Owner's personnel to locate, maintain, and operate the finished product and its various components.

1.79 Demonstration and Training

[CSI 01 79 00]

1.79.10 Training

[CSI 01 79 10]

See the Automatic Control section for automatic control systems training.

At the time that the facility is ready to be put into operation, the Contractor is to conduct an operation and maintenance training meeting with the Owner to explain in detail the operation and maintenance requirements of each of the facility's components. The training meeting shall not occur on the same days as a startup.

Operation of the facility shall commence immediately after completion of testing, startup, and training and after satisfactory repairs and adjustments have been made.

1.80 PERFORMANCE REQUIREMENTS

[CSI 01 80 00]

1.81 Facility Performance Requirements

[CSI 01 81 00]

1.81.30 Seismic Restraint and Anchorage

[CSI 01 81 30]

Contractor shall furnish seismic restraint for all architectural components, equipment, tanks, machinery, piping, valves, conduit, and other mechanical and electrical components. Seismic restraint shall be designed to meet IBC (ASCE 7 Chapter 13 – "Seismic Design Requirements for Nonstructural Components") code requirements. The following design values shall be used in calculating seismic forces:

Ip = 1.5	Sds = 1.11	Seismic Design Category = D

A complete seismic restraint system shall be provided including struts, straps, bolts, nuts, washers, etc. as required for secure attachment to foundations, pads, ceilings, floors, and/or walls.

Contractor shall submit either of the following in accordance with ASCE 7, 13.2.1 for all components:

1. Project-specific design and documentation prepared and submitted by a registered design professional.
2. Submittal of the manufacturer's certification that the component is seismically qualified by
   a. Analysis
   b. Testing in accordance with the alternative set forth in ASCE 7, Section 13.2.5.
   c. Experience data in accordance with the alternative set forth in ASCE 7, Section 13.2.6.

Special Certifications are required for the following systems for Seismic Design Categories C, D, E, and F. Systems shall be certified in accordance with ASCE 7, 13.2.2.

1. Mechanical and electrical equipment that must remain operable following the design earthquake. All mechanical and electrical equipment installed under this project falls under this category.
2. Components with hazardous contents.

All materials and fabrication shall be as required in these specifications. Contractor shall submit this information to the Owner for review prior to fabrication and installation.

Install seismic restraints when called for in the contract or recommended by the product manufacturer. Install in accordance with the manufacturer's requirements as applicable.

Seismic restraint systems shall be installed so as not to interfere with normal operations and maintenance of the equipment and other components as shown on the plans. Interference

with normal operations and maintenance shall be as determined by the Owner. Drilled-in anchors for non-rotating equipment shall be Concrete Anchors unless otherwise specified.

1.81.40 Pressure Ratings

[CSI 01 81 40]

Fittings, valves, pipe, and other fluid systems shall have pressure ratings equal to or greater than the pressures identified herein, unless specifically called out otherwise in the plans or specifications. Pressures listed are gauge pressure, unless specified otherwise.

The pressure class of pipelines and appurtenances shall comply with the Owner's standards for minimum pressure class or the pressure class that meets the requirements of this section, whichever is greater.

Equipment Type or Function	Normal Pressure	Working Pressure	Test Pressure
Inlet Piping	75 psi	100 psi	150 psi
Outlet Piping	75 psi	100 psi	150 psi

Normal Pressure: The maximum pressure anticipated under normal operating conditions. This value is provided for the Contractor's information, but typically is lower than the required pressure rating of the equipment.

Working Pressure: Manufacturer's rating of maximum pressure during extended operation.

Test Pressure: Maximum pressure during project specific testing.

1.81.45 Location Designations

[CSI 01 81 45]

The following location designations shall be used except where otherwise noted on the plans:

Dry Locations: Indoor continually dry areas including office, laboratory, blower, and electrical rooms.

Wet Locations: All locations exposed to the weather, whether under a roof or not, or within channels, basins or tanks.

Damp Locations: Process areas; areas containing pumps, valves, and major piping; all spaces wholly or partially underground, or having a wall or ceiling forming part of a channel or tank, unless otherwise designated on the Plans. Any areas which do not fall within the definitions for dry, wet, or corrosive shall be considered damp.

Corrosive Locations: Areas where chlorine gas under pressure, sulfuric acid, or liquid polymer are stored or processed, sewer wetwells and sewer manholes.

Immersed or **Submerged Locations:** Areas which are periodically, or continuously submerged in, or contain a liquid.

1.81.50 Materials in Contact with Domestic Water

[CSI 01 81 50]

All devices, components, and materials substantially in contact with potable water shall be certified by NSF International to comply with NSF 600 (leachable materials) and NSF/ANSI 372 (lead content). Certification of compliance shall be supplied in writing at the time of the submittal process. See exceptions in WAC 246-290-220(1).

Division 3
Concrete

3.00 GENERAL

Sections in these specifications titled "*Common Work for . . .*" apply to all following subsections whether directly referenced or not.

3.05 Common Work for Concrete

[CSI 03 05 00]

Part 1 - General

This division covers that work necessary for furnishing and installing all concrete as described in these specifications and as shown on the Plans.

References

Materials shall conform to the following standards:

- Cement – ASTM C150
- Coarse aggregate – ASTM C33
- Fine aggregate – ASTM C33
- Admixtures – ASTM C494
- Air-entraining admixtures – ASTM C260
- Fly Ash – ASTM C618

Submittals

Submittal information shall be provided to the Owner for the following items:

- Concrete mix design including aggregate gradation and substantiating strength data.
- Admixture Data
- Special placement procedures for hot or cold weather
- Construction Joint Plan
- Concrete anchors
- Concrete anchor installer certification per ACI/CRSI Adhesive Anchor Installer Certification Program.
- Schedule of surface finishes
- Rebar mill certifications
- Rebar placement shop drawings
- Precast concrete items
- Grouts
- Embedded items

Concrete mix designs shall be submitted to the engineer for approval a minimum of two weeks prior to placing any concrete. The mix design shall include the amounts of cement, fine and coarse aggregate, water and admixtures, as well as the water cement ratio, slump, concrete yield, aggregate gradation, and substantiating strength data in accordance with ACI 318, Chapter 5. A batch plant inspection may be required, the cost of which shall be paid by the Contractor. Review of mix submittals by the engineer of record indicates only that information presented conforms generally with contract documents. Contractor or supplier maintains full responsibility for specified performance.

Part 2 - Products

Components

Nominal maximum size for aggregates is the smallest standard sieve opening through which the entire amount of aggregate is permitted to pass. Provide intermediate aggregate grades as required to achieve a well-graded mix.

All concrete surfaces exposed to weather or standing water shall be air entrained. Total air content shall be in accordance with IBC requirements unless specified otherwise herein. Air shall be measured at the truck, unless otherwise agreed to.

Water used in concrete shall be potable.

Fly ash may be substituted for up to 15 percent of the required cement, except where noted.

Mixes

Concrete shall be mixed, conveyed, and proportioned in accordance with IBC section 1905.

The concrete mix shall include the amount of cement, fine and coarse aggregate, including aggregate gradations, water, and admixtures as well as water cement ratio, slump, concrete yield, and sustaining strength data in accordance with these specifications, the requirements of the International Building Code Section 1905, and the requirements of ACI 318.

Finishes

Coat all aluminum in contact with concrete as specified in Division 9.

Part 3 - Execution

Inspection

See Statement of Special Inspections on the Drawings for special inspection requirements. Provide two (2) full working day notice to Owner prior to needing the required inspections.

Also comply with local building department and permit requirements for inspection and notification.

The Contractor shall repair, replace or modify, as appropriate, any items noted in the Special Inspector's inspection or the building department inspection.

Testing

Concrete strength tests shall be performed per section 1905.6 of the IBC and per the requirements noted herein. The Owner will provide and pay all costs of concrete testing. The Engineer shall be furnished with copies of all inspection reports and test results.

Cylinders used for concrete strength tests shall be 6 by 12. Four by 8 cylinders may be used for mixes with maximum aggregates less than 1-inch, however the testing lab must apply a 0.94 multiplier to the compressive strength test results unless data acceptable to the Engineer is presented that would justify a higher multiplier. All mixes utilizing aggregates over 1 inch shall be tested using 6 by 12 cylinders.

When 4 by 8 cylinders are utilized AASHTO T23 requirements shall be followed, and the retainer used with neoprene pads when testing for compressive strength shall be constructed according to ASTM C1231.

The Contractor will coordinate all concrete testing with the testing agency. Costs will be paid by the Owner.

Give the Owner and testing agency 48-hour notice prior to concrete placement. If Contractor fails to provide the required notice, the Owner may elect to cancel the affected concrete placement. Contractor shall be responsible for costs and delays due to improper notification.

If the Contractor schedules a concrete placement and does not notify the Owner and testing agency of a cancellation within 24 hours of the scheduled placement, the Contractor shall pay the testing agency costs for an unnecessary trip. If the Contractor fails to provide the testing agency with adequate notification and testing agency cannot attend concrete placement, Contractor shall reschedule placement. Contractor shall be responsible for all associated delays.

The Contractor shall provide all assistance and cooperation necessary to testing personnel to obtain the required concrete tests. Contractor and Owner will have access to testing results as soon as they are available.

The testing agency shall take a minimum of four samples for every 50 yards of concrete placed (and a minimum of four per pour); one for a 7-day test, two for 28-day tests, and one for backup testing in case the other two samples do not meet design strength. Additional samples may be taken to verify strength prior to form removal at the Contractor's expense.

3.06 Maintenance of Concrete

[CSI 03 01 00]

3.06.30.71 Resurfacing of Cast-in-Place Concrete

[CSI 03 01 30.61]

Part 1 - General

This division covers that work necessary for repairing spalled and damaged concrete. Repair any areas with deterioration exceeding ½-inch, where rebar is exposed or where directed by the Owner.

Part 2 - Products

Materials

CONCRETE REPAIR MATERIAL: SikaTop 111 PLUS or equal cement-based repair mortar. Mortar shall be ANSI/NSF Standard 61 approved if in contact with potable water and contain a corrosion inhibitor. See Manufacturer's Literature for primer and auxiliary products appropriate for use with the repair material.

Siloxane / Silane sealer shall be Tnemec / Chemprobe Prime-A-Pell 633 or Prime-A-Pell H20.

Part 3 - Execution

Preparation

The Contractor shall be familiar with the product and methods and be prepared to discuss the repair procedure at the Preconstruction Meeting.

High pressure power-wash the exposed structure to remove all loose, delaminated concrete to sound concrete.

Surface Preparation: Remove loose, delaminated concrete to sound concrete. Where corrosion of the reinforcement exists, continue bulk removal along the reinforcing steel and adjacent areas with evidence of corrosion-induced damage Under-cut all exposed reinforcing steel by a minimum of ¾-inch. The shape of the prepared cavity should be square or rectangular in shape. The edges of the patches shall be saw-cut perpendicular to the surface to a minimum depth of ½-inch. Repair area shall be a minimum of ½-inch deep throughout. Use abrasive blasting to remove residual dust, debris, fractured concrete, and contaminants that prevent proper bonding. Following abrasive blasting, blow out repair areas with oil-free compressed air. The final surface texture should be rough with minimum ⅛-inch amplitude.

Treatment of exposed reinforcement: All signs of corrosion should be removed from exposed reinforcing steel by an abrasive blasting, wire wheel or needle scaler. If the cross-sectional area of the reinforcing steel has been significantly reduced, the engineer should be consulted. Prime reinforcing as recommended by the repair material manufacturer.

Installation

Surface Saturation: Saturate surface with potable water. The base concrete shall be in a saturated surface dry (SSD) condition prior to application of repair material to prevent a rapid loss of moisture from the repair material and into the substrate.

Mixing and Application of Repair Material: Mixing and application shall be in strict accordance with the manufacturer's instructions. Apply the material with adequate pressure before the bond coat dries. Thoroughly consolidate the repair material into the corners of the patch and around any exposed reinforcement in the repair zone. If a second lift is required, thoroughly roughen the surface of the first lift by scoring the soft mortar to achieve an aggressive finish, similar in profile to the prepared concrete substrate. If the second lift will not be immediately applied, keep the first lift moist until application of the second lift. Finish to match existing surface. Cure using curing compound.

Apply silane sealer as specified to exposed surfaces and edges of roof slab.

3.10 FORMING AND ACCESSORIES

[CSI 03 10 00]

3.11 Formwork

[CSI 03 11 00]

3.11.13 Structural Cast in Place Forming

[CSI 03 11 13]

Part 1 – General

The Contractor shall submit a construction joint plan to the Engineer for review prior to formwork and rebar installation if altered from that shown on the Plans. Modifications to the construction joints shall be submitted to the Engineer no less than 7 working days prior to placing the forms and rebar.

Part 2 – Products

Materials

Unless otherwise directed, coat contact surface of forms with colorless, non-staining, mineral oil that is free from kerosene, or other approved suitable material, to permit satisfactory removal of forms without concrete damage.

Form construction for surfaces covered with backfill shall be made of steel, plywood, or dressed, matched lumber. Form construction for exposed surfaces shall be made of new plywood or steel without surface markings.

Part 3 - Execution

Installation/Construction

Concrete forms shall be sufficiently tight to prevent leakage of concrete or mortar and shall be properly braced or tied together to maintain desired position and shape until removed.

Conduits, pipes and sleeves of any material not harmful to concrete and within the limitations of ACI 318, Section 6.3 are permitted to be embedded in concrete with approval of the Engineer. Provide a ¾-inch chamfer or radius at all exposed corners and edges, unless specifically stated otherwise on the Plans.

Forms shall remain in place until the concrete has developed sufficient strength to withstand imposed loads without damage or deflection. Wall and slab forms shall remain in place for a minimum of 24 hours after completion of the pour. Forms for beams and suspended slabs shall remain in place for a minimum of 14 days AND until concrete has developed 28-day design strength, unless approved by the Engineer. The Contractor shall coordinate with the testing lab to verify concrete strength prior to form removal.

Do not allow water to flow through areas where forms are to be placed. During form construction and prior to placement of concrete, keep footings and floor slab areas free of standing water.

Field Quality Control

Variations from plumb, specified grade, conspicuous lines, and walls shall not exceed plus or minus ¼-inch in any 10-foot length, and shall not exceed one inch over the entire length. Variations from dimensions shall not exceed plus or minus ½-inch. Closer tolerances shall be achieved by the Contractor as necessary to accommodate equipment and other permanent materials.

3.15.19 Concrete Anchors

[CSI 03 15 19 (cast-in) or 05 05 19 (drilled)]

Part 1 - General

Quality Assurance

Installation of adhesive anchors shall be performed by personnel certified in accordance with the ACI/CRSI Adhesive Anchor Installer Certification Program. In lieu of certification the installer shall attend on-site training held by the adhesive manufacturer prior to the installation of adhesive anchors.

Part 2 - Products

Materials

Concrete Anchors shall be Hilti HIT 500-V3, Simpson SET-XP, or engineer approved equal.

Part 3 - Execution

Installation

Install in accordance with Manufacturer's recommendations. Special Inspection in accordance with IBC, Section 17, must be provided. Provide a minimum of 48 hours' notice to Engineer prior to starting installation. Concrete anchors shall not be used to resist tension or fatigue loading without Owner's evaluation and approval.

Use threaded rod or reinforcing bar as shown on the drawing, and meeting Manufacturer's recommendations. Provide minimum embedment as shown. Holes shall be drilled with carbide-tipped drill bit. Holes shall be cleaned of dust and debris. Adhesive shall be inserted with a mixing nozzle.

3.20 REINFORCING

[CSI 03 20 00]

3.21 Reinforcement Bars

[CSI 03 21 00]

3.21.11 Plain Steel Reinforcement Bars

[CSI 03 21 11]

Part 1 - General

References

ACI – American Concrete Institute- latest edition

CRSI Manual of Standard Practice – latest edition

Part 2 - Products

Materials

Grade – ASTM A706, Grade 60

ASTM A615, Grade 60 shall be permitted if:

(a) The actual yield strength based on mill tests does not exceed fy by more than 18,000 psi; and,

(b) The ratio of actual tensile strength to the actual yield strength is not less than 1.25.

Detailing - ACI 318 and ACI 315

Lap requirements - See schedule on Plans or as required by ACI 318

Tie wire - 16 gauge minimum

Bar supports shall conform to "Bar Support Specification" CRSI Manual of Standard Practice, MSP-1-80. Provide Class 1, plastic protected bar supports. Use pre-cast concrete blocks to support bars off ground. Bar supports in water holding and buried structures shall be non-metallic.

Bar supports for the bottom rebar mat of suspended slabs or beams in water holding structures must be point supports (chairs or dobbies), not continuous.

Part 3 - Execution

Installation

Reinforcing steel shall be detailed in accordance with ACI 315and 318 and as shown on the Plans. Lap all reinforcements in accordance with "the reinforcing splice and development length schedule". Provide corner bars at all wall and footing intersections. Bend wire bar ties away from formwork to provide the same concrete clearance as shown on the Plans to the bars.

Welding of reinforcing steel shall not be performed unless specifically approved by the Engineer. If approved, Contractor will arrange and pay for all required Special Inspections associated with welding of reinforcing steel.

Field Quality Control

Reinforcing steel shall be free of rust and loose scale at time of concrete placement. Bars with kinks, improper bends, or reduced cross-section due to any cause will not be used. Bars shall not be field bent. Bars may not be tack-welded or otherwise heated.

If, within the project warranty period, rust spots appear on the concrete due to failure to achieve proper clearance on the rebar or wire ties, the Contractor shall grind out and patch the areas using a method satisfactory to the engineer.

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3.30 CAST-IN-PLACE CONCRETE

[CSI 03 30 00]

3.30.05 Common Work for Cast in Place Concrete

[CSI 03 30 05]

Part 1 - General

Scheduling

Contractor shall schedule and attend a Concrete Placement meeting at least one week prior to placing concrete. The following shall attend:

- Owner
- Engineer
- Contractor
- Testing Laboratory Representative
- Concrete Supplier

The following shall be discussed at the meeting:

- Safety (Contractor's sole responsibility)
- Batching and Delivery, Adjustments to Mix; Site Dosing
- Placement Rates and Anticipated Schedule of Placing and Finishing
- Site Layout –Holding Area; Pump Truck Location; Truck Wash-out Area; Parking area
- Equipment – Pumps and Appurtenances; Vibrators; Spare Equipment
- Concrete Testing Procedures
- Curing

Delivery

Concrete shall be transported in a truck mixer to the jobsite and discharged within 1.5 hours after cement has been added to water or aggregates. Rejected concrete will be at Contractor's expense.

Part 2 - Products

Components

If allowed, curing materials shall conform to ASTM C171 and liquid membrane-forming compounds shall conform to ASTM C309. When concrete is to be coated or stained, use UV-dissipating form release and curing compounds.

Part 3 - Execution

Preparation

Do not place concrete during rain, sleet, or snow until water and freezing protection is provided.

Position embedded items accurately, and support against displacement or movement during placement.

Fill voids in sleeves, insets, anchor slots, etc., temporarily with readily removable materials to prevent entry of concrete into voids.

Before beginning placement of concrete, remove hardened concrete and foreign materials from inner surface of mixing and conveying equipment. Before depositing concrete, remove debris from space to be occupied by the concrete. Secure reinforcement in position to prevent movement during concrete placement.

At construction joints, thoroughly clean surface of existing concrete to remove laitance. Roughen existing concrete surface to expose aggregate uniformly and apply approved bonding agent to existing concrete in accordance with manufacturer's recommendations. Prior to placing fresh concrete, dampen joint and coat with grout mixture in accordance with ACI 301, Section 8.5.

Installation

Placement shall be in accordance with IBC, Section 1905.

Place no concrete when air temperature is below or expected to be below 40 degrees during the 28-day curing period unless a low temperature concrete mix has been approved by the Owner. Provide adequate equipment for heating materials and protecting concrete during freezing or near freezing weather. Keep materials, reinforcement, forms, and ground in contact with concrete free from frost at time of placement. Heat mixing water as required. Use no materials containing ice.

Place no concrete when air temperature exceeds or is expected to exceed 85 degrees during the 28-day curing period unless a high temperature placement plan has been approved, and unless adequate precautions are taken to protect work. Cool ingredients prior to mixing. Flake ice or crushed ice of a size that will melt completely during mixing may be substituted for all or part of water. Cool forms and reinforcing prior to placing concrete.

Handle concrete from mixer, ready-mixed truck, or from transporting vehicle to place of final deposit by methods which prevent separation or loss of ingredients. Under no circumstances shall concrete that has partially hardened be deposited.

Place concrete in maximum lifts of 3 feet. Deposit concrete continuously so that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within the section. If a section cannot be placed continuously, locate and reinforce construction joints at points as provided for in the Plans or as approved by the Owner. Maximum concrete drop shall be 5 feet.

Consolidate concrete by vibration, supplemented by hand spading, rodding, forking, or tamping. Thoroughly work concrete around reinforcement, around embedded items, and

into corners of forms to eliminate air or rock pockets which may cause honeycombing, pitting, or planes of weakness. Insert and withdraw internal vibrators at points approximately 18 inches in each direction and extend into the lower concrete lifts. At each insertion, the duration shall be sufficient to consolidate the concrete; but not sufficient to cause segregation. Do not use vibrators to transport concrete within forms. Consolidate slabs by utilizing vibrating screeds, roller pipe screeds, internal vibrators, or other approved methods. Have a spare vibrator available at jobsite during concrete placing operations.

After removal of forms, cut out and patch defects in concrete surfaces. Remove form tie cones. Cut or snap off form ties to a depth of ¾-inch. Chip out rock pockets, holes from form tie removal, and other defects to solid concrete. Repair defects in accordance with 3.01.30.71.

Placement for mass concrete structures:

Place no concrete when the air temperature exceeds or is expected to exceed 70 degrees within 4 days of the concrete placement unless concrete precooling procedures have been submitted and approved by the owner.

Mass concrete temperatures shall be monitored for a minimum of 10 days following placement. Thermometers must have the ability to measure temperatures up to 180 degrees Fahrenheit. Insulating blankets shall be placed over all exposed surfaces and kept in place until the hottest portion of the concrete is within 35 degrees of the average air temperature. This may require that the insulation be left in place for several weeks.

Curing

See section 3.39.

3.31.30 Thrust Blocks, Driveways, Curb, Gutter, Sidewalks, Equipment Pads, and Fence Posts

[CSI 03 31 13.10]

Part 1 - General

Summary

All concrete for non-structural applications including thrust blocks, driveways, sidewalks, equipment pads, and fence post foundations. Hydraulic or Structural Concrete may be substituted.

Performance Requirements

28-day compressive strength – 4,500 psi minimum

Part 2 - Products

Mixes

Water/cement ratio - 0.45 maximum

Nominal maximum aggregate size – ¾-inch (AASHTO Grading No. 67)

Entrained air ratio – 3.5 percent minimum to 6.5 percent maximum

3.31.32 Hydraulic Concrete

[CSI 03 31 13.12]

Part 1 - General

Summary

All concrete as shown on the Plans including the reservoir foundation. Use water reducers for all concrete. Use super-plasticizers to achieve required slump.

Performance Requirements

28-day compressive strength – 4500 psi minimum

Slump – Without plasticizers; 4 inches for floor and roof slabs, 7 inches for walls. With plasticizers, maximum 9 inches and as desired for placement.

Part 2 - Products

Mixes

Water/cement ratio - 0.38 maximum

Nominal maximum aggregate size – 1½-inch

Combined Grading Limits: Limits shown are for all course and all sand mixed together, (combined).

Sieve Sizes	Combined Grading Limits
	1½" Max.
2"	-100
1½"	95 - 100
1"	65 - 85
3/4"	55 -75
1/2"	-
3/8"	40 - 55
No. 4	30 - 45
No. 8	23 - 38
No. 16	16 - 30
No. 30	10 - 20
No. 50	4 - 10
No. 100	0 - 3
No. 200	0 - 2

Entrained air ratio – 4.0 percent minimum to 7.0 percent maximum

3.31.36 Concrete for Mass Structures

[CSI 03 31 13.16]

Part 1 - General

Summary

This section includes all concrete as shown on the Plans for mass structures. Mass concrete shall be considered any concrete placement with a dimension in three directions of 3 feet or greater.

Part 2 - Products

Mixes

Concrete mix for mass concrete shall be the same as Hydraulic Concrete except for the following:

- Class F Fly Ash shall be substituted for 25 percent to 35 percent of the cementitious material

3.35 Concrete Finishing

[CSI 03 35 00]

3.35.05 Common Work for Surface Finishing

[CSI 03 35 05]

Part 2 - Products

Finishes

Each concrete area that requires finishing shall conform to one of the following requirements:

- Foundation (exterior) - Ordinary Wall
- Foundation (interior) - Ordinary Wall

Part 3 - Execution

Preparation

Do not place concrete which requires finishing until the materials, tools, and labor necessary for finishing the wet concrete are on the job and acceptable to the Owner. If rainfall is possible, tent the work area prior to the pour and maintain protection until the concrete is cured sufficiently to resist damage.

3.35.50 Ordinary Wall Finish

[CSI 03 35 50]

Part 2 Products

Materials

Ordinary Wall Finish requires the use of like-new forms and linings that will produce a uniform surface.

Part 3 - Execution

Construction

After points have set sufficiently, grind or fill form marks and pointings to give a smooth surface even with flat wall surface. Fill all holes greater than ¼-inch with 1:2 mortar floated to an even, uniform finish.

3.39 Concrete Curing

[CSI 03 39 00]

Part 2 - Products

Materials

Curing compounds are not permitted on surfaces that will receive coatings.

Part 3 - Execution

Installation

All concrete for structures, sidewalks, drives, curbs, shotcrete (see section 3.37), and where directed by the Owner, shall be water-cured in accordance with ACI 308.1 unless approved in advance by the Owner. If allowed, curing compound shall be applied immediately after finishing or form removal. When plastic or burlap covers are used to augment or protect curing, extend sheeting beyond the edges of the concrete and secure against wind lift. Inspect and adjust curing systems daily, including over weekends and holidays.

Concrete structures that require differential backfill as shown on the Plans or as required for construction shall cure for a minimum of the following prior to placing backfill:

- Backfill equal or greater than 24 inches: 7 days AND 28-day strength requirements.
- Backfill between 6 and 24 inches: 3 days AND 80-percent of the 28-day strength requirements.

All exposed surfaces of mass concrete structures shall be cured using an approved curing compound. Curing compound shall be sprayed on the concrete surface in a uniform manner and according the manufacturer's recommendations immediately after the concrete has reached sufficient strength to support a person's weight without creating a visible footprint.

3.60 GROUTING

[CSI 03 60 00]

3.62 Non-Shrink Grouting

[CSI 03 62 00]

3.62.13 Non-Metallic Non-Shrink Grout

[CSI 03 62 13]

Part 1 - General

Summary

Use Precision Non-Shrink Grout for grouting all equipment base plates, pipe supports, and base plates for metalwork. Precision Non-Shrink grout may also be used for all other non-shrink grouting operations. General Purpose Non-Shrink grout may be used for any applications other than those noted for Precision Non-shrink Grout. Non-shrink grout shall be used to seal all new pipe and conduit penetrations (watertight) into and out of all concrete and CMU block walled structures.

Storage and Handling

Stockpile grout to prevent contamination from foreign materials and store admixtures to prevent contamination or damage from excess temperature change

Part 2 - Products

Materials

Precision Non-Shrink Grout:

Provide a high-precision, fluid, non-shrink, quartz or non-catalyzed metallic aggregate grouting material. Provide a ready-to-use grout that hardens free from bleeding, settlement, or drying shrinkage when mixed, placed and cured at any consistency – fluid, flowable, plastic or damp-pack.

Provide precision, non-shrink natural aggregate grout that when cured produces the following properties:

A. Compressive Strength at fluid consistency (ASTM C109-Modified): 3500 psi (24 MPa) at 1 day, 7500 psi (52 MPa) at 28 days.

B. Passes ASTM C1107 as a grade B grout when tested as temperature minimum and maximums of 45 degrees Fahrenheit to 90 degrees Fahrenheit (8 degrees Celsius to 32 degrees Celsius) at a working time of 30 minutes. Grout must be tested at a fluid consistency per ASTM C939 and remain fluid at temperature range minimum and maximums for the 30-minute working time. All materials including water must be mixed and tested at temperature minimum/maximums.

C. Modulus of Elasticity at 28 days at fluid consistency (ASTM C469): 3.0 x 10^6 psi (20.7 GPa) minimum, 3.9 x 10^6 (27.0 GPa) maximum.

D. Coefficient of Thermal Expansion for fluid consistency (ASTM C531): 7.5 x 10^{-6}/ degrees Fahrenheit maximum (13.5 x 10^{-6}/ degrees Celsius).

E. Flexural strength at 28 days for fluid consistency (ASTM C78): 1300 psi (7.9 MPa).

F. Resistance to rapid freezing – thawing (ASTM C666, Procedure A): 300 cycles- min RDF 90 percent.

G. Split tensile strength at 28 days at fluid consistency (ASTM C496): 450 psi (3.1 MPa).

H. Pass 24-hour grout test under stated temperature, time and fluidity constraints. See MBT Protection and Repair 24-hour Grout Form.

Precision non-shrink grout shall be MasterFlow 928 or 885 Grout or approved equal.

General Purpose Non-Shrink Grout:

General Purpose Non-shrink grout shall meet the compressive strength and nonshrink requirements of CRD-C 621, Grades B and C; Corp of Engineers Specification for Non-shrink grout; and ASTM C1107, Grades B and C. General Purpose Non-shrink grout shall be MasterFlow 713, Dayton Superior 1107 Advantage, or approved equal.

Provide curing compounds as recommended by the grout manufacturer.

Water to be used in mixing the grout shall be potable.

Mixes

Comply with grout manufacturer's recommendations for mixing procedures.

Adjust water temperature to keep mixed grout temperature in the range of 45 degrees Fahrenheit (7 degrees Celsius) and 90 degrees Fahrenheit (32 degrees Celsius) minimum/maximum.

Use cold or iced water to extend working time in hot weather or in large placements.

Use warm water in cold conditions to achieve minimum as mixed temperatures.

Part 3 - Installation

Preparation

Mechanically remove unsound concrete within the limits of the grout placement.

Remove at least ¼-inch (6mm) of existing concrete facing and continue removal as required to expose sound aggregate.

Thoroughly clean the roughened surface of dirt, loose chips, and dust. Maintain substrate in a saturated condition for 24 hours prior to grouting. Surface should be saturated surface dry at time of grouting.

Clean baseplates and other metal surfaces to be grouted to obtain maximum adhesion. Remove loose rust and scale by grinding or sanding.

Comply with grout manufacturer's recommendations for form construction. Construct forms to be liquid tight.

Installation

Place grout mixture into prepared areas from one side to the other. Avoid placing grout from opposite sides in order to prevent voids. Work material firmly into the bottom and sides to assure good bond and to eliminate voids.

Ensure that foundation and baseplate are within maximum/minimum placement temperatures. Shade foundation from summer sunlight under hot conditions. Warm foundation when foundation temperature is below 45 degrees Fahrenheit (7 degrees Celsius).

Wet cure exposed shoulders for 48 hours followed by two coats of curing compound for best results. The minimal requirement is to wet cure until grout has reached final set, followed by two coats of curing compounds.

Division 5
Metals

5.00 GENERAL

This division covers that work necessary for furnishing and installing metalwork as described in these specifications and as shown on the Plans.

Sections in these specifications titled "*Common Work for* . . . apply to all following subsections whether directly referenced or not.

5.05 Common Work for Metals

[CSI 05 05 00]

Part 1 - General

Related Sections

- Division 1.81.45 Location Designations
- Division 9.90.00 Common Work for Painting and Coating
- Division 9.90.01 Color Schedule
- Division 9.91.13.12 Metals in contact with Concrete
- Division 9.91.13.01 Exterior metals
- Division 9.91.33 Submerged metals
- Division 1.81.30 Seismic Restraint

Submittals

Submittal information shall be provided to the Owner for the following items:

- Shop Drawings showing details of Fabricated Metalwork including connections and welding
- Calculations and plans stamped by a professional engineer licensed in the State of Washington for all Contractor- or Manufacturer-designed components or assemblies.
- Hand rail and guardrail
- Welder certifications if applicable. For ASME Section IX certifications, and if requested by the Owner, provide a continuity log if the last certification was 6 months prior to the work being performed.

Inspections

Unless otherwise noted on the Plans, specifications, or building department requirements, special inspections related to metal fabrications, placement and welding shall be subject to 48-hour notice to the Engineer prior to the inspection time. 48-hour notice is defined in Division 1, Contractor Responsibility.

Any Field welding shown on the Plans will require special inspections in accordance with section 1704.3 of the IBC and AISC 360.

Quality Assurance

Only prequalified welds (as defined by AWS) shall be used.

Fabricator shall be registered and approved by American Institute of Steel Construction (AISC) to perform shop fabrication without special inspection. Submit certificate of compliance to the Owner at the completion of fabrication. Owner will forward this to the Building Official.

If fabricator is not registered and approved, or the certificate of compliance is not received, the Contractor shall reimburse the Owner for all Special Inspections required by the IBC on shop fabricated items. The Contractor shall also reimburse the Owner for all Special Inspections required by the IBC for field welding not specifically shown on the Plans. Contractor shall alert Owner at least 30 calendar days in advance if such Special Inspections will be required in order to procure the services of a testing lab.

Special Inspection by the Owner does not relieve the Contractor of responsibility of performing his own inspections and testing to ensure that all items are properly constructed.

Part 2 - Products

Materials

Structural Steel

Structural steel shall conform to the following requirements:

Plates, shapes, angles, rods - ASTM A36 and A992, Fy ≥ 36 ksi

Special shapes, plates - ASTM A572, Fy ≥ 50 ksi

Pipe Columns - ASTM A53, Grade B Type E or S, Fy ≥ 35 ksi (see Division 15.22 for steel pipe carrying fluids).

Structural Tubing - ASTM A500, Grade B, Fy ≥ 46 ksi

Stainless Steel

Stainless steel shall be type 304 (non-welded) or type 304L (welded) or as called out.

Plates - ASTM A240

Fasteners - ASTM F593

Extruded Structural Shapes - ASTM A276

Pipe - ASTM A240 or higher grade or as called out.

See Section 15.22.4 for information on pipe used for mechanical applications.

All stainless steel shall have a standard mill finish where concealed or No. 4 finish where exposed and shall be cleaned of all foreign matter before delivery to the job site.

Aluminum

Plates - ASTM B209, Type 6061-T6

Extruded Shapes - ASTM B308, Type 6061-T6

Pipe - ASTM B210 Type 6061

Architectural Applications - ASTM B210, Type 6063

Aluminum materials in contact with concrete or other metals or other masonry materials shall have surfaces coated per Division 9.

Galvanized Steel

Base metal shall be as specified for Mild Steel.

Hot-dip galvanized after fabrication in accordance with ASTM A 924/A 924M.

Finishes: For pieces that will NOT be painted, galvanize with zinc coating in accordance with ASTM A 653/A 653M. For pieces that WILL be painted, galvanneal with zinc/10 percent iron coating in accordance with ASTM A 653/A 653M.

Manufactured Units

Design of Contractor- or Manufacturer-designed components or assemblies shall meet the specific component requirements as provided here-in, as well as all applicable state and federal codes. Design shall include gravity loads and seismic loads in accordance with ASCE 7-10 Chapter 13 "Seismic Design Requirements for Nonstructural Components". Design criteria shall be as provided herein for components, and as provided on the Plans.

Contractor-designed components and assemblies shall be shop welded and field bolted if possible. Field welding will NOT be allowed unless specifically shown, or there is no reasonable alternative.

Finishes

All steel fabrications shall be surface prepped, shop primed and field coated in accordance with Division 9. Shop priming shall be protected as required to prevent damage to the coating during shipping. Hold back shop priming from areas to be field welded.

Isolate and coat dissimilar metals to prevent galvanic corrosion.

Non-exposed structural steel: Mill finish or as shown on Plans

Exposed structural steel (damp or wet locations): Division 9

Aluminum: Division 9

Galvanized steel: Division 9

Stainless steel: Uncoated

Part 3 - Execution

Fabrication

All welding shall be in accordance with AISC and American Welding Society (AWS) standards and shall be performed by AISC and/or AWS certified welders using electrodes to match base

material. Only prequalified welds (as defined by AWS) shall be used. Welding inspection shall be performed in accordance with the applicable AWS provisions and Chapter 17 of the IBC. Shop welding requiring inspection or testing per IBC Chapter 17 must be tested by an independent testing laboratory certified by AWS and approved by the owner at the Contractor's expense. Field welding, where required or allowed, will be inspected by a representative of the owner at the owner's expense. This does not relieve the Contractor of responsibility of performing his own inspections and testing to ensure that all items are properly constructed.

All shop welds shall be ground smooth.

Any shop paint on metal surfaces adjacent to joints to be field welded shall be wire brushed to remove the paint film prior to welding.

Where steel items to be welded are galvanized, galvanizing must first be removed by grinding with a silicon carbide wheel, by grit blasting or by sand blasting.

Any cutting or grinding equipment used on stainless steel must be new or only previously used on other stainless-steel material.

All stainless-steel shop welds shall be pickled after welding to remove heat damage and contaminants. Field welds must be passivated using an Engineer approved product (Citrisurf 2210 or equal). If the metal will be in contact with potable water, pickling and passivation products must be citric acid based and thoroughly removed, or use a product approved by USDA or NSF.

Installation

Fabrications shall be installed as shown on the approved shop drawings. All members shall be accurately located and erected plumb and level.

Metal fabrications shall be installed or erected as based on the American Institute of Steel Construction (AISC) "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", latest edition, plus all referenced code requirements.

Temporary bracing, such as temporary guys, braces, false-work, cribbing, or other elements, shall be provided by the Contractor in accordance with the requirements of the "Code of Standard Practice", wherever necessary to accommodate all loads to which the structure may be subjected, including construction loads. Such bracing shall be left in place as long as may be required for safety. As erection progresses, the work shall be securely bolted or welded to compensate for all loads during construction.

No permanent bolting or welding shall be performed until the structure has been properly aligned.

5.05.23 Bolts and Other Connectors For Structural Elements

[CSI 05 05 23, 06 05 23]

Part 2 - Products

Materials

Bolts and other connectors not specifically called out otherwise shall be in accordance with the following.

Under no circumstances shall the fasteners be of lesser strength or higher corrosion potential than the materials being connected.

Connection bolts, nuts and washers for all materials in wet, damp or corrosive locations shall be Stainless Steel, alloy 304 in raw domestic or treated domestic water, alloy 316 in treatment process and sewage applications, and alloy 317 for acidic transport. Bolts and nuts shall meet ASTM F593B (bolts ¼-inch to 1½-inch in diameter with 30 ksi yield) and F594B (nuts). Use Nitronic 60 bolts and nuts for strong chlorine environments.

Steel and cast-iron fabrications: Connection bolts for dry locations shall be ASTM A307 galvanized or zinc plated bolts.

Structural Plastic Fabrications: Connection bolts shall be ASTM A307 galvanized in dry applications and Stainless Steel in wet, damp or corrosive locations.

Aluminum Fabrications: Connection bolts shall be ASTM A307 galvanized. Aluminum fasteners may be allowed where high strength is not needed (e.g. mounting expanded metal screens, or louver fins), confirm with Engineer prior to use. Steel screws must be galvanized, or zinc plated. 300 Series stainless steel fasteners allowed only with the use of isolating washers.

Stainless steel fabrications: Fasteners to match same stainless series as structure (e.g. 300 series fasteners with 300 series structure)

Bolts installed into hardened concrete and CMU shall be Concrete Anchors per section 3.15.19.

Bolts and studs shall be long enough that at least two threads extend beyond the face of the tightened nut.

For pump anchor bolts, see Division 11.

For mechanical pipe (non-structural) connections, see Division 15.21, "Common Work for Pipe and Fittings".

Part 3 - Execution

Installation

All materials to be joined together shall be connected as shown on the Plans, specifications, as recommended by the manufacturer, or as required by standard industry practices if not otherwise specified.

Dissimilar metals:

In damp locations, isolate dissimilar metals using nylon isolation sleeves and washers, Cooper B-Line Nylon Headed Sleeve Kit or equal.

For wet locations: avoid dissimilar metals unless specifically approved or shown. Use similar metals with welded connections. If approved or shown, use galvanized mild steel

bolts installed into prepped and coated holes with additional field coating over the top of bolt.

5.52 METAL RAILINGS

[CSI 05 52 00]

5.52.05 Common Work for Railings

[CSI 05 52 05]

Part 1 - General

Related Sections

This section also applies to section 6.81.13 Fiberglass Reinforced Plastic (FRP) Handrails.

References

Handrail and Guardrail systems shall be designed to meet the requirements of the IBC, ASCE 7, OSHA, and shall comply with Section 296-24-750 of the Washington Administrative Code.

Performance Requirements

Handrails and guardrails shall be designed to withstand a 200 lbs. concentrated load applied in any direction at any point to the top rail. Handrails and guardrails shall also be designed to withstand a load of 50 lbs./foot applied horizontally to the top rail. The two loads will not be applied simultaneously. The completed handrail installation shall prevent the passage of a sphere not more than 4-inch in diameter in areas with public access or, in areas not open to the public, shall have at least a midrail and top rail with 19-inches maximum vertical space between.

Part 2 - Products

Components

Handrail and guardrail systems shall be supplied and installed complete with posts, rails, toe-boards, connectors, plugs, end caps, bolts, nuts and washers, and other accessories as required for a complete installation. Post spacing shall be a maximum of 6 feet, 0 inches on horizontal runs and 4 feet, 0 inches on inclined runs, or as shown on the Plans. Post locations shall be no greater than 24 inches nor less than 9 inches from horizontal or vertical change in handrail direction.

Posts shall not interrupt the continuation of the top rail at any point along the railing, including corners and end terminations. The top surface of handrail or guardrail shall be smooth and shall not be interrupted by a projecting fitting. (OSHA 1910.29(b), WAC 296-24-75011(1))

Toe-board is required where shown on the Plans, and where there is a danger of tools, materials, or equipment falling and striking employees below and shall conform to OSHA standards. Toe-board shall be a minimum of 3.5-inches tall. Toe-board shall begin ¼-inch above the walking surface where the walking surface is a solid surface to allow for drainage (not required for grating walking surface).

Openings in the rail shall be guarded by a self-closing gate (OSHA 1910.23(e)(1)). Safety chains shall not be used unless specifically shown on the Plans.

Finishes

Steel rail systems shall be coated with the reservoir.

5.53 METAL GRATINGS

[CSI 05 53 00]

5.53.05 Common Work for Gratings

[CSI 05 53 05]

Part 1 - General

Related Sections

This section also applies to section 6.74.13 Fiberglass Reinforced Gratings.

Design Requirements

Grating shall be selected for a ¼-inch maximum deflection under a uniform live load of 100 psf or a point live load of 500 pounds at any point on the grating (whichever is more critical), unless otherwise shown on the Plans. Thickness shall be as needed to meet these requirements unless otherwise shown on the Plans.

Panels shall be sized such that any single grating piece shall not weigh more than 50 pounds.

The horizontal clearance between the grating and grating supports shall not be less than ¼-inch nor greater than ½-inch. Contractor shall field measure grating supports as required to achieve required fit. Shop drawings shall be based on field dimensions as appropriate.

Part 2 - Products

Materials

Unless shown otherwise, materials used for supporting members shall match the materials used for the grating except all embedded grating supports shall be stainless steel, and grating supports for FRP grating may be stainless steel.

Attachment between grating and supporting members below grating shall be made with a minimum of four clips per panel. All mechanical grating clips shall be manufactured of Type 316SS (stainless steel).

Fabrication

Grating shall be fabricated in such a manner that field cutting and drilling is not required. Panels shall be fabricated and installed in strict accordance with the manufacturer's recommendations.

Part 3 - Execution

Installation

Cut notches around pipes, conduits and other penetrations in such a way that panel removal/installation will not impinge on said objects. The horizontal clearance around grating panels shall not be less than 1/8-inch nor greater than 3/8-inch. File and de-burr cut edges. Contractor shall field measure grating supports as required to achieve required fit. Shop drawings shall be based on field dimensions as appropriate.

5.53.13 Bar Gratings

[CSI 05 53 13]

Part 2 - Products

Materials

Steel grating shall be welded rectangular bar grating, maximum 4-inch by $1\frac{3}{16}$-inch bar spacing unless otherwise noted on the Plans. Grating shall have a minimum bearing bar thickness of $\frac{3}{16}$-inch. All edges of metal grating shall be banded with $\frac{3}{16}$-inch banding matching the depth of the grating. Depth of bars shall be as shown, or as required for loads and spans.

Aluminum grating shall be swaged grating, maximum 4-inch by $1\frac{3}{16}$-inch bar spacing, unless otherwise noted on the Plans. Grating shall have a minimum bearing bar thickness of $\frac{3}{16}$-inch. All edges of metal grating shall be banded with $\frac{3}{16}$-inch banding matching the depth of the grating. Depth of bars shall be as shown, or as required for loads and spans.

6.74.13 Fiberglass Reinforced Plastic (FRP) Grating

[CSI 06 74 13]

Part 1 - General

Related Sections

5.53.05 Common Work for Gratings also applies to this specification.

Design Requirements

Deflection with a 100 lb/sf distributed load or 500 lb concentrated load (whichever is more stringent) must be less than span length/100, and no more than 0.28-inch.

Gratings shall have tested burn time of less than 30 seconds and an extent of burn rate less than or equal to 10 millimeters per ASTM D635.

Supply a copy of the ICBO report or test report from an independent testing laboratory showing ASTM-E84 flame spread and structural properties, including deflection. Test results must be less than two years old. ASTM-E84 flame spread must be less than 30.

Part 2 - Products

Materials

FRP grating with a clear span of 48 inches or less may be molded grating with smooth mold surfaces. All bearing bars and cross-bars of the grating shall be molded at the same time into a one-piece construction.

FRP grating with a clear span of greater than 48 inches shall be pultruded structural load and tie bar components. Form the load bar using continuous strand roving and an outside covered with a continuous strand mat and a UV resistant synthetic surfacing veil. Provide mechanical and bonded intersection between the load and tie bar components. Every end of every load bar must be structurally supported.

Supporting members shall be FRP or stainless-steel structural shapes unless shown otherwise.

Finishes

Grating bars shall have a skid-resistant walking surface.

All finished surfaces of FRP items and fabrications shall be resin-rich, free of voids and without dry spots, cracks, crazes or unreinforced areas. All glass fibers shall be well covered with resin to protect against their exposure due to wear or weathering.

Seal all cut or damaged edges with a resin sealant of equal or superior corrosion resistance to the grating.

Division 7
Thermal and Moisture Protection

7.00 GENERAL

This division covers furnishing all labor, materials, and equipment for providing a structure that is completely weather-tight.

Sections in these specifications titled "*Common Work for . . .*" shall apply to all following subsections whether directly referenced or not.

7.05 Common Work for Thermal and Moisture Protection

[CSI 07 05 00]

Part 1 - General

Submittals

Submittal information shall be provided to the Owner for the following items:

- Piping insulation
- Joint sealants
- Caulk

7.24 Exterior Insulation and Finish Systems

[CSI 07 24 00]

7.24.32 Exposed Small Piping Insulation

[CSI 07 24 32]

Part 2 – Products

Manufacturers

Insulation shall be equal to S and S Industries.

Part 3 – Execution

Installation

All exposed piping 1-inch and less used to distribute hot, tepid, cold, potable, and non-potable water shall be insulated with closed-cell polystyrene insulation pre-slit and installed per manufacturer's written information. Insulation shall be sized to match the diameter of the piping.

7.24.34 Exposed Large Piping Insulation

[CSI 07 24 34]

Part 1 – General

Performance Requirements

Insulation for exposed conditions shall be UV resistant and appropriate for exterior exposure in temperature ranges of -20 degrees Fahrenheit to 120 degrees Fahrenheit. Insulation shall have a minimum R-10 performance.

Part 2 – Products

Manufacturers

Insulation equal to Urecon Pre-Insulated Pipe.

Materials

Insulation shall be rigid polyurethane foam, suitable for the environment in which it will be installed.

Part 3 – Execution

Installation

Install per manufacturers recommendations. Seal gaps in insulation between joints with manufacturers supplied products. Repair any damaged insulation per manufacturer's instructions.

7.90 JOINT PROTECTION

[CSI 07 90 00]

7.92.13 Elastomeric Joint Sealants

[CSI 07 92 13]

Part 1 – General

Submittals

Submit schedule for caulk used on the project for approval prior to application.

Part 2 – Products

Materials

Kitchen, Bath, Laboratory, and Other Wet Areas

DAP® KWIK SEAL PLUS® Premium Kitchen & Bath Adhesive Caulk w/MICROBAN® or equal.

Concrete and Masonry

DAP® Premium Polyurethane Concrete & Masonry Sealant or equal.

Wood or Concrete Board Siding

DAP® ALEX PLUS® Acrylic Latex Caulk Plus Silicone or equal.

Doors and Windows

DAP® DYNAFLEX 230® Premium Elastomeric Sealant or equal. Where necessary to provide a suitable backstop and bond breaker, tightly pack with polyethylene foam. Rope the back of grooves, leaving a minimum depth of ¼-inch for sealant. Prime surfaces as recommended by manufacturer.

Other Surfaces

Contractor shall provide caulk appropriate to surface and reason for caulk application. Caulk shall be the most durable available (longest warranty) by DAP®, or equal.

Part 3 – Execution

Installation

Caulk all joints and spaces necessary to provide a completely weather-tight product.

Apply caulking in strict accordance with manufacturer's directions with regard to temperature at application and curing times, surface condition, moisture, and cleanliness.

Apply after surfacing prime and prior to final coatings if surface is to be coated. If surface will not be coated, provide color choices to the Owner for approval prior to application.

Clean all adjoining surfaces of excess sealant, smears, or marking due to application and leave joints with neat, uniformly-filled surfaces.

7.92.15 Concrete Reservoir Joint Sealants

[CSI 07 92 15]

Part 1 – General

Submittals

Submit schedule for sealant used on the project for approval prior to application.

Part 2 – Products

Materials

Concrete Reservoir Joint Sealants

Joints not requiring waterstops or when so indicated on the Drawings, shall be sealed with a mastic joint sealer material of uniform, stiff consistency that does not contain solvents. The mastic shall adhere to primed concrete surfaces and shall be NSF-61 approved for use in potable water. The material shall be of a type that will effectively and permanently seal joints subject to movements in concrete

The mastic joint sealer shall be an acceptable two-part, self-leveling (or gun grade), non-staining, polyurethane elastomeric sealant which cures at ambient temperature. Acceptable sealants shall conform to ASTM C920 or Federal Specification TT-S-00227E.

For sloping joints, vertical joints and overhead horizontal joints, only "non-sag" compounds shall be used; all such compounds shall conform to the requirements of ANSI/ASTM C920 Class 12-1/2, or Federal Specification TT-S-0027 E(3), Type II.

For plane horizontal joints, use self-leveling compounds which meet the requirements of ANSI/ASTM C920 Class 25, or Federal Specification TT-S-0027 E(3), Type I. For joints subject to either pedestrian or vehicular traffic, a compound providing non-tracking characteristics, and having a Shore "A" hardness range of 25 to 35, shall be used.

Primer materials, if recommended by the sealant manufacturer, shall conform to the printed recommendations of the sealant manufacturer.

Reservoir joint sealant shall be Sikaflex/2C polyurethane elastomeric sealant as manufactured by Sika Chemical Corp, PSI-270 reservoir sealant, as manufactured by Polymeric Systems, Inc., or approved equal.

Backing Rods

Backing rod shall be an extruded closed-cell, polyethylene foam rod. The material shall be compatible with the joint sealant material used and shall have a tensile strength of not less than 40 psi and a compression deflection of approximately 25 percent at 8 psi. The rod shall be ⅛-inch larger in diameter than the joint width except that a one-inch diameter rod shall be used for a ¾-inch wide joint.

Part 3 – Execution

Installation

Seal all joints and spaces necessary to provide a completely weather-tight product.

Joint sealed areas shall be blown clean of dust and sand with compressed air before the material may be applied. Apply sealant in strict accordance with manufacturer's directions with regard to temperature at application and curing times, surface condition, moisture, and cleanliness.

Apply after surfacing prime and prior to final coatings if surface is to be coated. If surface will not be coated, provide color choices to the Owner for approval prior to application.

Clean all adjoining surfaces of excess sealant, smears, or marking due to application and leave joints with neat, uniformly-filled surfaces.

Division 8
Openings

8.00 GENERAL

Sections in these specifications titled "*Common Work for . . .*" apply to all following subsections whether directly referenced or not.

8.05 Common Work for Openings

[CSI 08 05 00]

Part 1 - General

Summary

This division covers furnishing all labor, materials, and equipment necessary for providing all interior and exterior doors, frames, and windows.

Related Sections

- Division 5.05.23 Bolts and Other Connectors

Submittals

Submittal information shall be provided to the Owner for the following items:

- Hatches

8.30 SPECIALTY DOORS

[CSI 08 30 00]

8.31.22 Reservoir Roof Hatch

[CSI 08 31 22 or 07 72 33]

Part 1 - General

Related Sections

1.52.20 Locks and Keys

Submittals

Submit grease certification for potable water contact, if applicable.

Part 2 - Products

Manufacturers

Roof Hatch as manufactured by Bilco, Nystrom, or approved equal.

Components

Reservoir roof hatch shall have an overlapping cover to prevent entry of wind-driven rain. Hatch, curb, and frame shall be of one material, either aluminum, stainless, or galvanized steel.

Any drainage provision provided by the hatch or frame shall be routed to the exterior or drain system unless shown otherwise on the Plans.

Hatch shall include spring assist opening and rubber gasket suitable for contact with domestic water. All hardware shall be stainless steel or aluminum. Provide a hold-open arm for hatches that do not open 180 degrees.

Provide locking latch handle. Include integral padlock hasp. An internal lever shall open the latch to prevent accidental entrapment.

Distance from top of curb to hatch top shall be no less than 4 inches.

Size of hatch shall be as shown on the plans, but in no event shall be smaller than 24 inches by 24 inches.

If the hatch includes grease-filled spring cylinders, the grease must be rated for contact with potable water. Acceptable standards are NSF 61, FDA H1, FDA H3, or NSF 116.

Division 9
Finishes

9.00 GENERAL

This division covers that work necessary for providing all materials, equipment, and labor to coat all items in accordance with these specifications.

Sections in these specifications titled "Common Work for . . ." shall apply to all following subsections whether directly referenced or not.

9.90 PAINTING AND COATING

9.90.00 Common Work for Painting and Coating

Part 1 – General

Scope

The work specified in this Section covers the furnishing and installation of protective coating, complete in place. The Finishes Bid Item includes new pipe coatings, complete replacement of interior lining system (Schedule A) and repair of the exterior coating system (Bid Item #12) for proposed improvements and areas damaged or removed due to proposed improvements. Schedule B includes repair of the interior coating system for proposed improvements and areas damaged or removed due to proposed improvements. Shop coating and/or factory applied finishes on manufactured or fabricated items may be specified elsewhere. Regardless of the number of coats previously applied, at least two coats of paint shall be applied in the field to all coated surfaces unless otherwise specified herein.

The nominal dimensions of the existing reservoir are as follows:

- 93-foot diameter; and
- 40-foot height.

The reservoir was built in the 1980s.

A coatings evaluation is included in **Appendix A**.

Submittals

- Provide applicator qualifications/experience for shop and field work. Provide manufacturer's approval of coating system applicator.
- Provide quality control program including QC personnel credentials and QC inspection template.
- Submit credentials for Level 3 AMPP inspector.
- Submit containment plan, including method to collect paint chips during pressure washing and method of capturing waste generated during surface preparation. If utilized, provide detailed design and description of the proposed containment system, including materials of construction and methods of structural support.

- Provide waste handling and disposal plan. Include narrative description including containerizing, testing, transportation, and disposal methods.
- Submit a list of coatings and manufacturers intended for use for review by the Owner. Include the application each coating is intended for, any surface preparation, number of coats, method of application, and coating thickness.
- Provide Material Safety Data Sheets for all materials to be used including solvents. Provide NSF certification for all finishes in potential contact with potable water. Submit this information in accordance with the requirements regarding shop drawings included herein.
- Provide owner with schedule of coating operations and inspection timing. Coating inspections will be scheduled based upon Contractor-provided schedule, update schedule weekly or as necessary.
- If product being used are manufactured by a company other than the specified reference standard, provide complete comparison of proposed products with specified projects including application procedures, coverage rates, and verification that product is designed for intended use. Information must also be provided that demonstrates that the manufacturer's products are equal to the performance standards of products manufactured by Tnemec Corporation, which is the reference standard.
- Provide QC inspection report forms, submitted weekly unless otherwise noted.
- Provide material delivery bill of lading of all materials brought on site and lot/date batch numbers of coating products and confirmation from manufacturer of expiration dates.
- Provide project closeout documentation including disposal documents for waste.

Performance Requirements

All finishes potentially in contact with potable water shall be National Sanitation Foundation (NSF) certified for contact with potable water. Certification from the NSF or UL shall be supplied in writing at the time of the submittal process for Finishes. Contractor shall be responsible for verifying all finishes used on the project are compliant with primary and secondary standards of the Safe Drinking Water Act. Any violation shall be remedied at the Contractor's expense.

The completed coating shall produce a minimum dry film thickness in accordance with the specifications as determined by the microtest thickness gauge or comparable instrument. In areas where this thickness is not developed, sufficient additional coats shall be applied to produce it.

Quality Assurance

The Contractor shall be responsible for compatibility of all shop and field applied paint products including the use of primer, intermediate and top coats by different manufacturers if applicable. For any Contractor initiated substitutions, the Contractor shall verify complete

compatibility between coatings provided for the project. If coatings are not compatible per manufacturer's review it shall be the Contractor's responsibility to remove incompatible coatings fully and replace with compatible coating systems.

Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to the underlying paint.

The Contractor shall be responsible for obtaining written documentation from equipment/material manufacturers regarding the date at which shop prime coatings are applied and shall strictly adhere to the coating manufacturer's recommendations for recoat time intervals. The Contractor shall submit to the Engineer such documentation upon request.

Storage and Handling

Bring all materials to the job site in the original sealed and labeled containers of the paint manufacturer. Materials shall be subject to inspection by the Owner. Store paint supplies as recommended by the manufacturer and as approved by the Owner.

Extra Materials

For any products that have a shelf life longer than one year, provide one unbroken gallon container of each type and color of paint and each type of solvent and thinner used, as requested by the Owner. Dispose of all extra materials not desired by the Owner.

Waste Products

The Contractor shall be responsible for the collection, containment, transportation, and disposal of all waste products generated for this project. Cleaning and disposal shall comply with all federal, state, and local pollution control laws. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

Cleaning and disposal shall comply with all federal, state, and local pollution control laws. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

Site Conditions

Contractor shall take any and all measures necessary to prevent over-spray of structures and/or components in the field from both preparation and coating work. Should over-spray occur, the Contractor is responsible for all costs associated with any damage that occurs as a result of over-spray.

Contractor shall supply full containment of any blasting of structures and/or components in the field or wet blasting as required by local clean air agencies such as the Puget Sound Clean Air Agency.

Part 2 – Products

Manufacturers

The following coating system manufacturers are approved subject to compliance with the Specifications contained herein:

1. Sherwin Williams

2. Tnemec Company

The specified coating shall be understood as establishing the type and quality of the coating desired. Other manufacturers' products will be accepted provided sufficient information is submitted to allow the Engineer to determine that the coatings proposed are equivalent to those named. Proposed coating shall be submitted for review in accordance with Division 1. Requests for review of equivalency will not be accepted from anyone except the Contractor, and such requests shall not be considered until after the Contract has been awarded.

Substitutions of the coatings of other manufacturers shall be considered only if equivalent systems of coatings can be provided and only if a record of satisfactory experience with the system in equivalent applications is available. Offers for substitutions will not be considered which decrease film thickness, solids by volume or the number of coats to be applied or which propose a change from the generic type of coating specified herein. All substitutions shall include complete test reports to prove compliance with specified performance criteria.

Part 3 – Execution

Installers

Contractor shall be responsible for quality assurance including the retention of a coating applicator with experience necessary to complete the work as specified within this Division. Applicator's personnel shall be adequately trained for application of specified coatings. Applicator must prove adequate experience with the coatings specified for this project. At the discretion of the Owner, the applicator shall be approved to complete the coatings portion of the work. Submit list of a minimum of 5 completed projects of similar size and complexity to this project during the submittal process. Include for each project:

1. Project name and location.
2. Name and phone number of owner.
3. Name and phone number of Contractor.
4. Name and phone number of engineer.
5. Name and phone number of coating manufacturer.
6. Approximate area of coatings applied.
7. Date of completion.

Examination

The Owner shall inspect and approve all surface preparations prior to application of any coating. Provide 24-hour notice prior to surface inspection needs.

Lead Coatings

Testing of existing coatings has been performed and there were indications of lead found. The Contractor shall also test the existing coatings for lead content.

The Contractor is fully responsible for all costs associated with verifying, monitoring, personnel protection, containment, coating removal, waste handling, storage, testing,

transportation and disposal of coatings and associated debris regardless of metal concentrations in the coating and associated waste.

It is the Contractor's responsibility to provide to prevent site contamination and contamination of adjacent properties. The contractor shall be solely liable for all costs, including clean-up, and claims resulting from contamination of the site and adjacent properties.

The cost for this hazardous material removal made known to the Contractor as listed above shall be completed by the Contractor at their expense.

Preparation

Prepare surfaces in accordance with the recommendations of the manufacturer of the coating to be applied to the surface, or the surface preparation requirements of these specifications, whichever are stricter. In general all surface preparation shall meet Structural Steel Painting Council (SSPC) Surfacing Preparation (SP) guidelines, the National Association of Pipe Fitters (NAPF), American Water Works Association (AWWA) and/or the National Association of Corrosion Engineers/Association for Materials Protection and Performance (NACE/AMPP) as noted herein unless more strictly described by coating manufacturer.

Coatings shall only be applied during weather meeting the recommendations of the coating manufacturer. Air and surface temperatures, humidity and all other environmental conditions shall be within limits prescribed by the manufacturer for the coating being applied, and work areas shall be reasonably free of airborne dust at the time of application and while coating is drying.

Materials shall be mixed, thinned and applied according to the manufacturer's printed instructions. Dry Film Thickness (DFT) shall be as stated here in or applied based on coverage rates of square feet per gallon (sq. ft./gal).

Installation/Construction

Paint application shall be in strict accordance with manufacturer's printed instructions except that coating thickness specified herein shall govern. Finished coating on all items shall be clean, undamaged and of uniform thickness and color.

Coating shall be done in a manner satisfactory to the Owner. The dry film thickness listed in the "Materials" section of this Division must be met, regardless of the applied film thickness or number of coats.

Carefully observe all safety precautions stated in the manufacturer's printed instructions. Provide adequate ventilation and lighting at all times.

The manufacturer's recommended drying time shall be construed to mean "under normal conditions." Where conditions are other than normal because of weather, confined spaces, or other reason, longer drying times may be necessary. The manufacturer's recommendation for recoating time intervals shall be strictly adhered to.

Pipe shall be emptied of water for a minimum of 24 hours prior to surface preparation and painting. Pipe shall not be filled with water until coating is dry. If, in the Engineer's opinion it is not practical to drain the pipes, the water must stand for at least 48 hours to reach

ambient temperature prior to coating the pipe. Do not allow water to flow for at least 24 hours after final coating.

Field Quality Control

The prime Contractor shall be completely responsible for coating quality. The Contractor shall provide both wet and dry film gauges, and make such available to the Engineer when requested. If coating inspector finds anomalies and/or defects requiring further testing or blasting and recoating a meeting shall be held by all involved parties (coatings manufacturer representative, coating applicator and primary coating inspector) to come to a complete resolution as to the cause of the defect. All such remedies to repair defects shall be paid for by the Contractor. If prime Contractor does not agree with coating inspector's recommendations (i.e. there is no defect) they may hire a second coating inspector at Contractor's expense to review the work. If second coating inspector agrees with first, the decision is final. If there is disagreement, a third coating inspector shall be hired and paid for at split 50% cost between prime Contractor and owner and that decision shall be final and all such remedies to defects shall be paid for by the Contractor.

Contractor's Record

For each working day of shop and field coating application the Contractor shall provide the following.

- Report at least 2 days ahead of time to the owner and coating inspector when shop and field surface preparation and coating application will be completed. The owner and coating inspector shall be allowed to review and inspect surface preparation at any time.
- Daily QC Inspection Reports. These reports shall document
    - the start date of work in each area;
    - the date of application for each following coat;
    - ambient environmental conditions;
    - substrate temperature;
    - provisions utilized to maintain environmental conditions;
    - means employed to control debris;
    - ASTM D4285 blotter test for compressed air cleanliness
    - surface preparation;
    - coating application (including specified materials, mixing, thinning, and wet/dry film thickness);
    - recoat times; and
    - cleanliness between coats.
- The completed daily QC inspection reports shall be turned into the Owner on a weekly basis, or on a daily basis if requested by the Owner.

- Detailed electronic photographs and detailed written description of items surface prepared and/or coated including location on finished structure and parts (example – 3rd row of interior wall of reservoir, west to north quadrant).
- Signature of applicator certifying work was completed within manufacturer's written requirements for surface preparation and coating.

Manufacturer's Record

A technical representative from the painting manufacturer shall review the process and completed finish work on site. Any defects found by the paint manufacturer's technical representative or the owner's representative shall be repaired to their satisfaction at Contractor's expense.

Manufacturer technical representative shall provide a written report that includes the following:

- Verify coatings and other materials are as specified.
- Verify surface preparation and application are as specified.
- Verify DFT of each coat and total DFT of each coating system are as specified using a dry film thickness gauge.
- Note defects that would adversely affect performance or appearance of coating systems.
- Describe inspections made and actions taken to correct nonconforming work.
- Report nonconforming work not corrected.
- Submit copies of report to Engineer and Contractor.

Acceptance of the completed coatings shall be based on the proper application and proper preparation of the coated surfaces, and a finished product that does not contain runs, drips, surface irregularities, overspray, color variations, scratches, pinholes, holidays, and other surface signs that detract from the overall performance and/or appearance of the finished project.

Inspection

For metals exposed to exterior atmospheric conditions, first coat of paint or primer must be placed within four hours of passing inspection. Bare steel must be re-blasted and reinspected if not successfully coated within this four hour time frame, at the Contractor's expense. Regardless of time interval, under all conditions, re-blast surfaces that have started to rust before they are coated.

Use the Pictorial Surface Preparation Standards for Painting Steel Surfaces (VIS-1) by the Steel Structures Painting Council (SSPC) as a visual standard for inspection of surface preparation of metal surfaces. Test-Tex Tape may also be used to verify surface profile.

Surface preparation and each coat shall be inspected by NACE/AMPP inspector prior to application of the next coat. Areas found to contain runs, overspray, roughness, streaks, laps, sags, or other signs of improper application shall be repaired or recoated in accordance

with the manufacturer's recommendations. Finish coats shall be uniform in color and sheen. Surface preparations and coatings not inspected or approved by owner will be uncovered for inspection and approval at no additional cost to the owner.

Contractor shall inspect the completed and cured coating on metal surfaces in the presence of the Owner for pinholes and holidays with a tinker and rasor or other low voltage (under 100 volts) holiday detector. Areas found to contain pinholes shall be repaired or recoated in accordance with the manufacturer's recommendations. Provide 72-hour notice to owner prior to performing test. For Special coatings the installed lining system shall be checked by high voltage spark detection in accordance with NACE RP0188-90 to verify a pinhole-free surface.

NACE/AMPP Certified Inspector

A NACE/AMPP Certified Inspector paid for by the Contractor shall inspect all field coatings related to:

- Steel Reservoir Interior
- Steel Reservoir Exterior

Contractor-supplied NACE/AMPP-certified inspector (minimum Level 3) shall be qualified for the coating work involved with this project and independent to the general contractor and coating subcontractor. Contractor shall submit credentials for approval by the Owner.

Hold Point Level 3 AMPP inspection shall be provided as follows at a minimum.

a) Pre-Coating meeting with Owner, manufacturer, and contractor. Discussion shall include scope, safety practices, pre-cleaning inspection, surface preparation, materials and handling practices, application procedures, inspection (tools, methods and sequence), reporting, stop work authority, repair and remedial coating work, and contractor submittals.

a) Surface preparation: verification of 100% of bare steel prior to coating application. Verify surface cleanliness, surface profile, and surface dust.

b) Wet film thickness as necessary

c) Dry film thickness, in accordance with SSPC-PA 2

d) Visual observation for coating imperfections for each coat including stripe coat.

e) Holiday testing on 100% of the interior floor, shell, roof plates and structural supports, and exterior of piping and piping supports within the tank.

Inspection report shall be approved for each coated component before shop/factory coated parts are shipped to the job site. Field coatings shall be approved prior to demobilization of coating applicator and coating equipment. Any defects found by the NACE/AMPP-certified inspector shall be addressed by the Contractor at no additional expense to the Owner.

Repair/Restoration

The Contractor is responsible for all costs associated with any damage that occurs as a result of over-spray.

Scratched, chipped or otherwise damaged coatings, including factory coatings, shall be repaired before final acceptance will be given.

Cleaning

If any cleaning of equipment at the site is performed with solvents, such work shall be done over leak-proof linings. Preparation or coating materials may not be disposed of on site.

9.90.01 Color Schedule

Finish coatings, which are applied in the shop by the manufacturer, shall conform to this section. Factory coatings which are damaged during shipment or installation shall be recoated in the field in accordance with these specifications.

Items of similar purpose shall be painted the same color. If items come from the factory with a shop applied coating that does not match said color, they shall be field coated to match.

The contractor shall allow no less than 15 working days from the time the Owner is provided with color selections for the Owner to make color choices.

The Owner will develop a color schedule for painted items after award of the contract. Contractor shall provide a palette of colors from the manufacturer of not less than 30 color choices.

9.90.02 Unpainted Items

Do not coat aluminum items unless specifically directed otherwise below or as shown on the plans. Do not coat small diameter pilot systems such as galvanized iron, copper or brass pipe and fittings associated with control valves unless noted otherwise on the plans or herein.

9.91 PAINTING AND COATING SYSTEMS

Refer to 9.90.00 for coating application requirements.

9.91.13 EXTERIOR PAINTING

9.91.13.1 System 1: Metals Exterior (Wet Conditions)

Part 1 – General

This section refers to the coating of those steel appurtenances that are anticipated to be fabricated and shop primed offsite (e.g. handrail, vandal shield, cable tray and related components).

Part 2 – Products

Materials

Tnemec

Primer: Series 1 Omnithane Prime (shop prime)	2.5 to 3.5 mils DFT
Series 27 F.C. Typoxy	3.0 to 5.0 mils DFT

Finish: Series 1085 EnduraShield	3.0 to 5.0 mils DFT

Part 3 – Execution

Preparation

SSPC SP1 followed by SP6 Commercial Blast. Surface profile shall be 2.0 mils, minimum.

9.91.13.12 - System 2: Metals - Metal In Contact with Concrete or Dissimilar Metals

Part 1 - General

This section applies to all non-submerged metal surfaces including aluminum, hot-dipped galvanized steel, or other metals, which are conducive to corrosion due to interaction of dissimilar metals or to chemical reaction due to embedment in concrete or masonry grout, and which are not covered as part of another coating system.

Part 2 - Products

1. Tnemec
   a. First Coat: Series N69 Hi-Build Epoxoline II (4 to 6 mils DFT)
2. Sherwin Williams
   a. First Coat: 464 FC B58-600 Macropoxy (4 to 6 mils DFT)

Part 3 - Execution

Surface Preparation

1. SSPC-SP1 Solvent Cleaning
2. Lightly sand to degloss and provide a surface profile.

9.91.13.13 - System 3: Ferrous Metal including Cast/Ductile Iron Pipe (Atmospheric Outdoors)

Part 1 - General

This Section applies to all ductile/cast iron and ferrous metals, including bituminous coated pipe and materials unless specified otherwise. This Section applies to all pipe materials and equipment, including manufacturer applied coating systems. For the purposes of this coating system, metals which are located below the top of the exterior wall within a water bearing structure or are located within a vault or manhole shall be considered as under immersion service conditions and are not covered within this subsection.

Part 2 - Products

1. Tnemec
   a. Primer option 1: Series 1 Omnithane (2.5 to 3.5 Mil DFT).
   b. Primer option 2: Series N69 or N140 (2.5 to 3.5 Mil DFT) may be used if the time between prime coat and intermediate coat is less than 60 days. If more than

60 days occurs, surface will need re-preparation per the manufacturer's instructions.

c. Intermediate Coat: Series N69 Hi-Build Epoxoline II (6 to 8 mils DFT)

d. Finish Coat: Series 73 Endura-Shield (3 to 5 mils DFT)

2. Sherwin Williams

a. Primer: Corothane 1 Mio-Zinc Primer (2.5 to 3.5 Mil DFT)

b. Intermediate: Macropoxy 646FC B58-600 Series (6 to 8 Mil DFT)

c. Finish: Acrolon 218HS (3 to 5 Mil DFT)

Part 3 - Execution

Surface Preparation

1. Steel

a. SSPC-SP10 Near white metal blast cleaning

b. Per manufacturer's requirements for immersion service. If manufacturer does not provide requirements, provide SSPC-SP1 followed by NAPF 500-03-04/05 Grey White Blast. Ductile Iron pipe shall be purchased without the standard asphaltic coating. Removal of asphalt coatings is extremely difficult and overly aggressive preparation can create a damaged surface unsuitable for coating.

9.91.33 SUBMERGED AND BURIED METALS PAINTING

9.91.33.01 - System 5: Metals (In Contact With Drinking Water) (Steel Pipe)

Part 1 – General

This section applies to all metals in contact with potable drinking water, including the interior and exterior of the proposed mixing system piping, the interior and exterior of the proposed overflow system piping, and the interior of the new drain piping. Coatings shall be NSF approved for use in direct contact with potable drinking water. The NSF 61/600 approval shall be appropriate for the application at the time of submittal. Contractor is responsible for verifying the current NSF 61/600 requirements and restrictions of submitted coating.

Part 2 – Products

Materials

1. Tnemec

a. First Coat: Series FC22 Epoxoline (16 to 20 Mil DFT)

b. Finish Coat: Series FC22 Epoxoline (16 to 20 Mil DFT)

2. Sherwin Williams

a. Primer: Sherplate PW (16 to 20 Mil DFT)

b. Finish Coat: Sherplate PW (16 to 20 Mil DFT)

Part 3 – Execution

Surface Preparation

1. Steel
   a. SSPC-SP10 Near White Metal Blast Cleaning.

9.97.23.11 System 6: Anti-Graffiti Coating and Water Repellent on CMU and Concrete Exterior Foundation

Part 1 - General

This Section applies to all exposed concrete foundation walls.

Part 2 – Products

Materials

1. Tnemec
   a. First Coat: Chemprobe Dur A Pell GS (6-9 mils dft)
   b. Second Coat: Chemprobe Dur A Pell GS (6-9 mils dft)

2. Sherwin Williams
   a. First Coat: Anti-Graffitti Coating (6-9 mils dft)
   b. Second Coat: Anti-Graffitti Coating (6-9 mils dft)

Part 3 – Execution

Preparation

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion. Refer to SSPC-SP13/NACE 6, or ICRI 03732, CSP 1-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days at 75 degrees F (24 degrees C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Cement-Plex 875 or equal. Weathered masonry and soft or porous cement board must be brush blasted or power tool cleaned to remove loosely adhering contamination and to get to a hard, firm surface. Laitance must be removed.

9.98 Steel Reservoir Coating

9.98.1 Common Work for Steel Reservoir Coating

Coating Schedule

Interior (Schedule A)	Remove all existing coatings, prepare surface per SSPC SP-10, and install new interior lining system. Reference System 7.
Exterior	SSPC-WJ 4 surface preparation (pressure wash) entire tank

(Bid Item #12)	exterior. Where construction activities damage exterior coating and for new exterior steel, install exterior coating system. Reference System 9. Provide containment as necessary to manage environmental conditions and prevent debris from escaping or contaminating the site.
Interior (Schedule B)	SSPC-WJ4 surface preparation (pressure wash) entire tank interior. Where construction activities damage interior coating for new interior steel, welds, install interior coating system. Reference System 7. Manufacturer warranty for this schedule will not be required.

Part 1 – General

Design Requirements

All interior coatings are to be certified for contact with potable water per NSF 61/600. This includes coatings above the water line.

Warranty

Steel Reservoir Coating System provided under this contract shall be warranted against defects in workmanship for a period of two (2) years after date of project acceptance. Coating manufacturer shall warrant coating system from the end of year two (2) to the end of year five (5).

Applicator shall warrant their work in full for two (2) years starting after project acceptance. The coatings manufacturer shall warranty the coating system in full from the end of year two (2) to the end of year five (5). If defects are from application by applicator, the applicator shall pay for repair costs. If defects are from defective coating product the coating supplier shall pay for repair costs. If agreement is not found, 3rd Party Coating Inspector shall review defects and determine cause. 3rd Party Inspector's decision shall be considered final.

Maintenance

The Applicator shall provide, at no additional cost to the Owner, an inspection of the tank within the last month of the warranty period. Any defects, which are discovered during this inspection, shall be repaired by the Applicator in a manner acceptable to the Owner and coating supplier and at no additional cost to the Owner.

Part 2 – Products

Mixes

Materials shall be mixed, thinned, and applied according to the manufacturer's printed instructions.

Part 3 – Execution

Containment

Prior to SSPC WJ 4 washing the tank exterior, place filter fabric around the exterior of the tank. The filter fabric shall be free draining and suited to collect paint chips. The used fabric shall be disposed of as contaminated media.

At no time will the escape of debris into the environment be allowed. Where power tools are used on the tank exterior, provide vacuum shroud HEPA-filter vacuum. Where SSPC SP10 abrasive blasting is used on the tank exterior, provide SSPC Guide 6 Class 1A containment.

Waste generated by coating removal operations, including abrasive blast residue that contains paint chips, must be characterized for hazardous and dangerous waste constituents in accordance with applicable federal, state, and local regulations. If it is determined that the waste is a hazardous and dangerous waste, the Contractor shall store, transport, and dispose of the waste in a manner that is in compliance with applicable federal, state, and local regulations. The Contractor shall provide a copy of the waste determination analytical results to the Owner's Representative, and the final disposition of the waste shall be certified by the Contractor with a certificate of acceptance and hazardous or dangerous waste manifest, if applicable, from the approved disposal site. Provide the Owner's Representative with the proposed transportation and disposal methods and the proposed disposal site before removal of any waste or residue from the Project Site. The Owner's Representative will have the right to approve or disapprove of the transportation and disposal methods and the disposal site selected by the Contractor.

Lighting

Provide adequate lighting per SSPC Guide 12 recommendations (not minimums) for surface preparation, coating application, and inspection activities.

Preparation

Prepare surface and touch up welds, burned and abraded areas on shop primed steel with specified primer before applying field coats.

Construction

Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during dry phase.

Field Quality Control

Following surface preparation and coating application, Contractor shall furnish services of a qualified supplier/manufacturer's representative to inspect the surface and coatings and inform Owner of any defects or concerns regarding condition of surface preparation or coating system at the job site. The Contractor shall repair any defects to the coating supplier/manufacturer's satisfaction at Contractor's expense. The finished painting system shall be free of flaking, peeling, bubbling, cracking, permanent discoloration or other physical defect in the work for the warranty period.

The Certified Paint Manufacturer's Technical Representative employed by the Paint Manufacturer shall be approved by the Owner. All test results shall be approved by the

Paint Manufacturer's Representative in writing (with Copy sent to the Engineer for review) prior to shop painting and field painting.

9.98.3.2 System 7: Steel Reservoir Interior Lining

Part 1 – General

This section refers to the entire tank interior. Existing coating shall be removed and all interior steel shall be blasted and coated. Pipe exteriors and pipe support shall be coated per this specification. Interior lining surfaces shall be prepared per SSPC SP10.

Part 2 – Products

AWWA ICS 5: Zinc-Rich Primer and (2) Coats Epoxy

1. Sherwin Williams
   a. Prime Coat: Corothane GalvaPac (2.5-4.0 Mil DFT)
   b. Stripe Coat: Macropoxy 5500 LT or SherPlate 600
   c. Intermediate Coat: Macropoxy 5500 LT or SherPlate 600 (5.0 – 8.0 Mil DFT)
   d. Finish Coat: Macropoxy 5500LT or SherPlate 600 (5.0 – 8.0 Mil DFT)
2. Tnemec
   a. Prime Coat: Series 91- or 94- H2O Hydro-Zinc (2.5-3.5 Mil DFT)
   b. Stripe Coat: N140 Pota-Pox Plus or Series 21 Epoxoline
   c. Intermediate Coat: Series 21 Epoxoline (5.0 – 8.0 Mil DFT)
   d. Finish Coat: Series 21 Epoxoline (5.0 – 8.0 Mil DFT)

Minimum film thickness: 12.5 Mil DFT

Contractor shall apply primer, first and finish coats utilizing different colors for ease of inspection.

Part 3 – Execution

Pre-Blast Cleaning Requirements

A. Cap or seal all inlet/outlet and overflow piping inside tanks prior to beginning any surface preparation or cleaning work to prevent entry of foreign material into the piping systems.

B. Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning.

C. Repair corrosion pits by arc welding and grinding flush with the metal surface as directed by the Engineer. Weld undercutting, pits, slag, holes, or splatter shall be removed or corrected before repairs are acceptable.

D. Grind metal protrusions, deformations, and welds on interior of tanks flush with the metal surface where directed by the Engineer.

Abrasive Blast Cleaning Requirements

For all shop-prepared surfaces and all field-prepared surfaces, prepare surfaces in accordance with SSPC-SP1, immediately followed by abrasive blast cleaning in accordance with SSPC-SP10 Near White Blast Cleaning. Surface shall be tested for dust per ISO 8502-3 and shall be Level 2 or better.

It is the Contractor's responsibility to determine the original steel conditions in selecting the abrasive and equipment required for achieving the specified surface profile and cleanliness.

Blast profile shall be of a sharp, jagged nature, and angular, with no evidence of a polished surface. Peened surface patterns, such as those obtained from shot blasting, are not acceptable. Provide surface profile which meets the prime coating manufacturer's requirements.

Abrasive material shall be selected to accommodate required surface cleanliness and profile. Perform vial test per ASTM D7393, once per shift and at least (3) times per bulk shipment.

Post-Blast Cleaning

Clean surfaces of dust and residual particles prior to painting.

Vacuum-clean areas where dust settling is a problem. Horizontal surfaces subject to dust settlement, such as welds, floors, and flanges on rafters and girders, shall be cleaned again by dry air blast and vacuum immediately preceding paint application.

Remove all spent steel grit from floor, corners, painter's rail, and other areas as necessary using a magnetic broom and dry air blasting.

Blasted surfaces shall be carefully monitored and inspected for rusting immediately prior to painting. Under all conditions, re-blast surfaces that have started to rust before they are coated.

Apply the prime coat at the specified thickness.

Application of Paint

Plan coating application to ensure that specified temperature, humidity, and condensation conditions are met. If conditions do not allow for orderly application of sealant, primer, stripe coat, intermediate coat and topcoat, use appropriate means of controlling air and surface temperatures, as required. Partial or total enclosures, insulation, heating or cooling, or other appropriate measures may be required to control conditions to allow for orderly application of all required coats.

Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during dry phase. The use of ventilation shall be in accordance with the requirements for any dehumidification and temperature control.

Stripe Coat

A. Brush a stripe coat of coating on all bolted connections, bolt heads and nuts, corners, edges, angles, welds, member intersections, structural steel flanges, crevices, heavily pitted areas, top face of lower rafter flange, and all other deviations from smooth surfaces where paint application may not result in adequate paint thickness and coverage.

B. Stripe coat shall be worked into all cracks, crevices, and seams.

C. Mini-rollers or other tools may be required.

D. Alternate colors in a multiple coat system to provide a visual reference that the required number of coats has been applied. Stripe coats shall be alternated in color similar to a full coat.

9.98.3.4 System 9: Welded Steel Reservoir Exterior Repairs

Part 1 – General

Prepare and coat areas of new steel and areas where existing coating is removed/damaged due to welding and proposed construction. Feather existing coating edges where proposed repairs are performed. Additionally, the entire exterior will receive a pressure wash (water-jetting) prior to coating repair.

Submittals

Provide written documentation of shop primer application.

Performance Criteria

Abrasion:

- Method: Fed. Test Method Std. No. 141, Method 6192, CS-17 Wheel, 1000-gram load.
- Requirement: No more than 95 milligrams loss after 1000 cycles.

Adhesion:

- Method: ASTM 4541 Type V adhesion tester
- Requirement: Not less than 2,000 pounds per square inch pull, average of three trials.

Graffiti Resistance for External Finish Coating:

- Method: The following graffiti materials applied to coating and allowed to dry for seven days: acrylic epoxy-ester and alkyd spray paints, ballpoint ink, crayon, Markett marker, black shoe polish and lipstick. Removal first attempted with xylene, if graffiti remained then Methyl Ethyl Ketone was used.
- Requirements: Complete and easy removal without loss of shine.

Corrosion Weathering:

- Method: ASTM D5894, 6 cycles, 2016 hours
- Results: Rating 10 per ASTM D610 for Rusting
- Results: Rating 10 per ASTM D714 for Blistering

Part 2 – Products

Materials (Shop)

Includes exterior structural appurtenances (anchor chairs), if shop primed:

Prime all properly prepared surfaces with one coat:

1. Tnemec Series 91H2O or 94H2O (2.5 to 3.5 Mil DFT)
2. Sherwin Williams Corothane 1 Galvapac One Pack Zinc Primer B65G11 (2.5 to 3.5 Mil DFT)

Materials (Field)

For properly prepared External Surfaces: Prime all properly prepared new steel, holdbacks, anchor chairs and bolts, and welded and abraded areas of any shop primed surfaces with the following series of coatings:

Minimum total dry film thickness shall be 9.5 Mil.

1. Tnemec
   a. One coat: Tnemec Series 91H2O or 94H2O (2.5 to 3.5 Mil DFT)
   b. One coat: Tnemec Series 27 FC Typoxy (4 to 6 Mil DFT)
   c. One coat: Tnemec Series 1095 Endura Shield (3 to 5 Mil DFT)
2. Sherwin Williams
   a. One coat: Corothane 1 Galvapac One Pack Zinc Primer B65G11 (2.5 to 3.5 Mil DFT)
   b. One coat: Sherwin Williams Macropoxy 646FC (4 to 6 Mil DFT)
   c. One coat: Sherwin Williams Acrolon 218HS (3 to 5 Mil DFT)

Part 3 – Execution

Surface Preparation (Shop)

All surfaces shall be SSPC SP1 solvent cleaned followed by sandblasting in strict accordance with SP10 Near White Metal Cleaning.

Shop applied primers shall be evaluated for recoat window criteria and prepared in accordance with SSPC-SP7 if recoat window has elapsed for application of specified subsequent coating.

Surface Preparation (Field)

For entire tank exterior, including exterior appurtenances:

Prior to any coating activities, prepare entire tank via a SSPC-SP WJ-4 Waterjet Cleaning of Metals, Light Cleaning and detergent and/or scrubbing as needed. Remove all visible oil, grease, soil, dirt, mold and mildew, and other soluble contaminants.

For areas of proposed coatings:

Prepare all external surfaces in accordance with SSPC-SP 1.

At the contractor's option, clean to either:

a) SSPC-SP 10 Near White Metal Cleaning with SSPC Guide 6 1A Containment, or

b) SSPC-SP 11 Bare Metal Power Tool Cleaning using equipment with HEPA filter shroud suitable for lead-based paint removal.

Provide surface profile per manufacturer's requirements. Surface shall be tested for dust per ISO 8502-3 and shall be Level 2 or better.

Feather the edges of existing coating adjacent to coating repairs. Apply zinc primer only on the bare steel. Apply intermediate epoxy coat to the feathered edge as well as the primed area.

For Shop Primed External Surfaces:

All shop-primed surfaces shall be SSPC SP1 solvent cleaned prior to exterior coating system application.

Division 15
Mechanical

15.00 GENERAL

This division covers the work necessary for furnishing and installing mechanical appurtenances and accessories as described in these Specifications and shown on the Plans.

Sections in these specifications titled "*Common Work for . . .*" shall apply to all following subsections whether directly referenced or not.

15.05 Common Work for Mechanical

[CSI 33 05 00]

Part 1 - General

Summary

Provide the necessary piping, plumbing, fittings, and appurtenances to make all piping systems complete, tested, and ready for operation as specified herein and as shown on the Plans. Some fittings that are necessary for the complete piping system installation and operation may not have been shown. Provide fittings, pipe, and appurtenances necessary, whether shown on the Plans or not, to make all piping systems complete, tested, and ready for operation.

Some pipe supports, thrust blocking, and tie rods are not shown on the Plans. Provide pipe supports, thrust blocking, and tie rods for pipes as required by accepted design criteria to support and restrain the loads encountered.

Related Sections

- Division 1.81.30 Seismic Restraint and Anchorage
- Division 1.81.40 Pressure Ratings
- Division 1.81.50 Materials in Contact with Drinking Water

References

All products in contact with drinking water to be low-lead (less than 0.25 percent) content in compliance with NSF/ANSI 372.

Submittals

Submittal information shall be provided to the Owner for the following items:

- Ductile iron pipe
- Ductile iron fittings
- Steel pipe and fittings
- Other mechanical components listed in this division or required by the Engineer

Part 2 – Products

Materials

All valves, meters, hydrants, specialties, appurtenances, and other such mechanical and plumbing components that are of similar purpose shall be of a single manufacturer and model line. Do not "mix and match" unless specifically stated otherwise or allowed by the Engineer. The intention of this requirement is to maintain consistency across all components installed on the project for function, maintenance, aesthetics, and details of installation.

Part 3 - Execution

Field Quality Control

Pressure gauges used for testing and commissioning shall be in good working order and scaled appropriately for the test. Scale range shall not exceed 200% of the test pressure. For example, for a 250 psi test, the gauge scale shall not exceed 500 psi. The Owner has the right to reject any gauges that are suspect in their accuracy.

If any components that have been approved by the Owner are not rated for the specified system test pressure, remove or isolate those components during pressure testing in a method acceptable to the Owner. Said components must still be pressure tested in their permanent configuration at their individual test pressure rating.

Cleaning

Potable Water Systems

After preliminary purging of the system, chlorinate entire potable water system in accordance with AWWA C651 for flushing and disinfecting water mains, and in accordance with all other pertinent rules and regulations. Operate each valve during chlorination period to provide contact. Retention time shall be 24 hours minimum, or 48 hours if the water temperature is less than 41° F. Total retention time shall not exceed 3 days after which the chlorinated water shall be immediately flushed out.

Upon completion of disinfection, thoroughly flush the entire potable water system at a velocity of 3 feet per second, allowing four complete exchanges of contents. Do not discharge chlorinated material to storm or surface water systems without thoroughly neutralizing the chlorine residual remaining in the water in accordance with AWWA C655 for field dechlorination.

For pipe and fittings that cannot be disinfected as described above, such as those used for final connections to live systems, swab with 200 ppm chlorine solution or immerse in a 50 ppm chlorine solution.

After final flushing and before the water pipe is connected to or placed in service, the Contractor shall request that the Owner arrange to have samples collected for bacteriological testing. At least one sample will be collected from each branch of the pipe. A copy of the test results shall be delivered to the Contractor for review. The Contractor shall not connect the water pipe to the existing distribution system prior to acceptance of the bacteriological test by the Engineer.

The Owner will pay the laboratory fee for the initial bacteriological test. The Contractor will pay for future testing if the initial test results are unsatisfactory.

15.20 PIPE AND FITTINGS

15.21 Common Work for Pipe and Fittings

[CSI 33 05 00 or 40 05]

Part 2 - Products

Components

Under no circumstance shall the fasteners be of lesser strength or higher corrosive potential than the materials being connected. If dissimilar metals are adjacent (for example: stainless steel flange connecting to ductile iron flange) a dielectric insulation kit shall be used.

Fasteners for pipe and fittings: Per AWWA standards unless otherwise specified. All relevant subsections of AWWA C100, C200, and C500. All bolts and studs shall be long enough so that no less than two threads extend beyond the face of the nut. Non-submerged flange bolts to be ASTM A307 Grade A, zinc plated.

For submerged conditions, connection bolts shall be Nitronic 60 steel. Nuts and washers shall be Stainless Steel, minimum grade 304 in raw domestic or treated domestic water and minimum grade 316 in treatment processes and sewage applications. Minimum grade 317 for acidic transport. Bolts and nuts shall meet ASTM F593 and F594. Stainless steel shall not be used where in contact with chlorine or chlorine solutions. Stainless steel bolts may be used in lieu of Nitronic but must be assembled using appropriate lubricant or tape. For installations in domestic water, lubricant, or tape must be approved for domestic water service. Cobas Stainless Steel Thread Sealing Tape or approved equal.

Finishes

For conditions other than submerged, all nuts and bolts shall be zinc plated, and suitable for above and below grade locations as required. Where above grade/exposed piping is specially coated, the connecting nuts and bolts shall be coated using the same system unless directed otherwise by the Owner.

Part 3 - Execution

Construction

All piping and related equipment to be joined shall be connected as shown on the Plans, specifications, as recommended by the manufacturer or as required by standard industry practices if not otherwise specified.

Steel and stainless steel threads shall be protected against galling using steel thread sealing tape equal to Cobas steel thread sealing tape. Tape shall be specific to the steel type used.

15.22 Metal Pipe and Fittings

15.22.02 Ductile Iron Pipe and Fittings

[CSI 33 05 19 or 40 05 19]

Part 1 - General

Design Requirements

Ductile iron pipe shall have thickness designed in accordance with ANSI/AWWA C150/A21.50 and shall be based on laying conditions and internal pressures to meet the requirements of Division 1.81.40 unless listed as more stringent below.

The pipe thickness shall not be less than that of Class _52_ pipe for non-flanged pipe.

The pipe thickness for fire hydrant runs shall not be less than Class 52.

Flanged joints shall conform to ANSI Standard B16.1 and be of the class shown on the plans.

Part 2 - Products

Manufactured Units

Pipe shall be cement-lined and asphaltic coated in accordance with ANSI Standard A21.4 (AWWA C104) unless otherwise specified and shall conform to ANSI Standard A21.51 (AWWA C151).

Rubber gasket pipe joints are to be push-on-joint (Tyton) or mechanical joint (MJ) in accordance with ANSI Standard A21.11 (AWWA C-111), unless otherwise specified.

When requested, furnish certification from the manufacturer of the pipe and gasket being supplied that inspection and all of the specified tests have been made, and the results comply with requirements of this standard.

Ductile Iron Fittings

All fittings shall be ductile iron where possible. Steel fittings will not be accepted where ductile iron is called out on the plans. Ductile iron fittings shall be short-body, cement-lined, and for the pressure rating noted in Division 1.81.40. Metal thickness and manufacturing processes shall conform to applicable portions of ANSI Standards A21.20, A21.11, B16.2, and B16.4.

Standard cement lining shall be in accordance with ANSI Standard A21.4 (AWWA C104).

Mechanical joint (MJ), ductile iron, compact fittings 3-inches through 24-inches, and 54- inches through 64-inches shall be in accordance with AWWA C153.

Flanged pipe spools shall be fabricated from minimum Class 53 wall thickness pipe and conform to ANSI/AWWA C115/A21.15 with the exception that flanges shall be fabricated from ductile iron unless otherwise specified in the Contract Documents. Interior shall be cement lined.

Ductile iron flange (FL) fittings shall be in accordance with AWWA C110 and fabricated from ductile iron unless otherwise specified in the Contract Documents with a bolt pattern to match adjacent pipe. Gasket material for flanges shall be Styrene Butadiene Rubber (SBR, Buna-S), neoprene, nitrile rubber (NBR, Buna-N), chlorinated butyl, or cloth-inserted rubber. Gaskets shall be a minimum ⅛-inch thick.

Type of ends shall be specified as mechanical joint (MJ), restrained joint (RJ), true restrained joint (TRJ), plain end (PE), or flanged (FL).

Finishes

For above grade and exposed pipes, including those inside structures, prepare surfaces and coat the exterior per Division 9.91.13.13.

Part 3 - Execution

Installation

Install ductile iron water mains in accordance with AWWA C600. Provide tools and equipment, including any special tools required for installing each type of pipe used.

The amount of deflection at each pipe joint shall not exceed 3-degrees per joint (11 inches over 18 feet), or the manufacturer's printed recommended deflections, whichever is less.

15.22.03 Steel Pipe and Fittings

[CSI 33 05 24.23 or 40 05 24.23]

Part 1 - General

References

Unless otherwise stated, the latest edition for any commercial standards and all manufacturing tolerances referenced therein shall apply.

- ANSI/AWS D1.1 Structural Welding Code- Steel
- ANSI/AWS B2.1 Specification for Welding Procedure and Performance Qualification
- ANSI/AWWA C200 Steel Water Pipe—6 In. (150 mm) and Larger
- ANSI/AWWA C205 Cement-Mortar Protective Lining and Coating for Steel Water Pipe – 4 In. (100 mm) and Larger- Shop Applied
- ANSI/AWWA C206 Field Welding of Steel Water Pipe
- ANSI/AWWA C207 Steel Pipe Flanges for Waterworks Service—Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
- ANSI/AWWA C208 Dimensions for Fabricated Steel Water Pipe Fittings
- ANSI/AWWA C209 Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipe
- ANSI/AWWA C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
- ANSI/AWWA C214 Tape Coating Systems for the Exterior of Steel Water Pipelines
- ANSI/AWWA C215 Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines
- ANSI/AWWA C216 Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fitting

- ANSI/AWWA C218 Liquid Coating Systems for the Exterior of Aboveground Steel Water Pipelines and Fittings
- ANSI/AWWA C222 Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings
- ASME Section IX International Boiler & Pressure Vessel Code: Welding and Brazing Qualifications
- ANSI/ASME B36.10 Welded and Seamless Wrought Steel Pipe
- AWWA M11 Steel Water Pipe: A Guide for Design and Installation

Design Requirements

Pipe

Pipe thickness as necessary to meet the pressure requirements in Division 1.81.40, and as follows:

1. Buried piping shall have a minimum pipe thickness of 0.25-inches.
2. Aboveground piping shall be Standard Weight or greater Schedule as required for the pressure requirements.

Construct welded steel pipe in accordance with the ASME Welding Code and as shown in the Plans. Steel pieces shall be constructed as dimensioned to exact tolerances of ± 3/32-inch.

Construction steel pipe in accordance with AWWA C200. Steel pipe shall be fabricated from steel manufactured to meet the requirements of ASTM A53, Type E or S, minimum Grade B. Design stress shall be half the yield stress of the steel. All longitudinal and girth seams, whether straight or spiral, shall be butt-welded using an approved electric-fusion-weld process.

Buried piping shall be furnished principally in 50-feet net laying lengths with shorter lengths, field trim pieces and closure pieces as required by plan and profile for location of elbows, tees, reducers and other in-line fittings or as required for construction.

Where grooved joints are used, pipe thickness shall be modified accordingly to maintain the hydrostatic test pressure compliance.

Aboveground steel pipe and fittings 26 inches in diameter and smaller shall conform to ANSI Standard D36.10.

Fittings

Unless otherwise shown on the Plans, all specials and fittings shall conform to the dimensions of AWWA C208. Pipe material used in fittings shall be of the same material and pressure class as the adjoining pipe.

Buried elbows shall have a minimum radius equal to 2½ times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11¼-degrees (one cut elbow up to 22 ½-degrees). Aboveground elbows shall have a radius equal to 1 times the pipe diameter. If elbow radius is less than 2½ times the pipe diameter, stresses shall be checked per AWWA M11 and the pressure class increased if necessary.

Specials and fittings, unless otherwise shown on the Plans, shall be made of segmental welded sections from hydrostatically tested pipe, with ends compatible with the type of joint or coupling specified for the pipe. All welds made after hydrostatic testing of the straight sections of pipe shall be tested per the requirements of AWWA C200 Section 5.2.2.1.

Joints

Rolled Groove or Carnegie Rubber Gasket Joint

1. The standard joint for buried piping shall be a rolled groove or Carnegie rubber gasket joint unless otherwise noted on the Plans. Joints and gaskets shall conform to AWWA C200 and as shown in Chapter 8 of AWWA M11.
2. The joint shall be suitable for a working pressure equal to the class of pipe furnished and shall operate satisfactorily with a deflection angle, the tangent of which is not to exceed 1.00/D where D is the outside diameter of the pipe in inches with a pull-out of 1-inch.
3. Carnegie and rolled groove rubber gasket joints may be furnished only by a manufacturer who has furnished pipe with joints of similar design for comparable working pressure and pipe diameters that has been in successful service for a period of at least 5 years.

Lap Weld

1. Lap weld joints shall conform to AWWA C200 and as shown in Chapter 8 of AWWA M11.
2. Use lap field welded joints where restrained joints are required or indicated on the Plans. The standard bell shall provide for a 2 ½-inch lap. The minimum lap shall be 1-inch. The maximum joint deflection or offset shall be a 1-inch joint pull.
3. Lap welded joints shall be welded either externally or internally. Provide holdbacks for coating and linings as shown on the approved shop drawings. "Weld-after-backfill" of interior welds may be performed any time after joint completion and backfilling has been completed.
4. Unless otherwise shown on the Plans, all field joints shall be lap welded for diameters 48-inches and greater. Joints on pipe less than 48 inches in diameter may be lap-welded, rolled groove or Carnegie rubber gasket joints.

Mechanical Couplings

1. Mechanical couplings where indicated on the Plans shall be Romac 400, Smith Blair Style 411, Baker Style 200, Victaulic Depend-O-Loc or equal.
2. Insulating mechanical couplings where indicated on the Plans shall be double insulated Romac IC400, Smith Blair Style 416, Baker Style 216, or equal for working pressures up to 150 psi only.
3. Couplings for buried service shall have all metal parts painted with epoxy paint and conform to AWWA C210.
4. Pipe ends for mechanical couplings shall conform to AWWA C200 and M11. The shop applied outside coating shall be held back as required for field assembly of the

mechanical coupling or to the harness lugs or rings. Paint harness lugs or rings and pipe ends with one shop coat of epoxy conforming to AWWA C210.

5. Pipe for use with sleeve-type couplings shall have plain ends at right angles to the axis.

Flanges

1. Steel flanges smaller than 4-inch per ANSI B16.5, Class 150 or Class 300. Steel flanges 4-inches and larger per AWWA C207. All flanges rated for the specified working and hydrostatic testing pressures, but in no case shall be less than Class D. Supply documentation that flanged ends welded to the steel pipe and welded pieces are capable of the hydrostatic testing pressure.
2. Shop lining and coating shall be continuous to the end of the pipe or back of the flange. Flange faces shall be shop coated with a fusion bonded epoxy coating.
3. Gaskets shall be 1/8-inch thick minimum. Fasteners per Division 15.21.

AWWA C207 Flanges			
Flange Class	Diameter	Working Pressure	Maximum Test Pressure
D	4-inch to 12-inch	175 psi	218 psi
D	14-inch and larger	150 psi	187 psi
E	4-inch and larger	275 psi	343 psi
F	4-inch and larger	300 psi	375 psi

Submittals

Shop drawings and calculations shall be submitted to the Engineer for review and approval prior to material order, including:

1. Wall thickness and diameter. Calculations for pipe design and fittings reinforcement and/or test data.
2. Layout showing the overall system with all major dimensions, stations, and elevations. Each piece shall be identified by mark number referenced to a pipe laying schedule and detail sheet.
3. Details of standard pipe, joints, specials, and fittings.
4. Calculations, details, and locations of joint restraint for thrust restraint.
5. Details of joint bonding and field welded joint restraint calculations.

The Contractor shall submit previous experience of a minimum of three steel welding projects similar to this one. If requested by the Owner, supply specification of previous projects and written documentation that the construction met the specification.

Part 2 - Products

Source Quality Control

Pipe cylinders, lining, coating, and fabrication of specials shall be the product of one manufacturer that has not less than 5 years successful experience manufacturing pipe of the type and size indicated. For projects containing 1,000 lineal feet or less of buried steel piping

or for project involving both aboveground and buried steel piping, the products of up to two different manufacturers provided that each has not less than 5 years successful experience manufacturing pipe of the particular type and size indicated.

The pipe manufacturer must have a certified quality assurance program, ISO 9001:2000 or other equivalent nationally recognized program as approved by the Owner.

Welds shall be constructed in accordance with ASME Welding Code. The Contractor shall be responsible for compliance to this tolerance and correct any dimensions or welding that does not meet this specification at their expense.

All pipe shall be subject to inspection at the place of manufacture in accordance with the provisions of AWWA C200 and AWWA coating and lining standard as supplemented by the requirements herein.

Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of AWWA C200 and AWWA coating and lining standards.

The Contractor shall perform required tests at no additional cost to the Owner. The Engineer shall have the right to witness all testing conducted by the Contractor. The Contractor shall provide a minimum of 48 hours advance notice of any testing.

All welding procedures used to fabricate pipe shall be qualified under the provision of AWS B2.1 or ASME Section IX.

Skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used shall do all welding. Welders shall maintain current qualifications under the provisions of AWS B2.1 or ASME Section IX. Machines and electrodes similar to those in the work shall be used in qualification tests. The Contractor shall furnish all material and bear the expense of qualifying welders.

Internal bracing shall be provided for shipment if needed to maintain pipe shape.

Finishes

Aboveground Steel Pipe and Fittings: Lining and coating per Division 9.90.

Buried Steel Pipe and Fittings: Provide lining and coatings as follows:

Cement-mortar Lining

1. Interior surface of all steel pipe, fittings, and specials shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally per AWWA C205.
2. Leave pipe ends bare where field welded joints occur. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.
3. Fittings shall be cement-mortar lined per AWWA C205. Pipe and fittings too small to cement-mortar line may be lined with AWWA C210 epoxy or AWWA C222 polyurethane.
4. Defective linings as identified in AWWA C205 shall be removed from the pipe wall and be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder to avoid feather edged joints.

5. Cement-mortar lining shall be kept moist during storage and shipping. Provide a polyethylene or other suitable bulkhead on the ends of the pipe and on all special openings to prevent drying out the lining. All bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

Cement-Mortar Coating

1. All pipe shown on the Plans to be cement-mortar coated shall be coated with ¾-inch minimum thickness of reinforced cement-mortar coating per AWWA C205.

Part 3 - Execution

Installation

Buried piping shall be bedded and backfilled per the plan details or manufacturer's recommendations utilizing an E' value for design check per AWWA M11 Chapter 6.

Rolled Groove Rubber Gasket Joint

1. Clean, lubricate, and place gasket in grooved spigot and relieve tension by inserting a dull instrument under the gasket and completing at least two revolutions around the joint circumference.
2. Upon completion of insertion of spigot (including any angular deflection as shown on the approved shop drawing) and prior to releasing from slings, check the entire placement of the gasket with a feeler gauge per manufacturer's recommendations. If gasket has disengaged or rolled, immediately pull the joint apart and reinstall the joint with a new gasket if required. Again verify proper placement of gasket with feeler gauge.
3. Complete the interior of the joints with liquid epoxy per AWWA C210. Complete the exterior of the joints with heat-shrink sleeves per AWWA C216 and manufacturer's recommendations.

Lap Field Welded Joints

1. Clean exposed end of joint surfaces.
2. Provide a minimum overlap of 1-inch at any location around the joint circumference.
3. Field welders and field weld procedures shall be certified in accordance with AWS D1.1.
4. At the Contractor's option, provide a full fillet weld per AWWA C206 either on the inside or outside of the pipe. Inside welding may be performed after backfilling in accordance with manufacturer's recommendations.
5. Testing of field welds shall be in accordance with AWWA C206.
6. Complete the interior of the joints with liquid epoxy per AWWA C210. Complete the exterior of the joints with heat-shrink sleeves per AWWA C216 and manufacturer's recommendations.

Field Quality Control

The Contractor shall provide tools and equipment, including any special tools required for installing each particular type of pipe used. Pipe that is out-of-round shall be reshaped using methods provided by the pipe manufacturer. The Engineer reserves the right to reject pipe that is excessively out-of-round or damaged during reshaping.

Testing

For potable water pipe, disinfect and purity test per Division 15.05.

Pressure test per Division 15.13 and 15.18.

15.22.04 Stainless Steel Pipe and Fittings

[CSI 33 05 23 or 40 05 23]

Part 1 - General

Related Sections

- Division 5.05 Common Work for Metals

Design Requirements

Welding shall withstand the hydrostatic testing pressure as stated in Division 1.81.40 without leakage.

The pipe wall thickness shall be as required by Division 1.81.40 and the following table.

Pipe Wall Thickness (inches)

Working Pressure	Nominal Pipe Diameter 1"	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	24"	30"
0 - 100 psi	0.109 (1)	0.109 (1)	0.120 (1)	0.120 (1)	0.134 (1)	0.148 (1)	0.165 (1)	0.180 (1)	0.188 (1)	0.188 (1)	0.188 (1)	0.250	0.312 (1)
101 - 200 psi	0.133 (2)	0.154 (2)	0.216 (2)	0.237 (2)	0.280 (2)	0.322 (2)	0.365 (2)	0.375 (2)	0.375	0.375	0.375	0.375	0.375
201 - 400 psi	0.179 (3)	0.218 (3)	0.300 (3)	0.337 (3)	0.432 (3)	0.500 (3)	0.500 (3)	0.500 (3)	0.500	0.500	0.500	0.500	0.625

(1) Per Schedule 10s; (2) Per Schedule 40s; (3) Per Schedule 80s

Part 2 - Products

Materials

All stainless-steel pipe and fittings shown on the Plans in direct bury applications shall meet ASTM A312, Type 304L or 316L, Welded. All heat tints and chromium depleted layers caused by welding shall be removed by pickling prior to on-site delivery.

Above-ground stainless steel piping and fittings shall meet ASTM A778 and A774 respectively, welded. ASTM A312 is also acceptable. Piping systems shall be pickled after welding and prior to on-site delivery. Fittings shall be beveled plain-end for welding, mechanical joint connection, or flange as shown on the Plans.

Part 3 - Execution

Installation

Welding of pipe shall be per ASME Welding Code.

Passivate field welds per Division 5.05.

15.40 PIPING SPECIALTIES

15.40.02 Expansion Joint

[CSI 33 05 09.15]

Part 1 – General

Related Sections

1.81.40 Pressure Ratings

Submittals

Manufacturer's data showing neutral dimensions, deflection ranges, pressure rating, and materials of construction.

Design Criteria

Expansion joints shall be suitable for use within the intended application. All wetted surfaces must be corrosion resistant appropriate for the medium, as determined by the Owner.

- Potable Water: Any products with non-metallic wetted surfaces must be certified by NSF for potable water use. Uncoated wetted metals must be stainless steel.

Part 2 – Products

Performance Criteria

Manufactured Units

Connections as shown on the Plans (e.g., flange, weld, grooved). Elastomeric flanges must include stainless steel or coated steel backing rings.

Listed below is the application suitability by style of expansion joint. "Enclosed" means inside a weatherproof structure such as a building or vault. "Outdoor" means above grade and exposed to the weather.

Rigid Double Ball Expansion: Axial, rotational, and offset. Approx. 250 psi working pressure. Direct bury, enclosed, or outdoor. EBAA Flex-Tend or approved equal.

Direct Bury

Expansion joints directly buried in the ground shall be suitable to external service conditions, including soil overburden and contact with saturated soils.

Expansion joints larger than 2" shall be ductile iron. Ends shall be flanged.

Part 3 - Execution

Installation

Align piping prior to installing expansion joints, do not use the expansion joint to make up for misaligned systems. Unless specifically shown otherwise on the plans, the expansion joint shall be in its neutral state following installation. Install manufacturer provided limit rods for all flexible-style expansion joints, unless specifically noted otherwise on the plans.

15.40.04 Dielectric Fittings and Adapters

[CSI 40 05 06.17]

Part 2 – Products

Dielectric Isolating (Insulating) Flange Joints

Flange insulation shall include a full-face insulating gasket, a full-length insulating sleeve for each bolt, and two insulating washers and two steel bearing washers for each flange bolt.

Sleeves and Washers

Insulating sleeves and washers shall be Pyrox G-10. Both the insulating washers and the steel washers shall fit over the outside diameter of the sleeve and shall fit within the bolt facing of the flange.

Gaskets

Gaskets shall be full faced Styrene Butadiene Rubber (SBR), Nitrile (Buna-N), Neoprene, polytetrafluoroethylene (PTFE), or compressed vegetable fiber. Gaskets shall have adequate dielectric properties, 200V/mil minimum, and shall be suitable for the operating and test pressures of the pipe system. Gaskets shall NSF-61 approved. No hard rigid gasket (e.g. phenolic or epoxy-fiberglass (G-10)), even if full-faced elastomeric coated (e.g. neoprene-coated phenolic) or with elastomeric sealing element such as an O-ring or flat band.

For gaskets used at ductile iron pipe flange joints, provide American Toruseal Flange Gasket (yellow only) has sufficient dielectric characteristics to meet the 200V/mil minimum requirement.

Dielectric Isolation Joint Assembly

An insulating joint assembly shall consist of 2 flange by plain end or 2 flange by mechanical joint (FLG x PE or FLG x MJ) adapters, a full face insulating gasket, with full length insulating sleeves, 2 insulating washers, and 2 steel bearing washers for each flange bolt.

Flange Connection

Submittals for flange connections shall address suitability of gasket, bolts, washers, nuts, and flange characteristics for the specified pipe type and pressure, considering gasket compression, bolt strength, and required torque.

Part 3 - Execution

Installation

Provide dielectric adapters between dissimilar types of metal pipes, valves and fittings (e.g. copper to stainless steel). Flange isolating kits shall be used when dissimilar metal flanged pipe is connected. The following connections do NOT require dielectric isolators.

Metal	Connecting to
Bronze/brass	Copper or ductile iron
Ductile iron	Mild steel, bronze or brass

15.60 PRESSURE MEASUREMENT

[CSI 40 73 00]

15.60.01 Common Work for Pressure Measurement

[CSI 40 73 05]

Part 1 – General

Related Sections

- Division 17 - Electronic Pressure and Level Devices

Design Requirements

Pressure and level measurement devices shall be scaled and rated for the application.

Part 3 – Execution

Installation

All devices shall be installed to be field serviceable without taking the facility out of service. Readouts shall be positioned to be easily read from a standing position and central to the room, unless otherwise allowed by the Engineer.

15.61 Pressure Gauges

[CSI 40 73 13]

Part 1 – General

References

- ASME B40.100 (B40.1 Analog, B40.7 Digital)

Performance Requirements

Analog: Grade 2A (±0.5 percent of span) unless stated otherwise in the Products section.

Digital: Grade 2A (±0.5 percent of span) or AR (±1 percent of reading) unless stated otherwise in the Products section.

Submittals

Provide catalog sheets showing dimensions, pressure range, accuracy and optional accessories.

Part 2 – Products

Manufacturers

Marsh, 3D Instruments, or approved equal.

Materials

Gauges completely suitable for measuring potable water with wetted parts of brass, bronze, or stainless steel.

Accessories

Unless shown otherwise on the Plans, provide a block and bleed valve for each pressure gauge. Transcat 600/700 series, stainless steel, or approved equal. Do not use in chlorine rooms or chlorination systems.

Part 3 - Execution

Installation

Install gauges where shown on the Plans. Support gauges adequately. Tighten only with the connection hex nut, do not twist the case.

Field Quality Control

Where a new gauge is connected directly to the plumbing of a pressure transmitter, the gauge must read within its accuracy grade compared to the transmitter, unless the transmitter is proven faulty.

If the Engineer suspects any gauge is inaccurate, provide a calibrated gauge for comparison, or other method of verification acceptable to the Engineer.

Replace or calibrate gauges that do not meet the accuracy requirements.

16.00 GENERAL

The Contractor shall provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and specifications.

Sections in these specifications titled "*Common Work for . . .*" shall apply to all following sections whether directly referenced or not.

The Contractor shall reference Division 1.25 regarding substitutes and "or-equals".

16.05 Common Work for Electrical

[CSI 26 05 00]

Part 1 - General

Summary

Plans are diagrammatic and indicate general arrangements of systems and equipment, except when specifically, dimensioned or detailed. The intention of the plans is to show size, capacity, approximated location, direction and general relationship of one work phase to another, but not exact detail or arrangement.

Regulatory Requirements

The Contractor shall coordinate and provide all permits, licenses, approvals, inspections by the authority having jurisdiction and other arrangements for work on this project and all fees shall be paid for by the Contractor. The Contractor shall include these fees in the bid price.

Related Sections

See the following sections for items that may be provided and/or installed with other electrical equipment.

- Division 17.50 Sensors and controls

Codes and Standards

Provide all electrical work in accordance with latest edition of National Electrical Code, National Electrical Safety Code, Washington State Electrical Code, and local ordinances. If any conflict occurs between government adopted code rules and these specifications, the codes are to govern. All electrical products shall bear a label from a certified testing laboratory recognized by the State of Washington. Recognized labels in the State of Washington are UL, ETL, and CSA-US.

Definitions

Dry Locations: All those indoor areas which do not fall within the definitions below for wet, damp, or corrosive locations and which are not otherwise designated on the Plans.

Wet Locations: All locations exposed to the weather, whether under a roof or not, unless otherwise designated on the Plans.

Damp Locations: All spaces wholly or partially underground, or having a wall or ceiling forming part of a channel or tank unless otherwise designated on the Plans.

The words "plans" and "drawings" are used interchangeably in this specification and in all cases shall be interpreted to mean "Plans".

The word "provide" shall be interpreted to mean furnish and install.

Design Requirements

Unless otherwise noted, provide enclosures as follows:

1. Class 1, Division 1 and 2 Locations: NEMA Type 7
2. Indoors Unclassified Locations: NEMA Type 12
3. Corrosive Locations: NEMA Type 4X
4. Outdoors and/or Wet Locations: NEMA Type 4X

Submittals

Provide submittals of each item specified in this division to engineer for approval in accordance with Division 1 of these specifications.

Wiring Diagram or Connection Schematic

1. Include all devices in a system and show their physical relationship to each other including terminals and interconnecting wiring in assembly. This diagram shall be in a form showing interconnecting wiring only by terminal designations (wireless diagram).

Interconnection Diagram

1. Show all external connections between terminals of equipment and outside points, such as motors and auxiliary devices. Show references to all connection diagrams which interface to the interconnection diagrams. Interconnection diagrams shall be of the continuous line type. Show bundled wires on a single line with the direction of entry/exit of the individual wires clearly shown. Identify all devices and equipment. Show terminal blocks as actually installed and identified in the equipment complete with individual terminal identification. All jumpers, shielding and grounding termination details not shown on the equipment connection diagrams shall be shown on the interconnection diagrams. Show spare wires and cables.

Provide submittal information for the following items:

1. Conduit and Fittings
2. Wire and Cables
3. Other Electrical Components listed in this Division and/or required by the Engineer.

Part 2 - Products

Source Quality Control

Provide adequate space and fit for the electrical installation, including, but not limited to, determination of access-ways and doorways, shipping sections, wall and floor space, and space occupied by mechanical equipment. Provide electrical equipment that fits in the areas shown on the Plans. All equipment shall be readily accessible for maintenance, shall have electrical clearances in accordance with National Electric Code (NEC) and shall be installed in locations which will provide adequate cooling.

Do not use equipment exceeding dimensions indicated or equipment or arrangements that reduce required clearances or exceed specified maximum dimensions unless approved by the Owner.

Identification of Listed Products

Electrical equipment and materials shall be listed for the purpose for which they are to be used, by an independent testing laboratory. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the inspection authority may require the product to undergo a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.

Materials

Use equipment, materials and wiring methods suitable for the types of locations in which they will be located, as defined in Definitions above.

All materials and equipment specified herein shall, within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

Components

Fasteners for securing to walls, floors, and the like shall meet the requirements of Division 5.05.23.

Accessories

Wire Identification

1. Identify each wire or cable at each termination and in each pull-box using numbered and lettered wire markers. All electrically common conductors shall have the same number. Each electrically different conductor shall be uniquely numbered. Identify panelboard circuits using the panelboard identification and circuit number. Identify other circuits as approved by the Engineer. Identify each wire or cable in each pull-box with plastic sleeves having permanent markings. Conductors between terminals of different numbers shall have both terminal numbers shown at each conductor end. The terminal number closest to the end of the wire shall be the same as the terminal number.

Finishes

Refer to each electrical equipment section of these specifications for painting requirements of equipment enclosures.

Part 3 - Execution

Installation

General

1. Complete the wiring, connection, adjustment, calibration, testing and operation of mechanical equipment having electrical motors and/or built-in or furnished electrical components in accordance with electrical code, UL listing requirements and manufacturer's instructions. Install electrical components that are furnished with mechanical equipment.
2. Provide the size, type and rating of motor control devices, equipment and wiring necessary to match the ratings of motors furnished with mechanical equipment.
3. Complete the procurement, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical devices, components accessories and equipment which is not shown or specified but which is nonetheless required to make the systems shown and specified properly functional.

Workmanship

1. Assign a qualified representative who shall supervise the electrical construction work from beginning to completion and final acceptance.
2. Provide all labor using qualified craftsmen, who have had experience on similar projects.
3. Ensure that all equipment and materials fit properly in their installations.

Field Services

1. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up and operation of the equipment, and to correct any problems which occur during testing and start-up.

Installing Equipment

1. Provide the required inserts, bolts and anchors, and securely attach all equipment and materials to their supports.
2. Install all floor-mounted equipment on 3½-inch high reinforced concrete pads.
3. Install all equipment and junction boxes to permit easy access for normal maintenance.

Cutting, Drilling, and Welding

1. Provide any cutting, drilling, and welding that is required for the electrical construction work.
2. Structural members shall not be cut or drilled, except when approved by the Engineer. Use a core drill wherever it is necessary to drill through concrete or masonry. Perform patch work with the same materials as the surrounding area and finish to match.

Metal Panels

1. Mount all metal panels, which are mounted on, or abutting concrete walls in damp locations or any outside walls ¼-inch from the wall and paint the back side of the panels with a high build epoxy primer with the exception of stainless-steel panels. Film thickness shall be 10 Mils minimum.

Seismic Requirements

1. See Division 1.81.30

Field Quality Control

Minor Deviations

1. The electrical plans are diagrammatic in nature and the location of devices, fixtures, and equipment is approximate unless dimensioned. Based on this, the right is reserved by the owner to provide for minor adjustments and deviations from the locations shown on the Plans without any extra cost. Deviations from the Plans and/or specifications required by code shall also be done, subsequent to Owner's approval, without extra cost.
2. Plans indicate the general location and number of the electrical equipment items. When raceway, boxes, and ground connections are shown, they are shown diagrammatically only and indicate the general character and approximate location. Layout does not necessarily show the total number of raceways or boxes for the circuits required. Furnish, install, and place in satisfactory condition all raceways, boxes, conductors, and connections, and all of the materials required for the electrical systems shown or noted in the contract documents complete, fully operational, and fully tested upon the completion of the project.

Project Record Plans

1. A set of Plans shall be maintained at the job site showing any deviations in the electrical systems from the original design. A set of electrical Plans, marked in red to indicate the routing of concealed conduit runs and any deviations from the original design, shall be submitted to the Owner for review prior to final acceptance.

Cleanup and Equipment Protection

Equipment Protection

1. Always exercise care after installation of equipment to keep out foreign matter, dust debris, and moisture. Use protective sheet metal covers, canvas, heat lamps, etc., as needed to ensure equipment protection.

Cleaning Equipment

1. Thoroughly clean all soiled surfaces of installed equipment and materials upon completion of the project. Clean out and vacuum all construction debris from the bottom of all equipment enclosures.

Painting

1. Repaint any electrical equipment or materials scratched or marred in shipment or installation, using paint furnished by the equipment manufacturer.

Final Cleanup

1. Upon completion of the electrical work, remove all surplus materials, rubbish, and debris that accumulated during the construction work. Leave the entire area neat, clean and acceptable to the Owner.
2. Lamps and fluorescent tubes shall be cleaned, and defective units replaced at the time of final acceptance.

16.10 ELECTRICAL SITE WORK

16.10.1 Common Work for Electrical Site Work

[CSI 33 71 19]

Part 1 – General

Summary

The work included in this section consists of furnishing and installing conduit, fittings, handholes, pull vaults, warning tape, cables, wires, and related items, complete as specified herein and as indicated on the Plans for a complete and functional underground electrical system. Special vaults, grounding, trench backfill requirements may be specified with the particular equipment or electrical system involved.

Related Sections

Wire and cable per Section 16.60.

Raceways and conduit per Section 16.70.

Design Requirements

Materials and equipment shall conform to the respective specifications and standards; and to be the specifications herein. Electrical rating shall be as indicated on Plans.

Part 3 – Execution

Construction

Provide all excavation, trenching, backfill, and surface restoration required for the electrical work.

Excavate to depths as required by Code, particular installation, or as shown on the Plans. Trench width and length as required by the installation or as shown. Trench bottom shall be free of debris and graded smooth. Where trench bottom is rock or rocky or contains debris larger than 1 inch or material with sharp edges, over excavate 3 inches and fill with 3 inches of sand. Separation between new electrical utilities and other utilities shall be 12 inches horizontal and 6 inches vertical minimum, except gas line separation shall be 12 inches both vertical and horizontal. Cross concrete or asphalt only after surface material has been saw cut to required width and removed.

Backfill around raceways shall be 3-inches of pea gravel or sand for systems of 600 volt or less. Provide red marker tape over raceways below grade. Place backfill material to obtain a minimum degree of compaction of 95 percent of maximum density at optimum moisture

content. Moisten backfill material as required to obtain proper compaction. Do not use broken pavement, concrete, sod, roots or debris for backfill.

16.63 Signal Cable

[CSI 27 15 00]

Part 2 - Products

Materials

Twisted Shielded Pairs (TSP)

1. Cable shall conform to IEEE 383, UL 13, and UL 83 and shall be type PLTC cable suitable for direct burial. Each TSP shall consist of two #16 AWG, 7-strand copper conductors per ASTM B8 with 15 Mils PVC insulation and individual conductor jacket of nylon. Conductors shall be twisted with 2-inch or shorter lay, with 100 percent foil shielding and tinned copper drain wires. The cable shall have an overall PVC jacket with a thickness of 35 Mils. The insulation system shall be rated at 90 degrees Celsius and for operation at 600 volts.

Special Cables

1. Use only coaxial cable recommended for specific applications such as radio antenna systems and computer networks as required by the manufacture or system supplier.
2. Special cables such as triaxial (coax), twin-axial, and low capacitance computer grade cables shall be supplied where shown on the Plans or as required by the manufacturer or suppler. Deviations must be favorably reviewed by the Engineer.

Part 3 - Execution

Installation

Cable Installation

1. Cables shall be continuous from initiation to termination without splices.
2. Cable shielding shall be grounded at one end of the cable only. Bonding shall be to a single ground point only. Bonding from cable to cable in multiple run installations shall not be permitted.
3. Install instrumentation cables in separate raceway systems with voltages not to exceed 30 volts DC.

Conductor Identification

1. Except for interior lighting and receptacle circuits, identify each wire or cable at each termination and in each pullbox, junction box, handhole, and manhole using numbered and lettered wire markers. All electrically common conductors shall have the same number. Each electrically different conductor shall be uniquely numbered. Identify panelboard circuits using the panelboard identification and circuit number. Identify other circuits as shown in the circuit schedule as determined by the Engineer.

2. Conductors between terminals of different numbers shall have both terminal numbers shown at each conductor end. The terminal number closest to the end of the wire shall be the same as the terminal number.

Testing

Insulation Resistance Tests: Perform insulation resistance on all circuits. Make these tests before any equipment has been connected. Test the insulation with a 500 Vdc insulation resistance tester with a scale reading 100 mega ohms. The insulation resistance shall be 20 mega ohms or more. Submit results to Engineer for review.

16.70 RACEWAYS, BOXES, AND FITTINGS

[CSI 26 05 33]

16.71 Raceways

[CSI 26 05 33.23]

Part 1 – General

Design Requirements

Conduit sizes not noted on Plans shall be in accordance with NEC requirements for the quantities and sizes of wire installed therein.

Grounding of the raceway, junction boxes, fittings and any other boxes is the responsibility of the Contractor. Ground conductors, bushings, connections, clamps and other materials as needed to ground the raceway system is the responsibility of the Contractor. All raceways shall be grounded in accordance with the NEC.

Part 2 – Products

Components

Conduit and Fittings

1. PVC Coated Rigid Steel Conduit (PVC-GRS): PVC coated conduit shall meet the GRS standard above plus have a 40 Mil PVC factory applied PVC coating.

Conduit and Cable Supports

1. Conduit Supports: Hot dipped galvanized framing channel shall be used to support groups of conduit. Individual conduit supports shall be one-hole galvanized malleable iron pipe straps used with galvanized clamp backs and nesting backs where required. Conduit support for PVC or PVC coated rigid steel shall be one-hole PVC or epoxy coated clamps or PVC conduit wall hangers.
2. Ceiling Hangers: Ceiling hangers shall be adjustable galvanized carbon steel rod hangers. Unless otherwise specified, hanger rods shall be ½-inch all-thread rod and shall meet ASTM A193. Hanger rods in corrosive areas and those exposed to weather or moisture shall be stainless steel.

Conduit Sealants

1. Moisture Barrier Types: Sealant shall be a non-toxic, non-shrink, non-hardening, putty type hand applied material providing an effective barrier under submerged conditions.
2. Fire Retardant Types: Fire stop material shall be a reusable, non-toxic, asbestos-free, expanding, putty type material with a 3-hour rating in accordance with UL 1479. Provide products indicated by the manufacturer to be suitable for the type and size of penetration.

Part 3 - Installation

Raceway Applications

Galvanized Rigid Steel (GRS) conduit shall be used in all locations unless noted otherwise below or on the Plans.

ABOVE GRADE CONDUITS (wet or corrosive areas, NFPA 70 hazardous areas) shall be:

1. PVC-GRS for instrumentation and telecommunications wiring.

BELOW GRADE CONDUITS IN DIRECT EARTH (not under slabs-on-grade) shall be:

1. PVC-GRS for instrumentation and telecommunications wiring.

Installation

All conduits shall be concealed in the floor, walls, ceiling slab, or beneath the floor slab. Surface mounted conduit will not be accepted unless noted otherwise on the construction Plans.

Size of Raceways:

1. Raceway sizes as shown on the Plans, if not shown on the Plans, then size in accordance with NFPA 70.
2. Unless specifically indicated otherwise, the minimum raceway size shall be:
   a) Conduit: ¾-inch
   b) Wireway: 4-inch by 4-inch

All raceways shall contain a separate grounding conductor.

Spare conduits shall contain one $^{3}/_{16}$-inch diameter nylon pull rope.

Conduit routing is shown diagrammatic on the Plans. Contractor is responsible for routing the conduits in a neat manner, parallel and perpendicular to walls and ceilings.

Location of conduit ends are shown approximately. Contractor is responsible for ending conduits in location that will not conflict with electrical equipment. Route conduit ends to facilitate ease of equipment maintenance. Conduits extending from the floor to a device shall be located as close as possible to avoid creating a hazard.

Conduit shall not be routed on exterior of structures except as specifically indicated on the Plans.

Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.

Securely fasten raceways at intervals and locations required by NEC, or the type of raceway employed.

Provide all required openings in walls, floors and ceilings for conduit penetration.

1. Do not install one (1) inch and larger raceways in or through structural members (beams, slabs, etc.) unless approved by Engineer.
2. New Construction: Avoid cutting openings, where possible, by setting sleeves or frames in masonry and concrete, and by requesting openings in advance.
3. Existing Construction: Core drill openings in masonry and concrete. Avoid structural members and rebar.

Conduit encasement or embedment in the earth shall be separated from the earth by at least 3-inches of concrete unless otherwise shown on the Plans. Plastic conduit spacers shall be located five feet on centers. The spacers shall be secured to the conduits by wire ties. The conduits shall be watertight.

Analog signal conduits shall be separated from power or control conduits. The separation shall be a minimum of 12-inches for metallic conduits and 24-inches for nonmetallic conduits.

Install explosion-proof seal-offs in hazardous areas shown on the Plans and as required by the NEC.

Plastic raceway joints shall be solvent cemented in accordance with recommendations of raceway manufacturer.

All conduit openings not encased in a panel shall be sealed with duct seal.

Wireway Installation

1. Straight sections and fittings shall be solidly bolted together to be mechanically rigid and electrically continuous. Dead ends shall be closed. Unused conduit openings shall be plugged.
2. Wireways shall be supported every 5 feet minimum.

16.72 Boxes and Enclosures

16.72.2 Outlet and Junction Boxes

[CSI 26 05 33.16]

Part 1 – General

Design Requirements

In corrosive areas, all junction boxes shall be NEMA 4X.

Outlet boxes and switch boxes shall be designed for mounting flush wiring devices.

Outlet boxes shall not be less than 4-inch square and 1½-inch deep. Ceiling boxes shall withstand a vertical force of 200 pounds for five minutes. Wall boxes shall withstand a vertical downward force of 50 pounds for five minutes.

Part 2 – Products

Materials

Use cast boxes with threaded hubs for all rigid and intermediate conduits. Steel boxes may be used with rigid and intermediate conduits where cast boxes are not allowed by the NEC. All boxes shall be of proper size to accommodate devices, connectors, and number of wires present in the box. Boxes shall be readily accessible.

Cast box bodies and cover shall be cast or malleable iron with a minimum wall thickness of ⅛-inch at every point, and not less than ¼-inch at tapped holes for rigid conduit. Bosses are not acceptable. Mounting lugs shall be provided at the back or bottom corners of the body. Covers shall be secured to the box body with No. 6 or larger brass or bronze flathead screws. Boxes shall be provided with neoprene cover gaskets. Outlet boxes shall be of the FS types. Boxes shall conform to FS W-C-586C and UL 514.

Sheet metal boxes shall conform to UL 50, with a hot-dipped galvanized finish conforming to ASTM A123. Boxes and box extension rings shall be provided with knockouts. Boxes shall be formed in one piece from carbon-steel sheets.

Non-metallic boxes shall be hot-compressed fiberglass, one-piece, molded with reinforcing of polyester material, with a minimum wall thickness of ⅛-inch.

Finishes

Where only cast aluminum is available for certain types of fixture boxes, an epoxy finish shall be provided.

16.72.3 Watertight Enclosures

[CSI 26 05 33.17]

Part 2 – Products

Manufacturers

The watertight enclosure shall be equal to Hoffman.

Materials

Watertight enclosures for vault electrical outlets shall be molded from fiberglass reinforced polyester material. A hinged cover shall be gasketed and opened with quick release latches. The conduit penetrations shall be sealed watertight.

Part 3 – Execution

Installation

An epoxy plug shall be installed in the conduit to prevent the migration of water into the conduit. The enclosure shall be NEMA rated and installed per all applicable codes.

17.00 GENERAL

This division covers all work necessary for furnishing, installing, adjusting, testing, documenting, and starting-up the Instrumentation and Control (I&C) and Telemetry System.

Sections in these specifications titled "*Common Work for . . .*" shall apply to all following related subsections whether directly referenced or not.

These specifications are an integral part of the contract documents for the I&C and Telemetry portion of this contract. The written descriptions of system performance contained herein are given to assist the Contractor in interpreting the contract plans but are not intended to be all-inclusive. The Contractor shall be aware that all automatic control systems do not require the same components and accessories for complete system operation. Therefore, these specifications do not include all accessories and appurtenances required for a complete system. The Contractor shall, however, provide all accessories and appurtenances to result in a completely operational system as required to meet the functional requirements of these documents. Where specific equipment specifications are given, they are used to represent the level of quality required by these documents.

17.05 Common Work for Automatic Control

[CSI 40 60 05]

Part 1 - General

Summary

The work under this division covers construction specifically described in these specifications. Project Plans will be provided for this project. All work incidental and necessary to the completion of the project described herein shall be completed under the bid item listed in the bid proposal, and no other compensation will be allowed. The work generally consists of the following:

- Detailed system layout and design for the particular equipment bid in accordance with these functional specifications.
- Furnishing of I&C equipment including delivery, storage, software, programming, installation, testing, startup, and documentation.
- Providing operator maintenance manuals for all equipment and devices provided by this Contract.
- Providing system training to the operators of the proposed equipment.

Related Sections

- Division 16 Electrical

References

The project Plans are based on Instrument Society of America (ISA) standards numbers S5.1, S5.2, S5.3, and S5.4. The Contractor is encouraged to be familiar with these standards since

the project plans do not contain wiring or ladder diagrams, but are based on the functional requirements of the ISA format.

All equipment and materials shall conform to the latest revised editions of applicable standards published by the following organizations:

- American National Standards Institute (ANSI).
- Institute of Electrical and Electronic Engineers (IEEE).
- National Electrical Manufacturers Association (NEMA).
- Underwriters' Laboratories (U/L).
- Instrument Society of America (ISA)

All equipment and materials, and the design, construction, installation, and application thereof shall comply with all applicable provisions of the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and any applicable Federal, State, and local ordinances, rules and regulations. All materials and equipment specified herein shall be within the scope of Underwriter's Laboratory (UL) examination services, be approved by the UL for the purpose for which they are used and shall bear the UL label.

All control panels shall bear a label by UL or by an approved testing authority for the completed assembled panel.

Definitions

Contractor: The Contractor, as distinct from the Control System Integrator, shall install panels and other materials furnished by the Control System Integrator and provide all materials and work necessary and thereby, satisfy all requirements that are within the scope of this section.

Control System Integrator: A single firm preselected by the Owner and subcontracted by the Contractor, who shall design and furnish the system, provide the pressure transmitter, assemble and test the control panel equipment, and program PLCs, and other instrument components and provide start-up and training services. The Control System Integrator for this contract shall be: Control Systems Northwest, Inc.

Submittals

All submittals shall be complete, neat, orderly and indexed. Partial submittals will not be accepted. Submittal information shall be provided to the Owner for the following items:

- Pressure Transmitter
- Operation and Maintenance Manuals per Division 1.79.2 and Division 17.94
- Full size nameplate wording schedules, in lettering style proposed for use.

In addition to the requirements of Division 1.33, the Contractor shall develop and submit the following information provided by the Control System Integrator.

Hardware Submittals

Before any components are fabricated, and/or integrated into assemblies, or shipped to the site, the Contractor shall prepare a complete hardware submittal. The Engineer shall require

five (5) sets, including fully detailed shop drawing, catalog cuts, wiring connections, 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. Catalog information shall be submitted for all components and equipment, regardless of whether or not it is of the same manufacture as that listed in the Specifications.

System Plan Submittals

Following approval of the hardware submittal, the Control System Integrator shall prepare complete system interconnect wiring diagrams and panel layout plans for approval.

Plans

The Control System Integrator shall develop all shop drawings required for design, fabrication, assembly and installation of the control system. Shop drawings shall include all plans required in manufacture of specialized components and for assembly and installation of them.

Plans shall be prepared with a CAD program capable of exporting to AutoCAD format, and printed on 11-inch by 17-inch media. Plans shall have borders and title blocks identifying the project system, revisions to the plans, and type of plan. Each revision of a plan shall carry a date and brief description of the revisions. Diagrams shall carry a date and brief description of the revisions. Diagrams shall carry a uniform and coordinated set of wire numbers and terminal block numbers in compliance with panel work wiring. Additionally, one set of electronic .DWG files shall be provided to the Owner.

Elementary Diagrams

The Contractor shall provide elementary diagrams for all discrete loops. Loop diagrams shall be prepared in compliance with ISA S5.4 and shall be provided for all analog loops. Elementary diagrams and loop diagrams shall show circuits and devices of a system. These diagrams shall be arranged to emphasize device elements and their functions as an aid to understanding the operation of a system and maintaining or troubleshooting that system. Elementary and loop diagrams shall also show wire numbers, wire color codes, signal polarities, and terminal block numbers.

Panel Fabrication and Arrangements Plans

The Contractor shall provide arrangement plans of all panel front- and internal-mounted instruments, switches, devices, and equipment indicated. All panel mounting details shall be shown. Outer dimensions of all panels shall be included on the plan. Deviations from approved arrangements require approval prior to installation.

Arrangement plans shall be drawn to scale using standard Architectural or Engineering scales.

Site Conditions

Specified instrumentation and control equipment shall be modified, if necessary, to make it suitable for operation in the ambient conditions specified in Division 16.

Warranty

In addition to any other warranties required by the specifications, the entire PLC system will be warranted against defects in materials, workmanship, and software functions for a period

of one (1) calendar year following the successful completion of the Functional Acceptance Test (FAT). The Contractor or designated service organization will be available on 24-hour notice to correct any system problems without charge to the Owner during the warranty period. In addition, the Contractor will provide four 2-day site visits during the warranty period to perform inspection and calibration of the equipment or other work at the request of the Owner.

Part 3 - Execution

Installers

Installation shall be performed by the workers who are skilled and experienced in the installation of I&C and Telemetry systems.

Installation

Installation and testing procedures shall be as specified in these and subsequent sections of this division.

The control system shall be installed in accordance with the installation plans and instructions prepared by the Control System Integrator.

Installation shall include all elements and components of control system and all conduit and interconnecting wiring between all elements, components, sensors, and valve operators.

Equipment shall be located so that it is readily accessible for operation and maintenance.

Field Equipment

Equipment shall be provided as specified on the Plans such that ports and adjustments are accessible for in-place testing and calibration. Where possible, equipment shall be located between 48 inches and 60 inches, unless specified otherwise on the Plans, above the floor or a permanent work platform. Instrumentation equipment shall be mounted for unobstructed access, but mounting shall not obstruct walkways. Equipment shall be mounted where shock or vibration will not impair its operation. Support systems shall not be attached to handrails, process piping or mechanical equipment except for measuring elements and valve positioners. Instruments and cabinets supported directly by concrete or concrete block walls shall be spaced out not less than ⅝-inch by framing channel between instrument and wall.

Steel used for support of equipment shall be hot-dip galvanized after fabrication. Support systems including panels shall be designed in accordance with the Seismic Restraint and Anchorage section of Division 1.81 of these specifications and to prevent deformation greater than ⅛-inch under the attached equipment load and an external load of 200 pounds in any direction.

Electrical Power Connection

Electric power wiring and equipment shall be in compliance with Division 16. Power disconnect switches shall be provided within sight of equipment and shall be labeled to indicate opened and closed positions and specific equipment served. "Within sight of" is defined as having a clear unobstructed view from the equipment served and within 50 feet of the equipment served. Disconnect switches shall be mounted between 36 inches and 72 inches above the floor or permanent work platform. Where equipment location is such that the above

requirements cannot be met by a single disconnect switch, two switches, one at the equipment and one at the work platform, shall be provided.

Signal Connection

Electrical signal connections to equipment shall be made on terminal blocks or by locking plug and receptacle assemblies. Jacketed flexible conduit shall be used between equipment and rigid raceway systems except that flexible cable assemblies may be used where plug and receptacle assemblies are provided and the installation is not subject to mechanical damage in normal use. The length of flexible conduit or cord assemblies shall not exceed 2 feet. Flexible cable, receptacle and plug assemblies shall be used only where specified.

17.06 Control System Integrator

[CSI 40 61 13]

Part 1 - General

Division of Responsibility

All instrumentation and industrial electronic systems shall be provided under the supervision of a single Control System Integrator, chosen by the Owner, which is regularly engaged in the design and installation of such systems of similar scope and complexity. The Control Systems Integrator shall be enjoined by the Contractor as a Subcontractor. The assignment of specific responsibilities herein to the Control System Integrator shall not, in any way and under any conditions, diminish the Contractor's full and complete responsibility for all work performed and all materials installed under the contract. The contract between the Contractor and the Control System Integrator shall specifically require that the Control System Integrator conform to and meet all requirements specified in the contract documents.

The assignment of a Control System Integrator that is an equipment supplier shall not be acceptable.

Control System Integrator's Responsibility

The Control System Integrator shall be solely and completely responsible for the final design and assembly of the entire control system. Responsibilities include:

- The Control System Integrator shall supply the Contractor with all necessary detailed installation plans and/or written instruction for installation of all control components and sensing devices for proper system operation.
- Provide installation assistance.
- Programming of the PLC's.
- Programming of the graphical touch screen operator interfaces (OI) on the control panels.
- Provide Startup and Training Services.

General and Electrical Contractor's Responsibilities

The General and Electrical Contractor shall be responsible for the following equipment and services:

- Review of the Control System Integrator's submittals and wiring diagrams for coordination with space requirements, raceway requirements of field wiring, etc.
- Supply the Integrator with submittals of equipment related to the control system that the Integrator must include in their submittals and integrate.
- Installation of the interconnecting wiring in accordance with these documents and the Control System Integrators wiring diagrams.
- Installation of I&C and Telemetry System components in accordance with these documents and plans or instructions of the Control System Integrator.

Part 3 – Execution

Installers

The Control System shall be designed, constructed, programmed and commissioned by full time employees with a minimum of 5 years of experience (minimum of 1 year with Integrator).

Integrators List

The Control System Integrator shall be:

- Control Systems Northwest, Inc, Bothell, Washington

Approval of Personnel and Alternatives

The Contractor and the selected Control System Integrator shall anticipate that the Owner may withhold approval of the selected Integrator or employee if, in the opinion of the Owner, the Control System Integrator or employee does not have the experience, capability or an acceptable performance and execution record of similar projects in the past.

Neither the Contractor or Control System Integrator or employee not approved by the Owner, shall be entitled to an extension of time or to any claim for damages because of extra and unanticipated costs, hindrances, delays or complications caused by or resulting from the Owner not approving any Control System Integrator or employee for whatever reason.

17.50 SENSORS AND CONTROLS

[CSI 40 70 00]

17.52 Pressure and Level Sensors and Controls

[CSI 40 72 00, 40 73 00]

17.52.10 Gauge Pressure Transmitter

[CSI 40 73 26]

Part 1 – General

Design Requirements

Provide transmitter with ¼-inch or ½-inch process connections or as shown on the plans if different, and completely suitable for measuring pressure in potable water. Select ranges to provide a system that utilizes the largest percentage of available span for each transmitter. Transmitter shall transmit in pounds per square inch displayed at the device screen and through the 4-20mA output.

Location	Low end of range	High end of range (minimum)	High end of range (maximum)
Suction pressure	10 psi	50 psi	100 psi

Part 2 – Products

Manufacturers

Pressure transmitter shall be Endress+Hauser Cerabar S PMP71, or equal.

Manufactured Units

Pressure transmitters shall be all solid state with a 4-20ma output. All wetted parts shall be stainless steel. Transmitter shall be hermetically sealed to withstand submergence or an operating environment of 100 percent humidity for an indefinite period of time. Total error band shall not exceed 0.25 percent of full scale over a temperature range of 0-100 degrees Celsius. Voltage input shall be 9 to 20 VDC without more than a 0.12 percent change in output. Volumetric displacement of bridge from 0 psi to max-rated pressure shall be less than 0.01 cubic inches. Provide electronics with built-in protection against AC line transients and lightning spikes, and an R/F filter to reject external electrical and internal noise. Zero and span adjustments shall be non-interacting.

A digital indicator with on-board pushbuttons shall be provided to display the measurement with a choice of units. The pushbuttons shall allow zero and span adjustments and local configuration without the need for a hand-held terminal.

Part 3 – Execution

Installation

Transmitter installations shall be equipped with drain and bleed and isolation valves to remove air from transmitter diaphragm. Contractor shall be completely responsible for proper operation and interface of transmitter with other electronics provided on the project.

17.90 TESTING, STARTUP, AND TRAINING

17.90.1 Common Work for Testing, Startup, and Training

[CSI 40 61 21, 40 61 26, 40 80 00]

Part 1 – General

Summary

Total system hardware start-up is the responsibility of the Control System Integrator.

Maintenance

The Control System Integrator shall be solely and completely responsible for all hardware maintenance of the system from time of start-up to the date of acceptance, by formal action of the Owner, of all work under the contract. The Control System Integrator shall perform all such work required or considered to be required by the Owner to cause and maintain proper operation of the system and to properly maintain the system.

Warranty

The Contractor shall cause the Control System Integrator to make any and all repairs, replacements, modifications and adjustments required to eliminate any and all defects in design, materials and workmanship which are disclosed within the one year guarantee period. The Control System Integrator shall begin all repairs, replacements, modifications and adjustments within twenty-four (24) hours of notification by telephone by the Owner and shall complete such repairs, replacements, modifications and adjustments within forty-eight (48) hours of notification. Should the Control System Integrator fail to begin the work within 24 hours or complete the work within 48 hours, the Owner may proceed to undertake or complete the work. In such event, the Contractor and his surety shall be liable for all costs incurred by the Owner.

Part 3 – Execution

Field Quality Control

Equipment Manufacturer's Support

1. The Control System Integrator shall pay for services of equipment manufacturer's field service representative(s) to:
    a. Inspect equipment covered by these Specifications.
    b. Supervise adjustments and installation checks.
    c. Conduct start-up of equipment and perform operational checks.
    d. Provide Owner with a written statement that manufacturer's equipment has been installed properly, started up and is ready for operation by Owner's personnel.

Repairs

The Control System Integrator shall correct all deficiencies and defects and make any and all repairs, replacements, modifications, and adjustments as malfunctions or failures occur.

The Contractor and the Control System Integrator shall anticipate that the Owner may delay acceptance of all work under the contract if, in the judgment of the Owner, malfunctions or failures in operation of the control system repeatedly occur after start-up. Both the Contractor and the Control System Integrator shall not be entitled to an extension of time or to any claim for damages because of hindrances, delays or complications caused by or resulting from delay

by the Owner in accepting the work because of malfunctions or failures in operation of the control system.

17.91 Tests and Inspections

[CSI 40 61 21, 40 80 13]

Part 1 - General

Summary

Materials, equipment, and construction included under this specification shall be inspected in accordance with the specifications. Testing shall be performed by the Control System Integrator in accordance with Division 16, and this and subsequent sections of this division. Testing shall be required to determine if installed equipment and system(s) will operate in the manner in which they are intended to operate. The decision of the Owner upon the acceptability of the test procedures and conformance shall be final. The work will not be accepted until all testing has been satisfactorily performed.

Scheduling

The Contractor shall prepare factory and field test procedures to demonstrate conformance of the complete system to this specification. The Contractor shall submit the detailed test procedures within four weeks after the notice to proceed for the Engineer's review and approval.

The Contractor shall furnish all labor, materials, tools, equipment, instruments and services necessary to perform all specific functional testing of all installed equipment and systems at no additional cost.

The Control System Integrator and Contractor shall notify the Owner and Engineer (Control System Programmer) of the factory testing date 30 days before testing.

The Contractor and Control System Integrator shall include in the schedule 10 consecutive working days as part of the factory testing for the Control System Programmer to test the control system software with the hardware supplied by the Control System Integrator at the Control System Integrator's shop.

The Control System Integrator and Contractor shall submit to the Engineer (Control System Programmer) a detailed field testing schedule identifying each day that both the Control System Integrator and Control System Programmer will need to be on site for field testing of equipment. A preliminary schedule shall be submitted to the Engineer for review 60 days before testing. A final schedule shall be submitted to the Engineer for review 30 days before testing.

The Contractor and Control System Integrator shall include in the construction schedule 10 consecutive working days between the completion of field testing and the startup phase for the Control System Programmer to perform field software testing. Startup shall not proceed until the software field testing is complete.

Part 2 – Products

Factory Testing

All factory testing of control panels and computer systems shall be performed at the Control System Integrator's shop.

The completed control system shall be tested in the shop by the Control System Integrator and the Control System Programmer. All motor control centers and VFD's supplied by the Control System Integrator shall be interconnected with the control system and powered with rated incoming voltage. Testing shall be conducted in two phases. The initial hardware testing shall include, but not be limited to, operation of all input and output (I/O) points, control devices and motor controllers. The subsequent testing shall include, but not be limited to, testing of RTU programming and Operator Interface provided by the Control System Programmer.

The initial hardware testing of the control system shall include the following:

1. The entire assembled panels shall be meggered and tested to be free from grounds and shorts.
2. Energize each discrete input and output and simulating each analog input and output using a loop simulator and calibrator. Circuits not energized shall be tested for continuity. Discrete input signals shall be tested in both the "on" and "off" state. Analog signals shall be tested at a minimum of three values (4 mA, 12 mA, and 20 mA). The test results shall be documented by the Control System Integrator in checklist format. The final test results shall be signed by both the Engineer and Control System Integrator prior to shipment of equipment to the job site.
3. Provide signal generators, multimeters, and other test equipment as required to verify proper operation of the assembled panels.
4. The Control System Integrator shall interconnect the control panels with the motor control centers and VFD's for both hardware and software testing phases. Control panels shall initially be hardware tested in one group. Similarly, the motor control centers and VFD's shall be hardware tested in another group. After both groups of hardware are confirmed to be operating correctly, the Control System Integrator shall interconnect the equipment with Ethernet cables and analog and discrete wiring as shown on the Plans. The equipment shall remain connected for the remainder of the factory testing period.
5. Correct, replace, or repair control panel and motor control center wiring, and/or components until testing demonstrates proper operation. Control panels and motor control centers shall not be shipped to the job site until testing has demonstrated complete operation of the panels.
6. Provide updated and complete as-built drawings for the control panels and motor control centers at the time of final factory testing. The Engineer shall review the drawings against the panel construction at the time of final factory testing. Drawings which do not reflect the actual construction of the panel shall be revised and reviewed again by the Engineer. As-built drawings that require revisions shall be submitted to the Engineer for review prior to shipment of equipment to the job site. This review

process shall be repeated as necessary so that as-built drawings reflect the actual construction of the panels and motor control centers at the time of shipment. Panels and motor control centers shall not be shipped to the job site until the as-built drawings are updated, complete, and reflect the actual as-shipped status of the equipment.

Upon completion of the initial hardware testing, Control System Programmer shall conduct software testing for final inspection by the Owner. The Control System Integrator shall provide for time, equipment and support in their shop for Control System Programmer to completely demonstrate the functions of the entire control system. All control functions and all status and alarm monitoring and indication shall be demonstrated under simulated operating conditions. Simulating equipment shall be provided and wired into the control system for this testing. Testing shall be continued for the time period required by the Owner to observe and verify any revisions and as described above in the scheduling portion of this specification.

Part 3 – Execution

Field Quality Control

Following installation by the Contractor, the Control System Integrator will verify the correctness of the interconnecting wiring and energize all control equipment in the field. Each point at the controller(s) shall be checked for proper functional operation through communication with the central computer.

Field Tests

The Control System Integrator in conjunction with the Contractor shall conduct field tests of all panels, motor control centers, VFD's, and instrumentation in the presence of the Engineer after installation of the equipment at the site. Testing shall be conducted by physically actuating signaling devices, installing temporary jumpers, or artificially imposing signals on the field wiring. This shall be done to establish proper operation of the field devices, the integrity of the field wiring, and the proper connection of field devices to the panels. The Contractor and Control System Integrator shall coordinate with the Engineer to provide for as complete testing of the control system as is practical prior to placing the equipment on line for actual control and monitoring. The Contractor and Control System Integrator shall make corrections or repairs to the wiring and/or devices as necessary to provide proper operation of the system.

After the initial testing is complete, commissioning shall be accomplished by the Control Systems Integrator, Control System Programmer, and Contractor, with the Owner and Engineer present. Commissioning shall include operation and verification of all control components and features of the entire control system. Each function shall be demonstrated to the satisfaction of the Owner.

Repairs

Should any part of the system fail during the test, the test shall be rescheduled and repeated to the satisfaction of the Owner after repairs.

17.92 Startup

[CSI 40 80 15]

Part 1 – General

Summary

All testing, startup and operation shall not be cause for claims for delay by the Contractor, and all expenses accruing therefrom shall be deemed to be incidental to this contract. The Contractor shall make arrangement for all materials, supplies and labor necessary to efficiently complete the testing, startup and operation.

Startup shall consist of testing, by a simulated operation, all operational equipment and controls. The purpose of these tests shall be to check that all equipment will function under operating conditions, that all interlocking controls and sequences are properly set, and that the facility will function as an operating unit.

Scheduling

Factory representatives of all major units shall be present for the startup phase. The test shall continue until it is demonstrated that all functions of controls and machinery are correct.

Part 3 - Execution

Field Quality Control

When the installation of the Control System is substantially complete, the Contractor shall commence with calibration and field testing. Testing shall determine that all system components connect up correctly to each other so that the system works as designed. Refer to section 17.91 for field testing requirements.

All components of the control system shall be calibrated by the Control System Integrator after completion of installation. Each component shall be adjusted to be within the Manufacturer's required range and for the specific application.

Components that cannot be properly calibrated or that are found to exceed the Manufacturer's specified range or accuracy shall be removed and replaced at no additional cost to the Owner.

The control system shall be placed into operation by the Control Systems Integrator and Control System Programmer.

The Control System Integrator shall calibrate all instruments, indicators, recorders, loops, etc. and shall provide a five-point calibration test results sheet for each calibrated instrument supplied by the Control System Integrator. The five-point calibration shall include one point at: Minimum input range value, Maximum input range value, Midrange input value, no other point less than 25 percent of span to any other point. Test forms shall identify each instrument tested, input conditions vs. output signal results in tabulated form, and shall be submitted to the Engineer prior to final commissioning.

Repairs

All deficiencies observed during the start-up will be corrected by the Contractor.

17.93 Training

[CSI 40 61 26]

Part 1 – General

Submittals

Submit index of all training offered by PLC system equipment manufacturers including operation and maintenance.

The Control System Integrator shall prepare and assemble specific instruction materials for each training session and shall supply such materials to the Owner at least 2 weeks prior to the time of the training.

The Control System Programmer will provide additional training that is separate from this contract.

Part 3 – Execution

Hands-On Training

The Control System Integrator shall conduct specifically organized training sessions in operation and maintenance of the control system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in maintenance and operation of all components of the control system. Training shall include, but not be limited to, the following:

1. Preventative maintenance procedures
2. Trouble-shooting
3. Calibration
4. Testing
5. Replacement of components

At least two separate training sessions, each at least 4 hours in duration, shall be conducted at the facility after start-up of the system.

17.94 Documentation

17.94.2 Operations and Maintenance Manuals

[CSI 40 80 23]

Part 1 – General

Summary

Two types of operation and maintenance manuals (O&M) will be required for the contract:

1. General manuals for use by the District staff for daily operation, maintenance and troubleshooting.
2. Technical manuals for use by trained electronics technicians for technical and "board level" maintenance and repair.

Submittals

Prior to the receipt of payment for more than 50 percent of the work, the Contractor shall deliver to the Owner five sets of acceptable manufacturer's operating and maintenance instructions covering each piece of mechanical and electrical equipment, or equipment assembly, furnished under this contract. Each set of instructions shall be bound into multiple volumes; each volume to be complete with and index and bound in a suitable hard-cover binder. Manuals shall be assembled and indexed so that information on each piece of equipment can be readily found. Any additional operating and maintenance instructions from the Control Systems Programmer will be submitted separately.

Quality Assurance

Manuals shall be purposefully made for this installation, and general manuals which are vague or have limited applicability will not be accepted. The manuals shall be written in a non-technical format suitable for reading by water system operators with no previous automatic control equipment experience. The decision of the Owner on the acceptability of the manual shall be final.

Part 2 – Products

Materials

The Control System Integrator shall prepare and assemble detailed operation and maintenance manuals in accordance with the project general requirements. The manuals shall include, but not be limited to, the following:

1. Name, location and phone number of nearest supplier and spare part warehouse.
2. Step by step operating procedures.
3. Narrative of overall system performance and operation.
4. Listing of all equipment setpoints.
5. Preventative maintenance procedures
6. Trouble-shooting of master and remote equipment.
7. Calibration
8. Testing
9. Replacement of components
10. System schematics / shop drawings
11. As-built elementary and one-line diagrams
12. Catalog data and complete parts list for all equipment and control devices
13. Listing of recommended spare parts.
14. Listing of recommended maintenance tools and equipment.
15. Warranties.
16. Disassembly and reassembly instructions.

All plans shall be provided on hard copy and in electronic form on disk. Electronic drawing files shall be provided in AutoCAD .DWG format with all "xrefs" bound. If "xrefs" are not bound, all "xref".DWG files shall be provided unlinked with instructions to reestablish the links. Files shall be in AutoCAD 2010 or later format.

Division 18
Measurement and Payment

18.0 GENERAL

It is the intention of these specifications that performance of work under bid items shall result in complete construction, in proper operating condition, of improvements identified in these written specifications and accompanying plans. Work and material not specifically listed herein but required according to the plans and specifications and general practice shall be included in Contractor's bid price in the most closely applicable bid item.

If a minimum bid amount has been established for any item and the bidder's entry is less than the minimum specified amount, the Owner will unilaterally revise the price to the minimum specified amount and recalculate the total. The recalculated total will be used by the Owner for award purposes and to fix the contract price amount and the amount of the contract bond.

If a maximum or fixed bid amount has been established for any item and the bidder's entry exceeds the maximum or fixed specified amount, the Owner will reduce the bid item price to the maximum or fixed specified amount and relocate the offsetting amounts to bid items of the Owner's choosing.

Bid Item 1 – Mobilization, Demobilization, Site Preparation, and Cleanup

Lump sum price covers complete cost of furnishing, installing and testing, complete and in-place, all work and materials necessary to: move and organize equipment and personnel onto the job site; secure job site; traffic control for deliveries; provide and maintain necessary support facilities; obtain all necessary permits and licenses; prepare site for construction operations; maintain site and surrounding areas during construction; move all personnel and equipment off site after contract completion, and provide as-built data; cleanup site prior to final acceptance; and accomplish all other items of work not specifically listed in other divisions.

This bid item may not exceed 10-percent of the total bid price. 40-percent of this bid item will be paid once 5-percent of the total original contract amount is earned. The next 40-percent of this bid item will be paid once 10-percent of the total original contract amount is earned. The final 20-percent of this bid item will be paid on the final pay estimate.

Bid Item 2 – Force Account

The unit price shown shall cover the complete cost of performing work not shown or described in the contract documents. Changed work authorized by the Owner will be paid using the Force Account methodology described in the General Conditions and section 1-09.6 of the Standard Specifications unless the parties have otherwise agreed. The bid includes a fixed amount for all bidders and may not represent the actual amount performed during the project.

Bid Item 3 – Reservoir Site Work

Lump sum price shown shall cover the complete cost of providing all reservoir site work relating to construction of seismic improvements as shown on the Plans and specified herein. Work includes, but is not limited to: structure excavation, backfill, and compaction; site grading; footing drain; temporary construction fencing; temporary erosion and sedimentation control; disposal of excess material; control of water; landscaping; trenching; excavation; removal of unsuitable materials; select bedding; backfill; appurtenances; dewatering; restoration for underground utilities; and all other work necessary for a complete installation of all reservoir site work and underground utilities.

Bid Item 4 – NON-FEMA Site Work

Lump sum price shall cover the complete cost of providing all site work relating to construction of improvements outside the footprint of the reservoir seismic upgrades as shown on the Plans and specified herein. Work includes, but is not limited to: overflow line; footing drain outfall; storm piping; flapper valve; electrical vault removal; site grading and restoration; disposal of excess material; control of water; trenching; excavation; removal of unsuitable materials; select bedding; backfill; appurtenances; dewatering; restoration for underground utilities; and all other work necessary for a complete installation of all site work outside the footprint of the reservoir seismic upgrades and underground utilities.

Bid Item 5 – Reservoir

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for construction of the reservoir as shown on the Plans, and detailed in the contract specifications including foundation, floor, walls, roof, interior columns, and other structural support members, seismic anchors, access ladders and platforms, interior piping, and all appurtenances as shown on the Plans and detailed in the contract specifications.

Bid Item 6 – Reservoir Mechanical

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for the mechanical work shown on the Plans, and detailed in the contract specifications, including all mechanical work and equipment not listed in the other bid items.

Bid Item 7– NON-FEMA Reservoir Mechanical

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for the Non-FEMA mechanical work shown on the Plans, and detailed in the contract specifications, including all mechanical work and equipment not listed in the other bid items. Work includes roof vent, sample lines and associated piping.

Bid Item 8 – Reservoir Electrical

The lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for the electrical work shown on the Plans, and detailed in the contract specifications.

Bid Item 9 – Reservoir Automatic Control

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for the automatic control system as shown on the Plans, and detailed in the contract specifications.

Bid Item 10– Reservoir Testing, Startup and Training

Lump sum price shown shall cover the complete cost of providing all labor and materials necessary for testing and startup of the project as shown on the Plans, and detailed in the contract specifications. Payment shall be lump sum. Partial payment of up to 50 percent of the total bid item cost is allowed no earlier than first Contractor initiated testing date. Final 50 percent of payment shall not be paid until testing of the station is complete, and the pump station is completely operational, and staff trained as determined by the Owner and Engineer. Minimum cost for this bid item shall be $5,000.\

Bid Item 11 – Apprentice Utilization Goals

Lump sum price shown shall cover the complete cost of providing all labor, materials, administration and equipment necessary for the contract to meet Apprenticeship Utilization Goals as required by RCW 39.04.320.

Bid Item 12 – Exterior Coating Repairs

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for painting and coating all surfaces of the improvements as shown on the Plans and detailed in the technical specifications

Schedule A

Bid Item 1 – Interior Coating Replacement

Lump sum price shall cover the complete cost of providing all labor, materials, and equipment necessary for painting and coating all surfaces of the improvements as shown on the Plans and detailed in the technical specifications.

Schedule B

Bid Item 1 – Interior Coating Repairs

Lump sum price shown shall cover the complete cost of providing all labor, materials, and equipment necessary for painting and coating all surfaces of the improvements as shown on the Plans and detailed in the technical specifications.

APPENDIX A

Coating Inspection Report

P.O. BOX 73760, Puyallup, WA 98373
(253)904-8999 Office (253)904-8897 Fax
www.customcoatingconsultants.com

Mr. Dave Matz – P.E., LEED AP
Project Manager
RH2 Engineering, Inc.
1201 Pacific Avenue, Suite 1750
Tacoma, WA 98402

11/5/2021

Re: Cedar River Water & Sewer District – Fairwood #2 Reservoir Evaluation

Mr. Matz,

Per your request, I have visited the site and performed the visual evaluation of the interior, existing coatings within the noted potable water storage tank. An exterior visual inspection was also performed. I would offer the following test results of established interior Dry Film Thickness, Exterior adhesion testing and exterior DFT. At the conclusion of this report I will also offer an opinion as to future preservation work that could be considered by Cedar River Water & Sewer District

HISTORY – Fairwood #2 Reservoir
93' diameter
40' tall approximately
1.2 MG storage capacity (approx.)
1970's – original construction (approx.)
unknown – fabricator/erector

The tank appears to be a ferrous steel, welded tank with a supported domed roof that appears to be built soundly and professionally based on information provided by District staff and features/components viewed. Information provided by the owner, indicates that the reservoir was initially built in another district and then dismantled and re-assembled in its current location. Staff further stated that the reservoir may have suffered some degree of shifting/buckling and that some stiffening repairs were made following the Nisqually earthquake in 2001. The exterior is a solid color with no mural. The tank has an interior steel and exterior ladder system. There are 3 hatch/man-ways; two at ground level and one near the roof access ladder/landing. Main access man-way (24" dia.) is of a "swing" type configuration that swings to the interior of the reservoir. The interior overhead appears to be full seal welded at the exterior only. The roof appears to be supported by 10 steel columns.

12" floor drain with "silt stop" is viewed.

The roof access hatch appears to be square and 24" x 24".

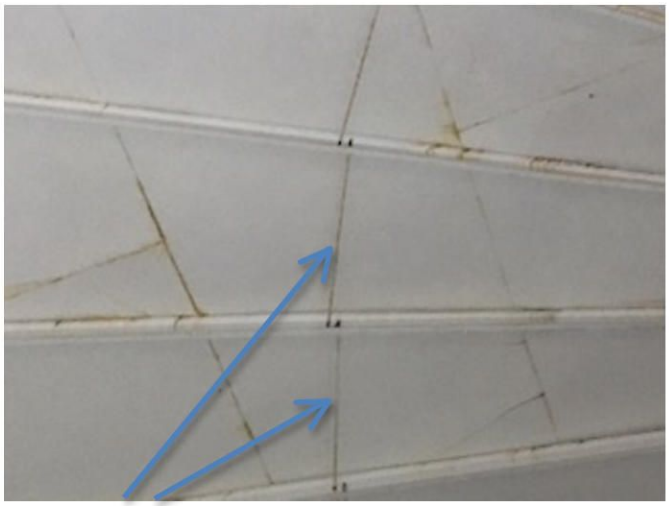
The interior ladder appears soundly affixed/anchored and is 16" wide with an attached "climber" fall protection mechanism. The interior ladder is steel.

Interior has vertical braces (3" x 3" angle) spaced 66" apart running floor to interior rafter ends for stiffening.

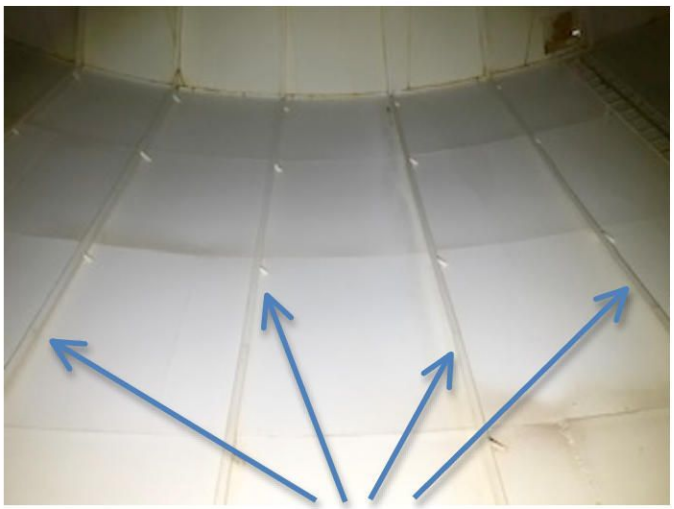
It's assumed that the current lining is of a generic epoxy/epoxy type coating system. Exterior system could have lead at the applied primer coat. Likely, the reservoir's exterior was been over-coated at some time during its working life. No Cathodic Protection system is observed.

Interior overhead depicting the plate overlaps w/ Crevice corrosion and rust bleed.

Interior upper shell and view of overhead. Note Vertical stiffeners placed 66" on center.



Threaded rod stiffeners observed at rafters.



Upper shell wall view with stiffeners.

Large concentration of existing pitted steel at An area of the shell wall. Coating appears sound However and actively protecting the steel.

Floor drain and area at floor where interior sample was recovered for lab analysis.

Localized pitting/corrosion cells observed at floor Plates within the interior.

Depth measurement of localized pitting at floor. Depth ranged from 1/8th to 3/16th.

TESTING

Random Dry Film Thickness (DFT) testing was performed from painted surfaces. The DFT testing was conducted using an Elcometer 456T, type II gage with detachable probe – serial #SA24850. Surfaces that were easily accessible were tested to calculate an overall average for the exterior and interior.

Interior floor & lower columns – 13.8 mil average, 24.0 mils highest spot reading & 8.1 mils lowest spot reading.

Interior shell – 14.5 mil average, 20.5 mils highest spot reading & 6.5 mils lowest spot reading.

Interior roof – near ladder – not tested

Exterior roof – 10.5 mil average, 16.2 mils highest spot reading & 7.1 mils lowest spot reading.

Exterior shell – 10.7 mil average, 18.1 mils highest spot reading & 5.5 mils lowest spot reading

Adhesion testing was also performed at QTY-5 randomly selected locations that showed no real sign of failure. I purposely tested areas of the structure where the coatings appear sound. Test fixtures were affixed using epoxy adhesive and the test locations were cleaned and lightly abraded before placement of the test fixtures. Test locations were "scored" prior to the test procedure. The following results and test data was recorded:

Test #1 (roof panel – N. quad)
11.0 mils DFT at test location
1,543 PSI – 100% glue failure

Test #2 (roof panel – S. quad)
8.3 mils DFT at test location
1,626 PSI – 100% glue failure

Test #3 (1st shell ring – N. quad)
11.5 mils DFT at test location
2,670 PSI – 100% glue failure

Test #4 (1st ring shell – W. quad)
7.5 mils DFT at test location
2,789 PSI – 100% glue failure

Test #5 (1st ring shell – SE quad)
8.0 mils DFT at test location
2,666 PSI – 100% glue failure

An exterior and interior sample of the existing coatings was recovered and delivered to the lab for heavy metal analysis. See test results included with this evaluation. The exterior sample was taken from the roof near the center vent and does in fact have lead present.

APPEARANCE / DEFECTS

INTERIOR

The visual evaluation was made from the floor and with adequate illumination.

The interior coating system generally appears to be in average shape with a few exceptions. Spotty, isolated corrosion appears in random locations in the overhead. Locations appear to be at roof plate/structure overlaps. Corrosion in overhead appears to be at common areas of edges and hard to coat locations, i.e. bolts and brackets.

Man-way hatch's (at ground) swing to interior of reservoir.

Interior coating appear to be relatively smooth and uniform with no Osmotic Blistering observed. Locations of active corrosion are viewed primarily at the overhead and floor areas. Coatings are compromised at the interior ladder, primarily at the upper portion.

Interior floor shows some spotty delamination near the floor drain. Coating sample recovered in this area.

Corrosion at floor is worst in the W. quad with active corrosion and pits observed.

APPEARANCE/ DEFECTS

EXTERIOR

The exterior has traces of organic deposits during this evaluation. The exterior coatings appear moderately weathered with faded color but no real gloss. There is extensive weld scabs and weld spatter at many of the weld lanes at the exterior of this reservoir, typical of the era and fabrication practices many years ago. The tank shell shows many ripples, but this has no effect on the performance of the coatings.

Lab results indicate lead is present at the roof and likely throughout the exterior, however no delamination is evident at the shell, and only small isolated cracks/lifting are evident at the roof plates.

Trace/slight organic growth at shaded sides of the reservoir and where water is cascading over the sides.

Rooftop handrail shows one vertical support that has ruptured possibly by ice causing expansion.

No handrails at outer portion of reservoir, only at landing and leading out towards center vent.

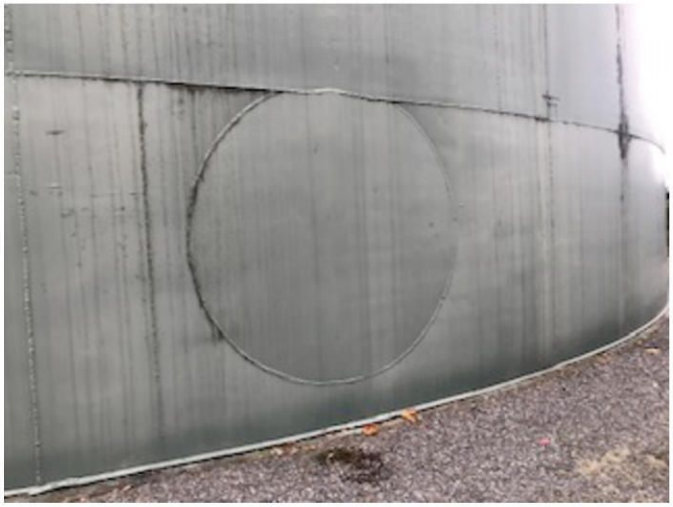
Chime caulking at foundation shows a few areas of loose grout, which could be repaired.

Exterior roof hatch, poor condition of coatings at Interior ladder assembly.

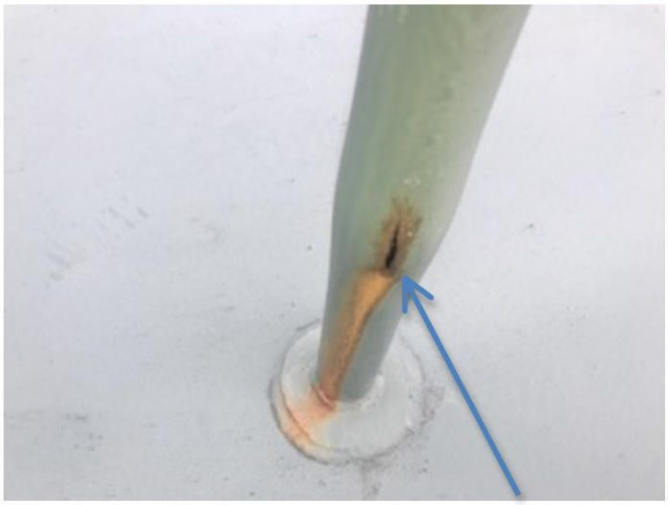
Exterior – East quad shows obvious "ripples" at The exterior rings from possible shifting possibly caused during Nisqually earthquake.

Area at exterior roof where coating sample was Removed for heavy metals testing at lab.

Residual weld scabs and weld spatter observed at Numerous locations of the exterior roof/shell.



View of lower shell, past access panel.



Handrail vertical support, ruptured possibly by ice.

Weld globules and spatter typical at exterior welds.

Organic growth at upper ring of shell.

Adhesion testing equipment and result.


View of interior column base – typical.

DISCUSSION

As it pertains to the existing coatings on the interior surfaces of this reservoir, I would recommend the Cedar River Water & Sewer District to possibly perform repairs at the interior floor, where the pitted steel locations are observed. Rapid curing, 100% solids materials are offered in "small kit" configurations and can easily be applied at "spots" after appropriate power tool cleaning is performed.

Spot repairs can be done and the tank could be re-filled in a few days to ensure demand is met and this could extend and help mitigate further deterioration at these locations.

The general condition of the interior appears to be in generally good condition and the District should plan to revisit the interior within the next 2 to 4 years to monitor degradation for planning purposes as the existing lining is aged.

The exterior, in my opinion is in good condition based on little to no corrosion at the exterior. The reservoir is off the main road does have some view from the surrounding neighbors. Power washing to remove organics should be done with caution as to not compromise the coatings. The lab analysis

Adhesion values are very good considering. Future preservation work could include power washing and over-coating (when needed), as the existing exterior system seems well adhered based on my testing.

My opinion would be to continue the districts inspection plan going forward.

Respectfully,

Mark C. Ficca
Owner/Member
NACE Certified Coating Inspector – Level III, Cert #9943
Custom Coating Consultants, LLC.

SPECTRA Laboratories ...Where experience matters

2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

11/04/2021

Custom Coatings Consultants, LLC
PO Box 73760
Puyallup, WA 98373
Attn: Mark Ficca

Project: Fairwood #2 Reservoir
Client ID: Fairwood #2 Int
Sample Matrix: Paint Chips
Date Sampled: 10/25/2021
Date Received: 10/25/2021
Spectra Project: 2021100695
Spectra Number: 1

Analyte	Result	Units	Method	Analyst	Date Analyzed
Total Arsenic	< 2.5	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Barium	394	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Cadmium	< 0.3	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Chromium	1.3	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Lead	14.9	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Selenium	< 2.5	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Silver	< 0.7	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Mercury	< 0.025	mg/Kg	SW846 7471B	SCJ	11/04/2021

SPECTRA LABORATORIES

Ben Frans, Laboratory Manager

a6/scj

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11/04/2021

Custom Coatings Consultants, LLC
PO Box 73760
Puyallup, WA 98373
Attn: Mark Ficca

Project: Fairwood #2 Reservoir
Client ID: Fairwood #2 Ext
Sample Matrix: Paint Chips
Date Sampled: 10/25/2021
Date Received: 10/25/2021
Spectra Project: 2021100695
Spectra Number: 2

Analyte	Result	Units	Method	Analyst	Date Analyzed
Total Arsenic	3.3	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Barium	604	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Cadmium	0.8	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Chromium	210	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Lead	5520	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Selenium	< 2.5	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Silver	< 0.7	mg/Kg	SW846 6010D	SCJ	11/04/2021
Total Mercury	< 0.025	mg/Kg	SW846 7471B	SCJ	11/04/2021

SPECTRA LABORATORIES

Ben Frans, Laboratory Manager

a6/scj

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
(253) 272-4850 Fax (253) 572-9838
www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS:

CHAIN OF CUSTODY

SPECTRA PROJECT # 2021100695

Return Samples: Y (N) Page 1 of 1 STANDARD X RUSH ☐

CLIENT: Custom Coating Consultants ADDRESS: P.O. Box 73760 Puyallup WA 98373 ADDRESS CHANGE ☐

PROJECT: Fairwood #2 Reservoir

CONTACT: Mark Ficca

SAMPLED BY: Mark Ficca

PHONE: 253-222-9190 FAX:

e-MAIL: accifmarcus@hotmail.com Prefer FAX ☐ or e-MAIL ☒

PURCHASE ORDER #

	SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	NUMBER OF CONTAINERS	HYDROCARBONS: NWTPH-HCID	BTEX	BTEX/NWTPH-G	NWTPH-G	NWTPH-Dx	1664 SGT-HEM (TPH)	1664 HEM (FOG)	ORGANICS: 8260/624 VOA	8260 CHLOR SOLVENTS	8270-625 SEMI VOA	8270 PAH/PNA	8082/608 PCB	METALS: TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	OTHER: PH 9040/9045	TX/TOX/EOX	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)
1	Fairwood #2 Int	10/25/21	Noon	paint Chips	1													X									
2	Fairwood #2 Ext	10/25/21	Noon	"	1													X									
3																											
4																											
5																											
6																											
7																											
8																											
9																											
10																											

LAB USE ONLY

Paid
CC 25-00448C

	SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
RELINQUISHED BY	Mark Ficca	Mark Ficca	Custom Coating Cons.	10/25/21	1:10pm
RECEIVED BY		Taylor Burkhart	Spectra	10/25/21	1:10
RELINQUISHED BY					
RECEIVED BY					

Payment Terms: Net 30 days. Past due accounts subject to 1 1/2% per month interest. Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co., WA venue. *Spectra Laboratories, LLC*

APPENDIX B

Geology Evaluation

TECHNICAL MEMORANDUM

Client:	Cedar River Water and Sewer District
Project:	Water Storage Tank Seismic and Condition Assessments
Project File:	CRWSD 21.0209.00.0002 Project Manager: David Matz, PE
Composed by:	Sue Cook, LG
Reviewed by:	Steve Nelson, LG, LHG, LEG, and Geoff Dillard, PE
Subject:	Fairwood 2 MG Reservoir Engineering Geology Evaluation
Date:	October 6, 2021

Suzanne Sweet Cook

Signed: 10/06/2021

STEPHEN ERIC NELSON

Signed: 10/06/2021

Introduction

The Cedar River Water and Sewer District (District) selected RH2 Engineering, Inc. (RH2) to provide seismic and condition assessments for several District water storage tanks, including the Fairwood 2.0 million gallon Reservoir, to develop a budget and prioritization of proposed improvements. The Fairwood 2 MG Reservoir is a 2.0 MG, 93-foot-diameter, 39-foot-tall steel reservoir constructed in 1976 and located in the northwest portion of the District's service area.

This technical memorandum summarizes the findings of a limited subsurface investigation to observe, characterize, and document earth and groundwater conditions of the reservoir site, identify potential geologic hazards, and provide preliminary recommendations for design and construction of the proposed seismic improvements.

The existing reservoir property (the Site) is located on a 0.9-acre parcel (Parcel No. 2523059054) owned by the District. The Site is in the SW ¼ of the NW ¼ of Section 25, Township 23 N, Range 05 E, centered at latitude 47.4545 degrees north and longitude 122.1179 degrees west in unincorporated King County. The Site is located on a glaciated upland approximately ¾ miles south of the Cedar River valley and approximately 2 miles north of Lake Youngs. The general layout of the property is shown in the attached **Site Plan**.

The area of the proposed seismic retrofits is developed with the existing reservoir and associated improvements. The Site is partially vegetated with shrubs and small trees. Residential parcels exist immediately south and east of the Site. Immediately north of the site is King County Parks land that includes open space, the Fairwood 1 MG Reservoir, and power lines.

The Site topography is sloping southwesterly, ranging from 10- to 20-percent slopes from an elevation of approximately 594 feet to 628 feet above mean sea level (AMSL). The footprint of the existing Fairwood 2 MG Reservoir is located near the center of the Site at an approximate elevation of 616 feet AMSL according to previous grading plans (**Site Plan**).

Proposed Site Design

Foundation deficiencies were identified in the seismic assessment, and the proposed conceptual retrofits to the existing reservoir foundation may include shell stiffeners, additional anchor bolts into the ringwall, an expansion of the ringwall foundation radius, or a combination of the above retrofits.

Construction of the proposed seismic retrofits would require excavating into fill and native soil surrounding the existing foundation to install structural fill as a foundation for a ringwall expansion.

Excavation to install the foundation retrofits likely will encounter cobbles and occasional boulders. Minor groundwater seepage may be encountered during excavations. Excavation is not likely to encounter contaminated soil or groundwater.

Regional Geology

RH2 reviewed geologic maps and descriptions of regional geologic conditions on the Washington State Department of Natural Resources (DNR) website and reviewed the Natural Resources Conservation Service (NRCS) soil mapping website and descriptions of local soil conditions. RH2 reviewed the driller's logs for borings and wells completed within 1 mile of the Site and recorded at the Washington State Department of Ecology well log website.

Review of existing geologic information indicates that the surficial geologic unit in the area is composed of dense, unsorted, silty sand with gravel and occasional boulders, identified herein as glacial till. NRCS identifies surficial soil as Alderwood gravelly loam, which is derived from weathered glacial till. Underlying glacial deposits in the area is sedimentary bedrock containing abundant coal beds, identified as the Renton Formation.[1] Coal mining hazard areas are identified within 350 feet southwest of the Site. Limited boring logs indicate that groundwater may exist at a depth of 100 feet or more below the ground surface.

[1] Booth, D.B. (1995). Surficial geologic map of the Maple Valley quadrangle, King County, Washington. U.S. Geological Survey. Miscellaneous Field Studies Map MF-2297.

The DNR Interactive Geologic Map, based on the United States Geological Survey National Earthquake Hazards Reduction Program, assigns a Seismic Site Class C (very dense soil) at the Site. In addition, the DNR website indicates low risks of liquefaction, landslides, erosion, and flooding at the Site, and identified the Site as a potential coal mining hazard area.

Site Investigation

On July 20, 2021, RH2 observed the excavation of one exploration test pit (TP-1 (Fairwood 2 MG)) to a depth of 7.5 feet by District staff with a District compact excavator. After investigation of the test pit, District staff backfilled the test pit with excavated soil and compacted the backfill using the excavator bucket. The test pit was located southeast of the existing tank; the location is shown on the attached **Site Plan**, and the **Test Pit Log** is attached.

RH2 observed soil samples retrieved from the excavation to identify stratigraphy, composition, texture, structure, and cohesion of native earth materials encountered in the excavation. The earth materials encountered in the excavation consisted of a thin surficial layer of fill (less than 1-foot thick), overlying light gray, medium dense, silty sand with gravel and occasional cobbles, interpreted as weathered glacial till. Underlying weathered glacial till at approximately 1.5 feet to the terminal depth explored was gray, dense to very dense, silty sand with gravel and occasional cobbles, interpreted as unweathered glacial till. No seepage was encountered in TP-1 (Fairwood 2 MG) (**Test Pit Log**).

Geologic Hazards

The DNR website was reviewed for geologic hazards at the Site. The information that follows summarizes the geologic hazards and relative risk they pose to the proposed reservoir retrofits.

- Risks from flooding are negligible.
- Risks from shallow and deep-seated landslides and erosion are low.
- An uncontrolled release or overflow of water from the reservoir or a break in the water main could cause erosion on the developed residential properties downgradient of the existing reservoir.
- The risk of persistent groundwater seepage from surrounding native soil into site excavations during site development is low. Minor groundwater seepage into the excavations may occur, depending on the season.
- The risk of earthquakes of magnitude 5 to 6 during the next 50 years is high (80 percent).
- Liquefaction risk is low due to dense soil conditions and soil texture.
- The risk of encountering soil or groundwater that potentially contains toxic or hazardous materials is low.
- Risks from coal mine hazards are low at the Site.

Geotechnical Properties

The following geotechnical properties for the native unweathered soil at the Site are estimated based on the observed soil composition and density of the dense to very dense silty sand with gravel unit below a depth of 3.0 feet.

The unweathered native soil may support a structure with an appropriately designed foundation that spreads a load that does not exceed a net allowable bearing capacity of 4,000 pounds per square foot. This estimate may be increased by 33 percent for transient loading due to seismic or wind effects.

The unweathered glacial till soil should be considered as a Site Class C, very dense soil.

Recommendations

Excavation for Foundation Retrofit

- The native soil may be excavated readily with a backhoe or excavator. Large boulders may be encountered during excavation and may be removed by over-excavation and replaced with structural backfill. Excavation should proceed until a uniformly dense surface has been cut into unweathered native soil at or below the design depth. Excavation below a depth of 4 feet will require shoring to maintain excavation sidewall stability for the safety of the workers.
- For shallow excavations, minor groundwater seepage may be encountered, and groundwater control may be achieved using sumping methods.

Slopes and Shoring

- Excavations into unweathered native soil may hold vertical slopes temporarily until appropriate shoring is installed soon after excavation.
- Shoring should be designed to protect workers inside excavations and to support slopes, particularly where native soil or backfill associated with existing utilities may be loose. All excavations should comply with all Occupational Safety and Health Administration safety requirements.
- All excavated slopes should be reviewed periodically for stability, including review of the top of the slope for tension cracks and the sidewalls and floors for evidence of seepage or saturated soil conditions.
- The native soil is moderately erodible. All temporary slopes in native material should be protected from erosion during precipitation events by plastic sheeting or other techniques that prevent rain splash erosion and rilling.
- The maximum permanent slope constructed in the native soil should be no steeper than 2H:1V.
- All permanent slopes should be protected from erosion by hydroseeding and planting with landscape fabric, coarse bark placement, quarry spalls, or other materials that prevent rain splash erosion and rilling.

Inspection and Treatment of Subgrade

- A Licensed Engineering Geologist (LEG) or Professional Engineer with geotechnical experience (PEG) should inspect the excavations to confirm whether the earth exposed during excavation is consistent with this technical memorandum and favorable for proceeding with the project as planned.

Subgrade Preparation

- The excavation subgrade should be flat and free of loose earth materials. Any fill used to replace loose native soil or boulders at the subgrade should consist of imported trench backfill placed in 8-inch lifts and compacted with a plate compactor or equivalent. Each lift should be compacted to a firm and unyielding surface to achieve 95 percent of maximum dry density (MDD), as determined by the modified proctor test (ASTM D1557).

Use of Excavated Earth Materials

- Excavated native soil likely contains excessive fines content, cobbles, and boulders and should be exported offsite and not used for structural fill.

Compaction and Testing of Imported Fill

- Representative samples of imported fill should be tested to establish optimum moisture content and MDD.
- Imported trench backfill material should be tested for moisture content just prior to placement. Trench backfill should be within plus 3 percentage points of its optimum moisture content when placed.
- Trench backfill should be placed in lifts that are not more than 8 inches in thickness. Placement and compaction of the fill should be observed by an LEG or PEG.
- All imported fill used as backfill below foundation improvements should be compacted to 95 percent of MDD, as determined in accordance with the modified proctor test (ASTM D1557).
- All imported fill not placed below foundations should be compacted to 90 percent of MDD, as determined in accordance with the modified proctor test (ASTM D1557).

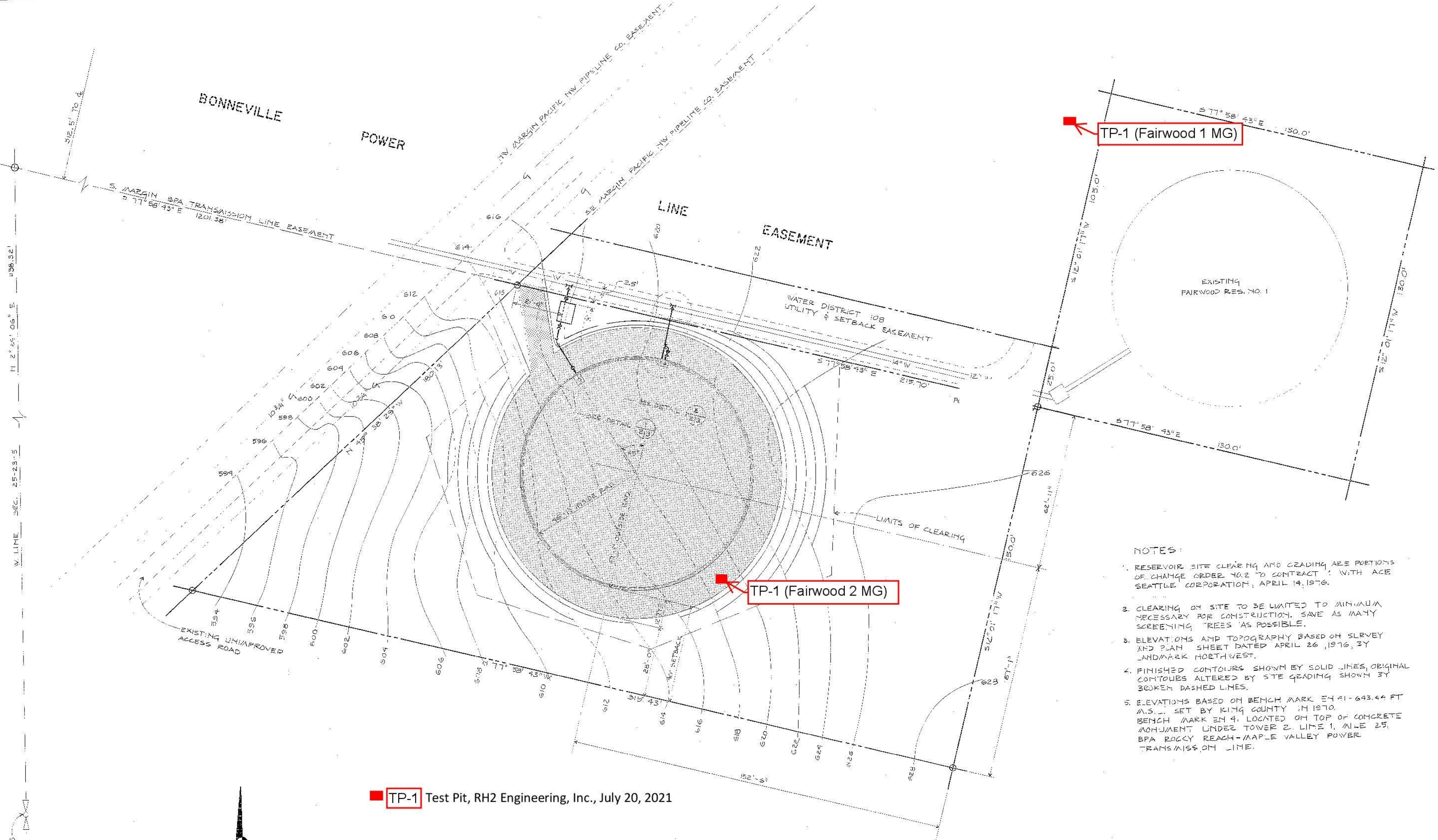
Infiltration Capacity

- The native soil has very limited capacity to support stormwater infiltration using Low Impact Development methods.

Attachments

1. Site Plan
2. Test Pit Log

Site Plan



SITE GRADING PLAN - PRIOR TO RESERVOIR CONSTRUCTION

NOTES:

1. RESERVOIR SITE CLEARING AND GRADING ARE PORTIONS OF CHANGE ORDER NO. 2 TO CONTRACT 1 WITH ACE SEATTLE CORPORATION, APRIL 14, 1976.
2. CLEARING ON SITE TO BE LIMITED TO MINIMUM NECESSARY FOR CONSTRUCTION. SAVE AS MANY SCREENING TREES AS POSSIBLE.
3. ELEVATIONS AND TOPOGRAPHY BASED ON SURVEY AND PLAN SHEET DATED APRIL 26, 1976, BY LANDMARK NORTHWEST.
4. FINISHED CONTOURS SHOWN BY SOLID LINES, ORIGINAL CONTOURS ALTERED BY SITE GRADING SHOWN BY BROKEN DASHED LINES.
5. ELEVATIONS BASED ON BENCH MARK EN 41 - 643.44 FT M.S.L. SET BY KING COUNTY IN 1970. BENCH MARK EN 4, LOCATED ON TOP OF CONCRETE MONUMENT UNDER TOWER 2, LINE 1, MILE 25, BPA ROCKY REACH - MAPLE VALLEY POWER TRANSMISSION LINE.

RICHARD C. T. LI, INC.
AS BUILT
1-24-77

RICHARD C. T. LI, INC. Consulting Engineers 1907 N. 133rd Street · Seattle, Washington 98133	WATER DISTRICT NO. 108 1976 IMPROVEMENTS CONTRACT 1 RESERVOIR SITE GRADING	DATE MARCH 1976 FILE 7411.08 SHEET NUMBER 2 of 3

P2 F4-64

Test Pit Log

RH2	**Test Pit/Exploration Log** **CRWSD TP-1 (FW2)** Exploration Name	**Cedar River Water & Sewer District** **Water Storage Tank Seismic and Condition Assessments, Fairwood 2 MG Reservoir** Project	**Fairwood 2 MG Reservoir,** **8 feet SE of Tank Wall,** **50 feet N of Property Line** Location
Sue Cook, LG Observed By	**July 20, 2021** Date	**CRWSD 21.0209** Project No.	**Bobcat E55 Track, 18-Inch Toothed Bucket** **Cedar River Water & Sewer District** Backhoe and Operator

Depth	Description	Sketch/Photo
0 to 0.7 feet	Gravel Drive/Fill.	
0.7 to 1.5 feet	Silty SAND with Gravel (SM). Light gray with orange mottling; fine to coarse sand, non-plastic fines, fine to coarse subrounded gravel; dry; medium dense; unsorted; slight oxidation (weathered glacial till).	
1.5 to 4.0 feet	Silty SAND with Gravel (SM). Light gray; fine to coarse sand, non-plastic fines, fine to coarse rounded gravel, occasional cobbles, dry; dense; unsorted (glacial till).	
4.0 to 7.5 feet	Silty SAND with Gravel (SM). Light gray; fine to coarse sand, non-plastic fines, fine to coarse rounded gravel, occasional cobbles, slightly moist; very dense; unsorted (glacial till). Vertical trench walls. No groundwater seepage encountered.	
Exploration backfilled with excavated soil.		