

1. 2:00 P.M. Agenda

Documents:

[2022-10-11 Public Works And Streets Agenda.pdf](#)

2. Meeting Materials

[2022-08-Financial-Report-Public-Works](#)

Documents:

[2022 September Public Works Department Report.pdf](#)

[Sept 2022 Water Report.pdf](#)

[RawWaterTankSiteGeotechnicalSvcsProposal.pdf](#)

[YachatsSTankSeis-WTPBackwashRecyle-ProjectManual4-6-22.Pdf](#)

[YachatsSouthTankSeismicValve-WTPBackwashRecycle- Drawings.pdf](#)

[2022-09-13 Meeting Summary Public Works.pdf](#)

3. Draft Of 5 Year CIP

Documents:

[Draft Of 5 Year CIP 10.7.2022.Pdf](#)



CITY OF YACHATS
PUBLIC WORKS & STREETS COMMISSION MEETING
Tuesday, October 11, 2022, at 2:00pm
Meeting Conducted Using Zoom

Join Zoom Meeting

<https://us02web.zoom.us/j/86437265216>

Meeting ID: 864 3726 5216

One tap mobile

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+16694449171,,86437265216# US

Dial by your location

+1 253 215 8782 US (Tacoma)

+1 669 444 9171 US

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+1 346 248 7799 US (Houston)

+1 646 931 3860 US

+1 929 205 6099 US (New York)

+1 301 715 8592 US (Washington DC)

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+1 564 217 2000 US

Meeting ID: 864 3726 5216

Find your local number: <https://us02web.zoom.us/j/86437265216>

AGENDA

- I. CALL MEETING TO ORDER**
 - a. Attendance of Commissioners
- II. CORRESPONDENCE / COMMUNICATIONS**
- III. REPORTS**
 - a. Public Works Report (Buckwald & McClung)
 - i. Wastewater
 - ii. Water
 - iii. Projects underway
 - iv. Grant(s) Status
 - v. Delineator update
 - b. Finance Report (Groth)
 - c. Emergency Preparedness Report (Cox)
 - i. Fire Dept. (Cox)
 - ii. Conex

This meeting is open to the public and all interested persons are invited to attend. This meeting will be audio taped. All items to be considered by the Commission must be submitted to City Hall no later than one week prior to the meeting. Minutes of all public meetings are available for review on the City website at www.yachatsoregon.org. In accordance with ORS 192.630, City of Yachats will make a good faith effort to provide accommodations for any person desiring to attend a public meeting, if the request is made at least 48 hours in advance of the meeting time. The meeting room is physically accessible to persons with mobility devices; a sign language or foreign language interpreter may be available, with advance notice. Call City Hall at 541- 547-3565 or Oregon Relay 1- 800-735-2900 (TDD) two days in advance.
Posted 10/4/22

IV. CURRENT BUSINESS

- a. CIP's status for Master Plan work (Groth, Buckwald & McClung)
- b. Status of a survey of Speeding Streets (Phipps)
- c. Phase 2 /3 Hwy 101 status update

V. OLD BUSINESS

- a. Street Inventory Status (Erdahl)
- b. Street Lighting Study (West & Urban)

Informational: Summary Minutes of August 8, 2022

Next Meeting: Tuesday, November 8, 2022 at 2:00pm

*******NOTICE OF POSSIBLE CITY COUNCIL QUORUM**

This meeting is open to the public and all interested persons are invited to attend. This meeting will be audio taped. All items to be considered by the Commission must be submitted to City Hall no later than one week prior to the meeting. Minutes of all public meetings are available for review on the City website at www.yachatsoregon.org . In accordance with ORS 192.630, City of Yachats will make a good faith effort to provide accommodations for any person desiring to attend a public meeting, if the request is made at least 48 hours in advance of the meeting time. The meeting room is physically accessible to persons with mobility devices; a sign language or foreign language interpreter may be available, with advance notice. Call City Hall at 541- 547-3565 or Oregon Relay 1- 800-735-2900 (TDD) two days in advance.
Posted 10/4/22

Date: September 4, 2022

To: Heide Lambert, City Manager

From: Public Works Department

Re: September 2022 Public Works Report

Rainfall at Yachats Public Works:

	<u>Inches</u>			
	2022	2021	2020	2019
September	0.69	2.54	2.23	3.50
Rain year to date:	36.48	32.51	36.73	38.37

Total wastewater treated: **3,740,000 gallons**

The following is a list of what was done by Public Works staff in September 2022.

Streets:

- Side-arm Mowing.

Storm Drainage:

- Gender storm drain culvert installation complete.
- Culvert repair on Greenhill Drive.

Water Treatment Plant:

- Water systems operations.
- Plant Maintc.
- Cleaned Reedy Creek screen.
- Replaced lagoon pump.

Distribution Sys:

- Meter reading.
- Meter maintc.
- Water leaks repaired on Ocean View Drive, Hwy 101 S, and Shell Street.

Wastewater Treatment Plant:

- Wastewater systems operations.
- Plant maintc. & clean-up.
- Biosolids operations.
- SBR aerator replacement completed.

Collection Sys:

- Lift station inspections.
- Degreased Lift Stations.
- Cleaned and CCTV'd 300 feet on 9th Street and 289 feet on Hwy 101 S.

Public Works:

- Shop maintc. and clean up.
- Fleet maintc. & repair.
- Equipment maintc. and repair.
- Multiple locates.
- Brush box handling.
- PW administration.
- Piles picked up for Trails crew.
- Equipment fueling.
- Fire extinguisher inspections.

Parks, Commons and City Hall:

- Misc. work orders.



City of Yachats Water Department

Water Audit- Month of September 2022

	5/1/21	6/1/21	7/1/21	8/1/21	9/1/21	10/1/21	11/1/2021	12/1/2021	1/1/2022	2/1/2022	3/1/2022	4/1/2022	5/1/2022	6/1/2022	7/1/2022	8/1/2022	9/1/2022
Gallons of Water Produced												2 month average					
Water Plant	4,476,300	3,339,800	4,765,800	5,166,000	5,597,000	4,481,700	3,808,800	2,540,100	3,890,100	3,718,667	3,912,500	3,740,000	3,740,000	3,508,300	4,981,200	5,983,000	5,468,700
Total	4,476,300	3,339,800	4,765,800	5,166,000	5,597,000	4,481,700	3,808,800	2,540,100	3,890,100	3,718,667	3,912,500	3,740,000	3,748,900	3,508,300	4,981,200	5,983,000	5,468,700
Gallons of Accounted for Water													7,488,900	3,508,300			
Reservoir Level Feet	29.8	19.1	21.8	28.1	29.3	28.2	28.4	27.7	29.8	24.5	22.6	30.0	22.0	17.6	31.5	26.5	28.2
Reservoir +/- Gallons 41,666 per Foot	312,495	445,826	112,498	262,495	49,999	45,832	8,333	29,166	87,498	220,829	79,165	308,328	333,328	183,330	579,157	208,330	70,832
Waterline Flushing Gallons	19,000	21,000	0	0	0	0	0	0	0	0	0	0	0	0	610,000	0	0
Gallons Sold	3,799,900	3,355,655	4,425,355	4,573,361	5,389,377	4,204,919	3,468,019	2,668,317	3,206,070	4,860,100	4,347,600		7,031,990	3,447,315	3,502,419	5,267,797	4,206,601
Total	4,131,395	2,930,829	4,537,853	4,835,856	5,439,855	4,159,086	3,476,352	2,639,151	3,293,568	4,639,271	4,268,434		7,006,990	3,263,985	4,691,576	5,059,467	4,277,433
Final Water Report																	
Water Loss Efficiency	92%	88%	95%	93%	97%	92%	91%	96%	84%	80%	92%		93%	93%	94%	85%	78%
Unaccounted Gallons per Month	344,905	408,971	227,947	330,144	157,145	322,614	332,448	99,051	596,532	920,604	355,934		481,910	244,315	289,624	923,533	1,191,267
Unaccounted Gallons per Minute	8	9.5	5.3	7.6	3.6	7.5	7.7	3.2	13.8	18.2	8.2		5.6	5.6	6.7	21.3	27.6

September 15, 2022

Rick McClung
City of Yachats
PO Box 345
Yachats, OR 97498

RE: Raw Water Tank Site Geotechnical Evaluation

Dear Rick:

Per your request, we obtained the attached proposal from our geotechnical engineering subconsultant (GeoEngineers, Inc.) to perform a geotechnical evaluation of the potential raw water tank site located west of the water treatment plant. Please review the attached proposal and let us know if it meets the City's needs. We assume that the City prefers to run this work through Westech's existing agreement for ongoing engineering services. With our standard subconsultant markup and a small budget for Westech's direct time to manage the work on the City's behalf. The total proposed not-to-exceed fees are as listed in the following table.

Yachats Raw Water Tank Geotechnical Evaluation Fee Schedule

Task	Not to Exceed Fee
GeoEngineers Fee	\$37,150
Westech Subconsultant Markup @10%	\$3,715
Westech Direct Fees	\$1,000
Total Not To Exceed Fee	\$41,865

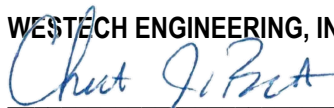
Before authorizing this work, please review the assumptions listed on page 3 of the attached proposal from GeoEngineers. Please let us know if these assumptions are not valid.

If the City decides to proceed with this work, we assume that the City will authorize us to proceed with these services under our existing city engineering contract (we will provide separate invoices for this work to allow the City to accurately track costs).

This proposal is valid for 6 months from today's date.

Sincerely,

WESTECH ENGINEERING, INC.



Christopher J. Brugato, P.E.

cjb
enc.



333 High Street NE, Suite 102
Salem, Oregon 97301
971.304.3078

September 14, 2022

City of Yachats
c/o Westech Engineering, Inc.
3841 Fairview Industrial Drive SE, Suite 100
Salem, Oregon 97302

Attention: Christopher J. Brugato, PE

Subject: Proposal
Geotechnical Engineering Services
Proposed City of Yachats Steel Tank Reservoir
Yachats River Road
Yachats, Oregon
File No. 8185-003-00

GeoEngineers, Inc. (GeoEngineers) is pleased to submit this proposal to the City of Yachats (City) through Westech Engineering, Inc. (Westech) to provide geotechnical engineering services for a proposed 500,000-gallon steel water tank at a partially developed home site north of Yachats River Road approximately 750 feet east of its intersection with Combs Road in Yachats, Oregon. Based on information you provided, the tank is to be sited in the open area in the upper elevation of the property where some residential and outbuilding type structures are currently located. We assume the site can be accessed by rubber-tired drilling equipment.

At the time this proposal was prepared, tank dimensions were not provided. Based on similar projects, we estimated a water tank with a 40- to 60-foot diameter footprint and approximately 50 to 25 feet tall respectively, for the capacity described above. Our geotechnical design services will include a geologic hazards assessment based on published geologic information, and on-site subsurface explorations as well as in-house information from nearby sites, and a general slope stability analysis based on borings conducted at the tank site and an additional boring downslope near Yachats River Road.

SCOPE OF SERVICES

The purpose of our geotechnical engineering services is to evaluate soil and groundwater conditions as a basis for developing geotechnical design recommendations for the proposed water tank and to assess the existing slope relative to project development.



Our proposed scope of services is written based on the information you provided, our experience in the site area, published geologic mapping and well logs of the area, and our understanding of the project. The specific scope of our services is summarized as follows:

1. Review information regarding subsurface soil and groundwater conditions at the site, including reports in our files, selected geologic maps, and other geotechnical engineering related information for the project area. This will include reviewing historical aerial stereo-photographs for indications of historic and recent or active mass movement.
2. Coordinate and manage the field investigation, including public utility notification and scheduling of subcontractors and GeoEngineers' field staff. Public locates will be called in by our office as required by law. We have assumed that if utilities are located on the site and cannot be identified by public locates, they will be identified with respect to our proposed exploration locations by Westech or by the City prior to our arrival on site. A private locator has not been included in our scope of services but can be added for an additional fee if requested.
3. Explore subsurface soil and groundwater conditions at the proposed tank location and at a location downslope near Yachats River Road by drilling exploratory borings using a truck-mounted drill rig.
 - a. At the proposed tank location in the upslope portion of the site, we will drill one boring to an approximate depth of 140 to 160 feet below ground surface (bgs) or practical refusal on very dense gravel or rock if encountered at a shallower depth. The intent of such deep explorations is to adequately characterize subsurface soils to a sufficient depth for the large area under the tank load and to extend the boring to below the elevation of the roadway to the south. If the first boring is drilled and meets refusal at 30 feet bgs or less, a second boring will be advanced in the tank footprint to a similar depth to confirm consistent depth of materials in the upper portion of the subsurface.
 - b. In addition, we will drill one boring to a depth of 30 to 40 feet bgs or practical refusal in dense gravel or rock if encountered at a shallower depth.

We have assumed that access to the site will be provided to us by means of right of entry provided by Westech or the City. In addition, we have assumed that if there are areas of the site that our equipment is not allowed to access, that we will be notified prior to equipment mobilization. Drilling activities are completed with large diesel engine driven equipment and can be very loud. Adjacent site users and tenants should be notified of this prior to our arrival.

Drilled explorations will require 2 to 3 full working days (8:00 a.m. to 5 p.m.) to complete. The borings will be backfilled as required by state law and surface disturbance minimized to the extent practical. We will endeavor to clean up exploration areas and minimize surface damage and surface impacts to the explored areas, but some surface damage such as rutted tracks and soiled surface areas will remain as a result of drilling to depth. We can discuss potential for surface damage further with the current site owner or the project team if requested.

4. Conduct a site walk to assess the surficial slope conditions upslope and downslope of the proposed tank location. The intent of the site walk is to perform a geologic visual reconnaissance of the site and immediate vicinity to document existing surface conditions, with particular attention to surficial indications of slope instability.



5. Obtain samples at representative intervals from the explorations, observe groundwater conditions and maintain detailed logs in general accordance with ASTM International (ASTM) Standard Practices Test Method D 2488. Qualified staff from our office will observe and document field activities.
6. Perform laboratory tests on selected soil samples obtained from the explorations to evaluate pertinent engineering characteristics. Specific laboratory tests will depend on soil conditions encountered, but may include moisture/density tests, Atterberg limit tests, and percent fines tests.
7. Provide a geotechnical evaluation of the site and provide geotechnical design and construction recommendations in a geotechnical report that will address the following geotechnical components:
 - a. A general description of site topography, geology and subsurface conditions.
 - b. A summary of our geologic site reconnaissance.
 - c. An opinion regarding the adequacy of the proposed reservoir tank from a geotechnical engineering standpoint.
 - d. Recommendations for site preparation measures, including disposition of undocumented fill and unsuitable native soils, and constraints for wet weather construction.
 - e. Recommendations for temporary excavation and temporary excavation protection.
 - f. Recommendations for earthwork construction, including use of on-site and imported structural fill, and fill placement and compaction requirements.
 - g. Recommendations for foundations to support the proposed tank walls and tank base slab, including minimum width and embedment of footings, design soil bearing pressures, settlement estimates (total and differential), coefficient of friction and passive earth pressures for sliding resistance. We have assumed that shallow spread foundations or a mat foundation can be used to adequately support the tank structure.
 - h. Comments on potential for effect of seismic hazards, including liquefaction, slope failure, surface fault rupture, International Building Code (IBC) geotechnical seismic design parameters, and IBC soil classification.

Our geotechnical work will be directly supervised by a professional geotechnical engineer licensed in the state of Oregon. Our engineer will apply their professional seal to the final report.

ASSUMPTIONS

In preparing this proposal, we have made the following assumptions with respect to the geotechnical engineering services.

1. Full access to the site will be provided for our exploration personnel and equipment and facilitated through Westech and be arranged prior to our arrival at the site to conduct field explorations. This will include access to the slopes adjacent to the tank site.
2. A conventional truck-mounted drill rig can adequately access the site without use of specialized transporting or supporting equipment. Specialized track-mounted or limited access drilling equipment can be mobilized for additional cost if authorized.

3. Minor surface damage that will result from exploration activities is acceptable to the City. We can discuss this item further with the project team or City of Yachats personnel if requested.
4. Excess drill cuttings can be scattered on site and will not require drumming and removal from the site.
5. Contaminated soils will not be encountered during our exploration and sampling. If contaminated or suspected contamination is encountered (based on field screening), we will stop drilling operations, notify you and discuss how to proceed.
6. No specialty permits, or archeological testing provisions are required.
7. A site-specific seismic study with non-linear response spectra is not anticipated and is not included in our scope of services.

SCHEDULE, TERMS, AND FEES

Boring subcontractors are approximately 4 to 6 weeks out for available scheduling. We are prepared to schedule the explorations for the geotechnical evaluation immediately after receiving your written authorization to proceed. To expedite the report completion process, we are prepared to mark boring locations and schedule utility locates immediately following written authorization to proceed so that we can mobilize to the site to conduct proposed explorations if a driller date opens from a cancellation on another project. We estimate that the exploration program will require 2 to 3 working days to complete. Our initial report will be available approximately 4 weeks after completing the explorations. We will provide a verbal summary of our findings as the information becomes available.

Our scope of services will be provided for an estimated fee of **\$37,150** in accordance with the Schedule of Charges and General Conditions that are attached to and part of this proposal. The estimated fee with contingency scope added does not include remobilizing to the site to remove the observation points as noted above. Services requested and authorized in addition to the scope of services outlined above will be provided in accordance with the attached Schedule of Charges.

An approximate itemization of our expenditures for the scope of services outlined above for this proposed phase of work follows.



ESTIMATED FEE BREAKDOWN

Activity	Expenditures
GeoEngineers	
Subsurface Data and Geologic Review, Marking Site	\$1,930
Geologic Reconnaissance On Site	\$1,760
Fieldwork (two working days, including travel and per diem expenses)	\$4,680
Laboratory Testing/Equipment	\$1,960
Analysis and Report Preparation	\$8,380
Project Management	\$1,920
Subtotal	\$20,630
Subcontractor	
Driller	\$15,970
Private Locator	\$550
Subtotal	\$16,520
Total Estimated Budget	\$37,150

Additional required or requested services will be discussed with you and will not be undertaken without your prior approval.

This proposal is valid for a period of 60 days commencing from the first date listed above and subject to renegotiation by GeoEngineers, Inc., after the expiration date.

LIMITATIONS

Our services are for the exclusive use of City of Yachats, Westech, and their authorized agents for this project. There are no intended third-party beneficiaries arising from the services described in this proposal and no party other than those listed above shall have the right to legally rely on the product of our services without prior written permission of GeoEngineers.

We appreciate the opportunity to submit this proposal. Please call if you have any questions regarding this submittal. Formal authorization for our services can be provided by returning one signed copy of this agreement.

Sincerely,
GeoEngineers, Inc.

Julio C. Vela, PhD, PE, GE
Principal Geotechnical Engineer

JCV:alb

Attachments:

General Conditions – Standard 2021

Schedule of Charges—Salem 2022

One copy submitted electronically

The parties hereto have made, executed and agreed to this Agreement as of the day and year first above written. By signature below, Client accepts the scope of services and all terms described herein. In addition, Client's signature shall constitute as authorization to proceed on the date listed below Client's printed/typed name unless such authorization has been otherwise provided verbally or in writing.

Westech Engineering, Inc.	
ORGANIZATION	* SIGNATURE
DATE	TYPED OR PRINTED NAME *Individual with contracting authority.

Proprietary Notice: The contents of this document are proprietary to GeoEngineers, Inc. and are intended solely for use by our clients and their design teams to evaluate GeoEngineers' capabilities and understanding of project requirements as they relate to performing the services proposed for a specific project. Copies of this document or its contents may not be disclosed to any other parties without the written consent of GeoEngineers.

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Schedule of Charges – 2022

COMPENSATION

Our compensation will be determined on the basis of time and expenses in accordance with the following schedule unless a lump sum amount is so indicated in the proposal or services agreement. Current rates are:

Professional Staff

Staff 1 Scientist	\$ 110/hour
Staff 1 Engineer	\$ 115/hour
Staff 2 Scientist	\$ 121/hour
Staff 2 Engineer	\$ 126/hour
Staff 3 Scientist	\$ 134/hour
Staff 3 Engineer	\$ 137/hour
Engineer/Scientist 1	\$ 141/hour
Engineer/Scientist 2	\$ 150/hour
Senior Engineer/Scientist 1	\$ 168/hour
Senior Engineer/Scientist 2	\$ 180/hour
Associate	\$ 205/hour
Principal	\$ 230/hour
Senior Principal	\$ 235/hour

Technical Support Staff

Administrator 1	\$ 78/hour
Administrator 2	\$ 83/hour
Administrator 3	\$ 88/hour
CAD Technician	\$ 95/hour
CAD Designer	\$ 107/hour
CAD Design Coordinator	\$ 121/hour
GIS Analyst	\$ 145/hour
Senior GIS Analyst	\$ 160/hour
GIS Coordinator	\$ 180/hour
*Technician	\$ 75/hour
*Senior Technician	\$ 85/hour
*Lead Technician	\$ 95/hour
*Environmental Technician	\$ 95/hour

*Hours in excess of 8 hours in a day or 40 hours in a week will be charged at one and one-quarter times the hourly rates listed above.

Contracted professional and technical services will be charged at the applicable hourly rates listed above. Staff time spent in depositions, trial preparation and court or hearing testimony will be billed at one and one-half times the above rates. Time spent in either local or inter-city travel, when travel is in the interest of this contract, will be charged in accordance with the foregoing schedule. A surcharge may be applied to night and weekend work. See proposal for details.

Rates for data storage and web-based access will be provided on a project-specific basis.

Equipment

Air Quality Monitoring Package, per day	\$	200.00
Asbestos/Lead Paint Sampling Equipment Package, per day	\$	150.00
Environmental Exploration Equipment Package, per day	\$	225.00
Field Exploration Equipment Package (marking paint, stakes, survey flagging, other misc. supplies)	\$	40.00
Geotechnical Exploration Equipment Package, per day	\$	175.00
Groundwater Monitoring & Sampling Equipment (Bladder Pump) Package, per day	\$	450.00
Groundwater Monitoring & Sampling Equipment (Peristaltic Pump) Package, per day	\$	325.00
Surface Water Quality Monitoring Equipment Package, per day	\$	200.00
Operations and Maintenance Equipment Package, per day	\$	300.00
Rock/Slope Fall Protection / Rigging Equipment Package, per day	\$	600.00

Specialized Equipment

4 Gas Meter, per day	\$	150.00
Field Data Acquisition – iPad or GPS, per day	\$	75.00
Flow Meter, per day	\$	150.00
Hydrolab Multi Meter Probe, per day	\$	75.00
Interface Probe, per day	\$	65.00
Nuclear Density Gauge, \$80/day, or \$40/half-day	\$	80.00/40.00
Photoionization Detector (PID)	\$	125.00
Pressure Transducer with Data Logger, per day	\$	150.00
Slope Indicator, per day	\$	135.00
Turbidity Monitoring Meter, per day	\$	50.00
Water Level Indicator, per day	\$	50.00
Vehicle usage, per mile, or \$50/half-day, whichever is greater	\$	0.70
Vehicle - 4-Wheel Drive Truck, per day (1 day min.)	\$	100.00
Other Miscellaneous Field Equipment, at current rates, list available upon request, per day		

Specialized equipment will be quoted on a per-job basis.

OTHER SERVICES, SUPPLIES AND SPECIAL TAXES

Charges for services, equipment, supplies and facilities not furnished in accordance with the above schedule, and any unusual items of expense not customarily incurred in our normal operations, are charged at cost plus 15 percent. This includes shipping charges, subsistence, transportation, printing and reproduction, miscellaneous supplies and rentals, surveying services, drilling equipment, construction equipment, watercraft, aircraft, and special insurance which may be required. Taxes required by local jurisdictions for projects in specific geographic areas will be charged to projects at direct cost.

In-House Disposable Field Supplies

Routinely used field supplies stocked in-house by GeoEngineers, at current rates, list available upon request.

Associated Project Costs (APC)

Computer hardware and software, telephone and fax communications, printing and photocopying and routine postage via USPS will be charged at a flat rate of 6 percent of labor charges.

Laboratory Schedule of Charges

Type of Test		Unit Price*
Moisture Content / Oven (ASTM D2216)	\$	30.00
Sample Preparation		
Extrusion - Extrude and log (visual classification) Shelby tube sample, per hour	\$	67.00
Trimming - Trim a soil sample to 2.41-inch dia. for consolidation testing, per hour	\$	67.00
Remolding - Remold a soil sample to desired moisture and density, per hour	\$	67.00
Moisture/Density		
Rings	\$	35.00
Shelby Tubes, waxed chunk	\$	50.00
Tubes (liners), chunk	\$	50.00
Organic Content (ASTM D2974)**	\$	75.00
Particle Size Analysis		
Sieve (ASTM C136) max size < 3/4-inch (includes -200 Wash, Dry Sieve)	\$	115.00
Sieve (ASTM C136) max size > 3/4-inch (includes -200 Wash, Dry Sieve)	\$	120.00
Percent Passing No. 200 (ASTM C117-87/D1140)	\$	60.00
Combined Sieve and Hydrometer (ASTM D422)	\$	225.00
Hydrometer only (ASTM D422)	\$	125.00
Atterberg Limits (ASTM D4318)	\$	130.00
Nonplastic	\$	90.00
Specific Gravity, Fine Material (ASTM D854)	\$	90.00
Specific Gravity, Coarse Material (ASTM C-127)	\$	75.00
Percent of Fracture (ASTM D5821)	\$	50.00
Sand Equivalent (AASHTO T 176, ASTM D-2419)	\$	80.00
Compaction (ASTM D1557/D698, Methods A, B and C, AASHTO T-180)		
4 points	\$	200.00
Direct Shear (ASTM D3080)		
3 points	\$	450.00
R-Value (ASTM D2844, Idaho T-8)	\$	500.00
Consolidation (ASTM D2435)		
With 2 timed load increments	\$	450.00
Permeability		
Constant or falling head in rigid wall permeameter (ASTM D 2434, D 5856)**	\$	350.00
In triaxial cell with back pressure saturation (ASTM D 5084)**	\$	800.00
One-Dimensional Swell (ASTM D4546)		
Method A**	\$	500.00
Method B**	\$	500.00
Method C**	\$	750.00
CBR (3 point) with Proctor (ASTM D1883)	\$	600.00
Rock Point Load Index Test (ASTM D5731)	\$	45.00
Unconfined compressive strength of rock cores (ASTM D7012)	\$	55.00
High Strength Grout Cubes (ASTM C109)	\$	30.00
Compressive Strength of Drilled Concrete Core (ASTM C 42)	\$	55.00

Other tests charged at negotiated rates

*Increase unit prices by 20 percent – 50 percent for contaminated samples.

** Conducted in our Redmond Laboratory, additional shipping charges may apply.

All rates are subject to change upon notification.

THE CITY OF YACHATS

Project Manual: SPECIFICATIONS AND CONTRACT DOCUMENTS

For

SOUTH TANK SEISMIC VALVE AND WATER TREATMENT PLANT BACKWASH RECYCLE IMPROVEMENTS



JO 3096.4010.0

April 2022

WESTECH ENGINEERING, INC.
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THE CITY OF YACHATS
SOUTH TANK SEISMIC VALVE AND WATER TREATMENT PLANT BACKWASH RECYCLE
IMPROVEMENTS

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PART 1:
BIDDING REQUIREMENTS

INVITATION TO BID (ON-LINE BIDDING)

Only on-line bids will be accepted for this project. Paper bids will not be accepted.

ON-LINE bids for the **South Tank Seismic Valve and Water Treatment Plant Backwash Recycle Improvements** will be received on behalf of the **City of Yachats, Oregon** (“Owner”) by **Christopher J. Brugato, P.E.**, Project Manager, of Westech Engineering, Inc., until the bid closing time of 2:00 p.m. local time on **May 17, 2022**. All bidders must register with and obtain plans from the online plan distribution system (QuestCDN) which can be accessed at Westech Engineering’s website at <http://www.westech-eng.com> (*under the currently bidding tab*). Only firms that obtain bidding documents from this online plan distribution system will have access to the online bidding system, which can also be accessed at Westech Engineering’s website as noted above, or directly from QuestCDN at www.questcdn.com. All firms choosing to submit a bid must submit an on-line bid and required bidding documents online and pay a \$30.00 bidding fee through QuestCDN. Bids will be opened and evaluated shortly after the bid closing time, but written bid tabulations will not be finalized or released until after 4:00 p.m. (*the submittal deadline for the “First-Tier Subcontractor Disclosure Form”*).

By no later than 4:00 p.m. local time on **May 17, 2022** (*i.e. 2 working hours after the bid closing*), each bidder shall submit through the on-line bidding system noted above, the “First Tier Subcontractor Disclosure Form” contained in the bidding documents. This form shall be submitted regardless of the bid total. Bidders who fail to submit the required disclosure form will be considered non-responsive, and their bid will not be considered for award. The disclosure form can either be submitted at the same time as the on-line bid, or can be submitted separately.

The work includes the following: The installation of a seismic valve control system at the City’s South Water Storage Tank and the construction of a backwash water recycled pump station and forcemain at the City’s Water Treatment Plant.

A **non-mandatory** pre-bid open-house & site inspection for prospective bidders will be held at the project site between 12:00 PM and 4:00 PM local time on **May 3, 2022**. Both work sites are in secured areas that will be open during this time for inspection. Bidders are welcome to arrive for inspections of the facilities at any time during the open house. Parking at both facilities is very limited. Therefore, bidders are encouraged to stagger visitations rather than all arriving at 12:00PM. There will be no formal meeting that starts at 12:00 PM. Any prospective bidder not attending the pre-bid open house will be fully responsible for making separate arrangements with the City of Yachats for access to examine the project site. In the event that the prospective bidder fails to coordinate such separate access with the City of Yachats, the bidder will be fully responsible for any and all

information affecting the cost, progress or performance of the work that could have been obtained by such a pre-bid inspection visit.

Paper sets of the bid documents will not be available for purchase from Westech Engineering for bidding purposes.

Complete digital (*pdf*) copies of Bid Documents (*including drawings*) are available at <http://www.westech-eng.com> (*under the Currently Bidding tab*). The digital Bid Documents may be downloaded for a non-refundable payment of \$25 by inputting QuestCDN eBidDoc Number listed on the project information sheet available through the website link above. Assistance with free QuestCDN registration, document downloading or working with the project information may be obtained at QuestCDN.com, at 952-233-1632, or via email at info@questcdn.com.

This contract is for a public works project subject to ORS 279C.800 to 279C.870 (*state prevailing wages*) as applicable.

Dated: April 19, 2022

BIDDER'S CHECK LIST

The prospective bidder's attention is especially called to the following forms that must be executed in full and included with the bid except as noted. Submittal of all forms and information required (*with the Bid or following bid closing as specified*) is a matter of responsiveness.

1. **Required Information on Bid Form & Attachment(s)** (*a scanned pdf copy of the bid form must be uploaded to QuestCDN with all bids*)
 - a. Bid conditions or qualifications, if any (*fill in or write "none"*).
 - b. Bid Bond information (*fill in*).
 - c. Resident bidder statement (*check box*).
 - d. Addenda acknowledgement (*fill in*).
 - e. Name of bidder, date and other information shown (*fill in*).
 - f. Signature of Bidder
 - g. Completed Schedule of Prices (*fill in the on-line schedule of prices*).

2. **Bid Bond** (*a scanned pdf copy of the bid bond must be uploaded to QuestCDN on-line bidding system prior to the bid closing time*)
 - a. Bid Bond form is to be executed by the bidder and surety company (*see Article 5 of Instructions to Bidders, "Bid Security"*).
 - b. The amount of the bond shall be not less than 10 percent of the total amount bid (U.S. dollars).

3. **First Tier Subcontractor Disclosure Form** (*a scanned pdf copy of the bid bond must be uploaded to QuestCDN on-line bidding system by the time specified in the Invitation to Bid*).
 - a. Must be completed and submitted per the instructions attached to the First Tier Subcontractor Disclosure Form.

INFORMATION FOR BIDDERS

PROJECT DATA AND REQUIREMENTS

1. **Project Name:** South Tank Seismic Valve & Water Treatment Plant Backwash Water Recycle Improvements
2. **Project Location:** Yachats, Oregon.
3. **Project Owner:** City of Yachats, Oregon.
4. **Owner's Engineer:** Westech Engineering, Inc., 3841 Fairview Industrial Dr. SE, Suite 100, Salem, Oregon 97302, Phone:(503) 585-2474. Project Manager: Christopher J. Brugato, P.E.
5. **Receipt of Bids:** The name and title of the person responsible to receive or oversee receipt of bids and the contract person for questions are as noted in the Invitation to Bid.
6. **Project Financing:** Local funds.
7. **Warranty Period:** The warranty period for this project will be 24 months from the date of substantial completion. Where the project has multiple schedules, or substantial completion is otherwise granted for separate portions of the work, the warranty period for each portion of the project shall be measured from each portion's date of substantial completion. The period of the performance bond shall match the length of the warranty period in order to avoid the need for a separate warranty / maintenance bond.
8. **Project Starting and Substantial Completion/Final Completion Times:** If the Owner chooses to award the project, the Notice of Award will be issued and contracts will be executed as soon as feasible after the bid opening date. After contract execution, the Owners will work with the Contractor to select the appropriate date for the Notice to Proceed, within the timeframes summarized below.

Unless an earlier start date is requested by the Contractor, the Owner will issue the Notice to Proceed by no later than March 20, 2023. The Owner would prefer to start the work as soon as possible after the award of the project. However, the Owner wants to provide as much flexibility as possible for the Contractor.

Bids shall be prepared based on the Contractor's anticipated starting date. No adjustments to the Contract Price will be made if the Contractor chooses to delay the start of the work in accordance with these provisions.

The contract time will commence to run on the day indicated in the Notice to Proceed (NTP). Work is to commence within ten (10) days of the date of issuance of the Notice to Proceed and shall be substantially complete within **One-Hundred and Twenty (120)** calendar days after issuance of the Notice to Proceed.

Unless otherwise specified in the Contract Documents or otherwise approved by the Owners in accordance with the General Conditions of the Contract Documents, all work shall be entirely

completed (Final Completion) and ready for final payment within fifteen (15) calendar days after the date of substantial completion.

9. **Pre-bid Meeting:** A non-mandatory pre-bid open house & site inspection for prospective Bidders will be held at the date, time and location designated in the Invitation to Bid. Statements made by Owner's representatives at the open house are not binding upon the Owner unless confirmed by written addendum. Bids that are submitted by Bidders that do not have a representative in attendance at the mandatory pre-bid meeting will not be opened.
10. **Schedule of Prices:** Work is offered on a unit and lump sum price basis, Each bid item is to be bid. All schedules and all bid alternates are to be bid. Failure to provide a bid price for all bid items, including all bid schedules and all bid alternates as applicable, may result in the bidder being disqualified. No alternate or partial bids are allowed, except as provided for by the schedule of prices or by written addenda from the Engineer.

The various bid schedules will be evaluated and awarded as summarized under a subsequent section (*Evaluation of Bid, Basis of Award*).

Submission of a bid signifies the Bidder's willingness to enter into a contract on any or all bid schedules or bid alternates for which the Bidder submitted the lowest responsive and responsible bid. Bidders submitting a responsive bid must be capable of completing the Work within the contract time period(s) specified.

11. **Acceptance of Stipulated Prices:** Submission of a bid also signifies the Bidder's acceptance of any stipulated prices included in the schedule of prices or in Section 01025. If a bidder considers the stipulated prices to be inadequate, any request for adjustment shall be submitted in writing far enough in advance of bid closing (*a minimum of 5 business days unless otherwise specified*) in order to allow time for evaluation of the matter and issuance of an addendum (*if the Owner or Engineer decide to grant such an adjustment*). Requests for adjustments do not obligate the Owner or Engineer to adjust stipulated prices.
12. **Submittal of Bids:** On-line or sealed bids must be submitted in the manner or to the location designated in the Invitation to Bid, by the bid closing time. Faxed or electronically mailed (email) bids will not be accepted. Submitted bids shall be accompanied by a bid security (bid bond) as noted below and in the "Instructions to Bidders".
13. **Bid Security.** All bids shall be accompanied by a bid bond equal to ten percent (10%) of the total bid (*see Instructions to Bidders, Section 5a for bid bond options*), to be forfeited to the Owner in the event of failure of the Bidder to execute the contract. It is required that the surety issuing a bid bond be duly authorized and licensed to transact surety business in the state of Oregon.
14. **Bids to Remain Open.** The Owner reserves the right to postpone the award for up to 60 days from the date and time of the bid closing (bids submitted by all bidders shall remain open and all bid prices shall remain valid for this period), to delete certain items from the bid, and to award the contract to the lowest responsive responsible bidder. The owner may, in his sole discretion, release any bid and return the Bid Security prior to that date.

15. **Evaluation of Bid, Basis of Award:** See Section 16 of the Instructions to Bidders. In accordance with ORS 279.395, the Owner reserves the right to reject any bid not in compliance with all prescribed public contracting procedures and requirements, including the requirement to demonstrate the Bidder's responsibility under ORS 279C.375(3)(b), and may reject for good cause any and all bids after finding that doing so is in the public interest.

The Owner reserves the right to delete certain bid items from the award, and/or to award or delete bid alternates as the Owner deems appropriate and in the Owner's best interest.

16. **Bid Tabulations:** Following bid opening, any bidder may request in writing copies of bid tabulations from the Owner.

17. **Availability of Bids:** After opening, the Contracting Agency will make Bids available for public inspection pursuant with timeframes under OAR 137-049-0330(3).

18. **Notice of Intent to Award, Protests:** As provided by OAR 137-049-0395, notice of intent to award will be issued to all bidders, and any bid award protests must be submitted in writing and received no later than 4:00 p.m. seven (7) calendar days after the date of issuance of the notice of intent to award (ie. if the Notice of Intent to Award is dated and issued on a Friday, the bid award protest period ends at 4:00 p.m. on the following Friday). Award will not become final until the latter of the seven (7) calendar days following the issuance of the notice of intent to award, or until the Owner provides written response to all timely filed protests that denies the protest and affirms the award. Solicitation protests must be submitted prior to bid closing as specified in (and will be processed in accordance with) OAR 137-049-0260. Award protests must be submitted (and will be processed) in accordance with OAR 137-049-0450.

19. **Liquidated Damages:** The completion of this project is important to the Owner for public health, safety and welfare. If completion is not timely, the Owner will be damaged. The parties, therefore, agree that liquidated damages in the amounts listed in the Agreement, accruing on a daily basis, are part of the consideration for the bid and that this amount is a reasonable sum for such damages.

Liquidated damages shall apply against the successful bidder (the Contractor) and accrue to the Owner at the rate(s) specified in the Agreement for each and every day that expires after the time specified for Substantial Completion. The parties further agree that this amount of liquidated damages is a reasonable forecast of just compensation for the harm caused by any breach and that this harm is one which is impossible or very difficult to estimate.

After Substantial Completion, if the Contractor shall neglect, refuse, or fail to complete the remaining work within the Contract Time for Final Completion or any proper extension thereof granted by the Owner, liquidated damages shall apply against the successful bidder (the Contractor) and accrue to the Owner at the rate(s) specified in the Agreement for each and every day that expires after the time specified from Substantial Completion until the work is complete and ready for final payment.

In addition to the liquidated damages, the Contractor shall reimburse the Owner and/or Engineer for cost incurred for inspection and project management services required beyond the time period outlined above. If the Contractor fails to reimburse the Owner and/or Engineer directly, the cost will be deducted from the Contractor's final pay request by the Owner.

20. **Retainage:** To ensure the proper performance of this Contract, the Owner shall retain five percent (5%) of the amount of each progress payment until Final Completion and acceptance of all work covered by this Contract.

As may be required by ORS 279C.845, Contractor or contractor's surety and every subcontractor or subcontractor's surety shall file certified payroll statements with the Contracting Agency in writing.

- (a) If a contractor is required to file certified statements under ORS 279C.845, the Contracting Agency shall retain 25% of any amount earned by the contractor on the public works project until the contractor has filed with the Contracting Agency statement as required by ORS 279C.845. The Contracting Agency shall pay the contractor the amount retained within 14 days after the contractor files the required certified statements, regardless of whether a subcontractor has failed to file certified statements required by statute. The Contracting Agency is not required to verify the truth of the contents of certified statements filed by the contractor under this section and ORS 279C.845 (*as a condition to release the 25% retainage*).
- (b) The contractor shall retain 25% of any amount earned by a first-tier subcontractor on this public works contract until the subcontractor has filed with the Contracting Agency certified statements as required by ORS 279C.845. The contractor shall verify that the first-tier subcontractor has filed the certified statements before the contractor may pay the subcontractor any amount retained. The contractor shall pay the first-tier subcontractor the amount retained within 14 days after the subcontractor files the certified statements as required by ORS 279C.845. Neither the Contracting Agency nor the contractor is required to verify the truth of the contents of certified statements filed by a first-tier subcontractor (*as a condition to release the 25% retainage*).

As required by ORS 279C.570(2), "*If the contract price exceeds \$500,000, the contracting agency shall place amounts deducted as retainage into an interest-bearing escrow account. Interest on the retainage amount accrues from the date the payment request is approved until the date the retainage is paid to the contractor to which it is due.*"

21. **Contractor Registration.** In accordance with OAR 137-049-0200(1)(a)(K), no bid will be received or considered by the Owner unless the bidder's bid includes a certification that the bidder is registered and in good standing with the Construction Contractors Board or licensed and in good standing by the State Landscape Board, as specified in OAR 137-049-0230. For public contracts, registration "at the time the offer is made" is a matter of bid responsiveness per OAR 137-049-0230(1).
22. **Subcontractor Registration.** Per ORS 701.005(5)(a), ORS 701.021(1) and ORS 701.026(1), it is the bidder's responsibility to ensure that all subcontractors comply with the statutory requirement to be licensed

through the Oregon Construction Contractor Board (CCB) in order to “undertake, offer to undertake or submit a bid to do work” in the State of Oregon.

23. **Performance and Payment Bonds:** Prior to execution of the Agreement, the Bidder shall furnish separate bonds covering the faithful performance of the Contract, and the payment of all obligations arising thereunder, each in an amount equal to one hundred percent (100%) of the Contract sum. The cost of furnishing such bonds shall be included in the price proposal. The duration of the performance bond shall match the length of the project warranty.

The surety issuing such bonds shall be duly authorized and licensed to issue bonds in the State of Oregon. The bonds shall be executed by an attorney-in-fact, principal or other authorized representative for the surety company, showing the Oregon agent for service, and bear the seal of the surety company. Where the bond is executed by a person outside the state of Oregon, his authority to execute bonds shall be shown.

24. **Resident Bidder Certification:** In accordance with ORS 279C.365(1)(h), each bid shall contain a statement as to whether or not the bidder is a resident bidder, as defined in ORS 279A.120.

25. **BOLI Public Works Bond:** Pursuant to ORS 279C.830(2), the Contractor and every subcontractor must have a Public Works bond filed with the Construction Contractors Board before starting work on the project, unless exempt under ORS 279C.836(4), (7), (8) or (9). This bond is in addition to performance bond and payment bond requirements. A photocopy of the Contractor’s BOLI Public Works bond shall be provided with the executed contract documents unless exempted as noted above.

Per ORS 279C.836(4) & (8), projects which are exempt from prevailing wages do not need to have a BOLI Public Works Bond provided with the executed contract documents.

26. **Potential Additions or Changes to the Work.** At its sole discretion, the Owner reserves the right to make changes or additions to the work as provided by OAR 137-049-0910, including but not limited to potential additional work consisting of street or utility work within the jurisdiction of the Owner. Such changes, if requested by the Owner, will be made in accordance with the contract change provisions contained in the Contract Documents. This reservation of rights imposes no obligation on the Owner to make any additions or modifications to the work.

27. **Asbestos Abatement Notice** as required by OAR 137-049-0200(a)(L). This project does not include known asbestos abatement work (or work on or around asbestos cement pipe), and therefore, the contractor does not need to be licensed under ORS 468A.710 in order to submit a bid on this project. This does not eliminate the requirement that any asbestos abatement work subsequently required due to differing conditions discovered (i.e. differing site condition), or expansion of the project scope, must be done by an appropriately licensed contractor or subcontractor.

28. **Prevailing Wage Rates (PWR):** In accordance with ORS 279C.365(1)(g), no bid will be received or considered by the Owner unless the bidder’s bid included a certification that the provisions of ORS 279C.840 (relating to Oregon prevailing wages) will be complied with, as applicable.

For projects which meet or exceed the current dollar limit set by statute, Contractor must pay the current prevailing wage rates as established by the Bureau of Labor and in accordance with ORS 279C.800 – 279C.870 and contained herein, including daily, weekly, weekend and holiday overtime as required.

29. **BOLI Public Works Notice Forms & BOLI Fee:** For reference, the BOLI Public Works fee is to be paid pursuant to the provisions of ORS 279C.825 by the public agency awarding the contract, as noted on the attached sample forms at the end of this Information For Bidders *(the applicable forms are to be completed and submitted to BOLI by the public agency within 30 days following the Notice of Award, including a copy of the 1st Tier Subcontractor Disclosure Form submitted by the bidder to whom the contract was awarded. Note that the forms attached at the end of this Information for Bidders are samples only, and the current copies of the forms for submittal must be obtained from the BOLI website).*
30. **Contractor Application for Payment & Certification:** With each application for payment, the Contractor will be required to complete and submit the “Application for Payment Cover Sheet & Certification” included in this section, in addition to a detailed invoice listing all bid items (and a schedule of values for lump sum contracts). If required by the Contract Documents or funding agency requirements, additional documentation required shall be submitted with this cover sheet.

CONTRACTOR APPLICATION FOR PAYMENT & CERTIFICATION

Application for Payment No. _____

To: _____ (Owner name & address)

From: _____ (Contractor name & address)

Contract: **Agreement Dated** _____, 20__

Project: _____ (Project name)

Engineer's Project No. **JO** _____

For Work accomplished for the period of: _____, 20__ to _____, 20__.

1. Original Contract Total: \$ _____
2. Net change by Change Orders & Written Amendments (+ or -) (thru CO __): \$ _____
3. Current Contract Total (line 1 plus 2) (based on est. quantities as applicable): \$ _____
4. Total Amount Earned to Date (based on actual quantities as applicable): \$ _____
5. Total Retainage (5%): \$ _____
6. Total Amount to Date, less Retainage (line 4 minus 5): \$ _____
7. Total from Previous Applications for Payment: \$ _____
8. Retainage for Release (after project completion): \$ _____
9. **DUE THIS APPLICATION** (line 6 minus 7, plus 8 as applicable): \$ _____

Accompanying Documentation:

- Attach additional sheets if necessary with a detailed summary of requested payment (*ie. of all bid items for unit price contracts, or a detailed breakdown based on a schedule of values for lump sum contracts*), or detailed summary of claims.
- Attach additional documentation as required by the Contract Documents or funding agency requirements.

Contractor's Certification:

The undersigned Contractor certifies that:

- (1) All previous progress payments received from Owner on account of Work done under the Contract referred to above have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment, including payment of all subcontractors & material suppliers; and
- (2) Title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (*except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Lien, security interest or encumbrance*); and
- (3) All Work covered by this Application for Payment is in accordance with the Contract Documents and not defective; and
- (4) In consideration for the payment referenced above, and upon receipt of such payment, Contractor hereby waives and releases its lien and right to claim a lien for labor, services, or materials furnished through the date of this application, with the exception that this release does not cover retainage; and
- (5) Contractor represents that receipt of said payment constitutes full and complete payment for all work, and all costs or expenses incurred (*including, but not limited to, costs for supervision, field office overhead, interest on capital, profit and conditions costs*) relative to the work or improvements as of the date of this application; and
- (6) Contractor specifically waives, quitclaims and releases any claim for damages due to delay, hindrances, interference, acceleration, inefficiencies or extra work, or any other claim of any kind it may have as of the date of this application, except as follows (*to be completed by Contractor, attach pages if required*): _____

Dated _____

Contractor signature

By: _____
(print or type name)

Payment of the above amount is recommended. (*signature line below for use only when form submittal is required by Owner*)

Dated _____ Westech Engineering, Inc. (Engineer) By: _____

31. **Public Contracting.** The Bidder agrees to comply with all applicable state laws, municipal ordinances, and rules and regulations of all authorities having jurisdiction over the construction, and specifically the applicable provisions of Oregon law relating to public contracts (ORS Chapter 279C) which by this reference are incorporated in the Contract Documents and made a part hereof, including the following provisions included in the contract pursuant with OAR 137-049-0200(1)(c).

The paragraphs below with underlined headings are lettered to correspond with the general lettering order and headings under OAR 137-049-0200(1)(c).

- a. Prompt payment to all Persons supplying labor or material; contributions to Industrial Accident Fund; liens and withholding taxes. Pursuant with ORS 279C.505(1), contract hereby includes a condition that *“the contractor shall:*
 - (a) Make payment promptly, as due, to all persons supplying to the contractor labor or material for the performance of the work provided for in the contract.*
 - (b) Pay all contributions or amounts due the Industrial Accident Fund from the contractor or subcontractor incurred in the performance of the contract.*
 - (c) Not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished.*
 - (d) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167.”*
- b. Demonstrate that an employee drug testing program is in place. Pursuant with ORS 279C.505(2), contract hereby includes a condition that *“the contractor shall demonstrate that an employee drug testing program is in place”*.
- c. If the Contract calls for demolition Work described in ORS 279C.510(1). Pursuant with ORS 279C.510(1), this contract hereby includes a condition *“requiring the contractor to salvage or recycle construction and demolition debris, if feasible and cost-effective”*.
- d. If the Contract calls for lawn or landscape maintenance. Pursuant with ORS 279C.510(2), this contract hereby includes a condition *“requiring the contractor to compost or mulch yard waste material at an approved site, if feasible and cost-effective”*.
- e. Payment of claims by public officers. Pursuant with ORS 279C.515(1), this contract hereby includes a condition that, *“if the contractor fails, neglects or refuses to pay promptly a person’s claim for labor or services that the person provides to the contractor or a subcontractor in connection with the public improvement contract as the claim becomes due, the proper officer that represents the state or a county, school district, municipality or municipal corporation or a subdivision of the state, county, school district, municipality or municipal corporation may pay the amount of the claim to the person that provides the labor or services and charge the amount of the payment against funds due or to become due the contractor by reason of the contract.”*

- f. Contractor and first-tier subcontractor liability for late payment on Public Improvement Contracts, including the rate of interest. Pursuant with ORS 279C.515(2), this contract hereby includes a condition that, *“if the contractor or a first-tier subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract within 30 days after receiving payment from the contracting agency or a contractor, the contractor or first-tier subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period within which payment is due under ORS 279C.580 (4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.”*
- g. Persons right to file a complaint with the Construction Contractors Board for all Contracts related to a Public Improvement Contract. Pursuant with ORS 279C.515(3), this contract hereby includes a condition that, *“if the contractor or a subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.”*
- h. Hours of labor in compliance with ORS 279C.520. Pursuant with ORS 279C.520.1, this contract hereby includes a condition that,
“(a) a contractor may not employ an employee for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency or when the public policy absolutely requires otherwise, and in such cases, except in cases of contracts for personal services as defined in ORS 279C.100, the contractor shall pay the employee at least time and a half pay for
(A)(i) All overtime in excess of eight hours in any one day or 40 hours in any one week if the work week is five consecutive days, Monday through Friday; or
(ii) All overtime in excess of 10 hours in any one day or 40 hours in any one week if the work week is four consecutive days, Monday through Friday; and
(B) All work the employee performs on Saturday and on any legal holiday specified in ORS 279C.540.
(b) The contractor shall comply with the prohibition set forth in ORS 652.220, that compliance is a material element of the contract and that a failure to comply is a breach that entitles the contracting agency to terminate the contract for cause.
(c) The contractor may not prohibit any of the contractor’s employees from discussing the employee’s rate of wage, salary, benefits or other compensation with another employee or another person and may not retaliate against an employee who discusses the employee’s rate of wage, salary, benefits or other compensation with another employee or another person.”
- i. Environmental and natural resources regulations. Pursuant with ORS 279C.525, the Contractor shall comply with all ordinances, rules or regulations enacted by federal, state and local agencies dealing with the prevention of environmental pollution and the preservation of natural resources that affect the performance of the contract *(also see list included at the end of this subsection)*. To the extent that known environmental and natural resource risks are specifically noted, shown, specified or referenced in the contract documents or on the construction drawings, such risks are allocated to the Contractor pursuant with 279C.525(8)(a).

- j. Payment for medical care and attention to employees. Pursuant with ORS 279C.530(1), this contract hereby includes a condition that, *“the contractor shall promptly, as due, make payment to any person, copartnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the contractor, of all sums that the contractor agrees to pay for the services and all moneys and sums that the contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.”*
- k. Required Contract provision as follows. Pursuant with OAR 137-049-00200(1)(c)(K) and ORS 279C.530(2), this contract hereby includes a contract provision as follows: *“all employers, including Contractor, that employ subject workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.”*
- l. Maximum hours, holidays and overtime. Provisions of ORS 279C.540 pertaining to maximum hours, holidays and overtime shall be complied with by the Contractor and all subcontractors.
- m. Time limitation on claims for overtime. Provisions of ORS 279C.545 pertaining to time limitation on claims for overtime and requirements for posting circulars containing said provisions shall be complied with by the Contractor and all subcontractors.
- n. Prevailing wage rates. The provisions of ORS 279C.800 to ORS 279C.870 relating to the prevailing wage rates will be complied with for publicly funded projects. The hourly rate of wage to be paid by Contractor or any Subcontractor to workers in each trade or occupation required for the public works employed in the performance of this Contract shall not be less than the specified minimum rate of wage in accordance with ORS 279C.838 and ORS 279C.840.
- 1) The latest prevailing wage rates for public works contracts in Oregon are contained in the following publications: The Prevailing Wage Rates for Public Works Projects in Oregon, including any amendments, which are in effect at the time the project is advertised for bid. Such publications can be reviewed electronically at:
https://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx
and are hereby incorporated as part of the contract documents
 - 2) Contractor and all Subcontractors shall keep the prevailing wage rates for this Project posted in a conspicuous and accessible place in or about the Project.
 - 3) The Owner shall pay a fee to the Commissioner of the Oregon Bureau of Labor and Industries as provided in ORS 279C.825. The fee shall be paid to the Commissioner as required by the administrative rules adopted by the Commissioner.
 - 4) If Contractor or any Subcontractor also provides for or contributes to a health and welfare plan or a pension plan, or both, for its employees on the Project, it shall post notice describing such plans in a conspicuous and accessible place in or about the Project. The notice shall contain information on how and where to make claims and where to obtain future information.
- o. BOLI Public Works bond. Pursuant with ORS 279C.830(2), this contract hereby includes contract provisions as follows:
“(a) the contractor and every subcontractor must have a public works bond filed with the Construction Contractors Board before starting work on the project, unless the contractor or subcontractor is exempt under ORS 279C.836 (4), (7), (8) or (9).

- (b) *Every contract that a contracting agency awards must require the contractor to:*
 - (A) *Have a public works bond filed with the Construction Contractors Board before starting work on the project, unless the contractor is exempt under ORS 279C.836 (4), (7), (8) or (9).*
 - (B) *Require, in every subcontract, that the subcontractor have a public works bond filed with the Construction Contractors Board before starting work on the project, unless the subcontractor is exempt under ORS 279C.836 (4), (7), (8) or (9).*
- (c) *Every subcontract that a contractor or subcontractor awards in connection with a public works contract between a contractor and a public agency must require any subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the public works project, unless the subcontractor is exempt under ORS 279C.836 (4), (7), (8) or (9)."*

p. Retainage. Retainage shall be as outlined in these contract documents and as specified under ORS 279C.550 to 279C.570.

q. Prompt payment policy, progress payments, rate of interest. Contract provisions regarding payment policies, progress payments, interest, etc. are as outlined in the General Conditions and ORS 279C.570.

r. Contractors relations with subcontractors. The Contractor's relations with subcontractors shall comply with ORS 279C.580.

Pursuant with ORS 279C.580(3) , this contract hereby includes a condition that, *"requires the contractor to include in each subcontract for property or services the contractor enters into with a first-tier subcontractor, including a material supplier, for the purpose of performing a construction contract:*

- (a) *A payment clause that obligates the contractor to pay the first-tier subcontractor for satisfactory performance under the subcontract within 10 days out of amounts the contracting agency pays to the contractor under the public improvement contract.*
- (b) *A clause that requires the contractor to provide a first-tier subcontractor with a standard form that the first-tier subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from the contractor.*
- (c) *A clause that requires the contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. A contractor may change the form or the regular administrative procedures the contractor uses for processing payments if the contractor:*
 - (A) *Notifies the subcontractor in writing at least 45 days before the date on which the contractor makes the change; and*
 - (B) *Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.*
- (d) *An interest penalty clause that obligates the contractor, if the contractor does not pay the first-tier subcontractor within 30 days after receiving payment from the contracting agency, to pay the first-tier subcontractor an interest penalty on amounts due in each payment the contractor does not make in accordance with the payment clause included in the subcontract under paragraph (a) of this subsection. A contractor or first-tier subcontractor is not obligated to pay an interest penalty if the only reason that the contractor or first-tier subcontractor did not make payment when payment was due is that the contractor or first-tier subcontractor did not receive payment from the contracting agency or contractor when payment was due. The interest penalty:*
 - (A) *Applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and*

(B) Is computed at the rate specified in ORS 279C.515 (2)."

- s. Notice of claim. Any notice of claim on a payment bond or public works bond shall comply with the requirements of ORS 279C.605.
- t. Contractors certification of compliance with the Oregon tax laws. As required by 137-049-0200(1)(c)(T), by signing this contract the Contractor certifies "*compliance with the Oregon tax laws in accordance with ORS 305.385.*"
- u. Subcontractor Registration. As required by 137-049-0200(1)(c)(U), by signing this contract the Contractor certifies "*that all subcontractors performing Work described in ORS 701.005(2) (i.e., construction Work) will be registered with the Construction Contractors Board or licensed by the State Landscape Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractors commence Work under the Contract.*"
- v. The Owner will pay all fees due to BOLI pursuant with ORS 279C.825.
- w. Pursuant to ORS 279C.540(2), the Contractor must give notice to employees who work on this contract in writing, either at the time of hire or before commencement of work on the contract, or by posting a notice in a location frequented by employees, of the number of hours per day and the days per week that the employees may be required to work.
- x. The contract may be canceled at the election of Contracting Agency for any willful failure on the part of Contractor to faithfully perform the contract according to its terms.
- y. Pursuant to OAR 137-049-0880, the Contracting Agency may, at reasonable times and places, have access to and an opportunity to inspect, examine, copy, and audit the records relating to the Contract.
- z. ORS 279C.527 (Green Energy Technology): Contractor shall ensure Owner's compliance with all applicable provisions of ORS 279C.527 and OAR Chapter 330 Division 135 regarding green energy technology requirements for new or major renovations of public buildings costing over \$5,000,000.
- aa. Contractor certifies that it has not and will not discriminate against minorities, women or emerging small business enterprises in obtaining any required Subcontractors, or against a business enterprise that is owned or controlled by, or that employs a disabled veteran as defined in ORS 408.225.
- bb. If the contracting agency awards the public contract, in whole or in part, on the basis of the contractor's certification, the Contractor shall remain certified as a disadvantaged, minority, women or emerging small business enterprise under ORS 200.055 for the entire term of the public contract. The Contractor shall provide in the Contractor's subcontracts that a subcontractor remain certified as a disadvantaged, minority, women or emerging small business enterprise under ORS 200.055 for the entire term of the subcontract, if the Contractor awards the subcontract, in whole or in part, on the basis of the subcontractor's certification (OR-HB 2716, ORS 279A_).

- cc. Assignment or Transfer Restricted. Unless otherwise provided in the Contract, the Contractor shall not assign, sell, dispose of, or transfer rights, or delegate duties under the Contract, either in whole or in part, without the Contracting Agency's prior Written consent. Unless otherwise agreed by the Contracting Agency in Writing, such consent shall not relieve the Contractor of any obligations under the Contract. Any assignee or transferee shall be considered the agent of the Contractor and be bound to abide by all provisions of the Contract. If the Contracting Agency consents in Writing to an assignment, sale, disposal or transfer of the Contractor's rights or delegation of Contractor's duties, the Contractor and its surety, if any, shall remain liable to the Contracting Agency for complete performance of the Contract as if no such assignment, sale, disposal, transfer or delegation had occurred unless the Contracting Agency otherwise agrees in Writing (OAR 137-049-200(2)).
- dd. All sums due the State Unemployment Compensation Fund from the Contractor or any Subcontractor in connection with the performance of the contract shall be promptly so paid.
- ee. In the performance of this contract, the Contractor shall use, to the maximum extent economically feasible, recycled paper, materials, and supplies, and shall compost or mulch yard waste material at an approved site, if feasible and cost effective.
- ff. In compliance with the provisions of ORS 279C.525, the following is a list of federal, state and local agencies, of which the Owner has knowledge, that have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the contract:

FEDERAL AGENCIES:

Forest Service
 Defense, Department of
 Environmental Protection Agency
 Bureau of Sport Fisheries and Wildlife
 Bureau of Land Management
 Bureau of Reclamation
 Occupational Safety and Health Administration
 Coast Guard
 Homeland Security, Department of

Agriculture, Department of
 Soil Conservation Service
 Army Corps of Engineers
 Interior, Department of
 Bureau of Outdoor Recreation
 Bureau of Indian Affairs
 Labor, Department of
 Transportation, Department of
 Federal Highway Administration

STATE AGENCIES:

Environmental Quality, Department of
 Forestry, Department of
 Human Resources, Department of
 Soil and Water Conservation Commission
 State Land Board
 Water Resources Board

Agriculture, Department of
 Fish and Wildlife, Department of
 Geology and Mineral Industries, Department of
 Land Conservation and Development Commission
 State Engineer
 Transportation, Department of

LOCAL AGENCIES:

City Council
 County Commissioners
 Metropolitan Service Districts
 Sanitary Districts
 Fire Protection Districts"

City or County Public Works Departments
 County Court
 Port Districts
 County Service Districts
 Water Districts

For Office Use Only:
Project DB #:

PUBLIC AGENCY INFORMATION

SECTION A: To be completed when a public agency awards a contract to a contractor for a public works project, including CM/GC projects. (See reverse for public works projects in which no public agency awards a contract to a contractor.)

Project Name: _____ Project Number: _____

Contract Name (if part of larger project): N/A _____ Contract Number: N/A _____

Project Manager Name: _____ Phone #: _____ Fax #: _____

Project Location (Street(s), City): _____ Project County: _____

Contract Amount: \$ _____ If under \$50,000, is this contract part of a larger project? YES:___ NO:___

_____ If yes, total project amount: \$ _____

Will project use federal funds that require compliance with the Davis-Bacon Act? YES:___ NO:___

Date Contract Specifications First Advertised for Bid (if not advertised, date of RFP or first contact with contractor): _____

If CM/GC Contract, Date Contract Became a Public Works Contract (see OAR 839-025-0020(6)): N/A _____

Date Contract Awarded: _____ Date Work Expected to Begin: _____

Date Work Expected to be Complete: _____

Name: _____

Address: _____

City, State Zip: _____ Phone: _____

Construction Contractors Board Registration Number: _____

Name of Bonding Company: _____

Address: _____

Agent Name and Phone Number: _____

Bond Number: _____

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SECTION B: To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(B) (a project for the construction, reconstruction, major renovation or painting of a privately owned road, highway, building, structure or improvement of any type that uses funds of a private entity and \$750,000 or more of funds of a public agency) and no public agency awards a contract to a contractor.

CONTRACT INFORMATION:

Name of Project Owner: N/A Phone #: _____ Fax #: _____
 Project Name: _____ Project Number: _____
 Project Location (Street(s), City): _____ Project County: _____
 Total Project Amount: \$ _____ Amount of Public Funds Provided for the project: \$ _____
 Name(s) of Public Agency(ies) Providing Public Funds: _____
 Date the public agency or agencies commit to the provision of funds for the project: _____
 Will project use federal funds that require compliance with the Davis-Bacon Act? YES: _____ NO: _____
 Date Work Expected to Begin: _____
 Date Work Expected to be Complete: _____

SECTION C: To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(C) (a project for the construction of a privately owned road, highway, building, structure or improvement of any type that uses funds of a private entity and in which 25 percent or more of the square footage of the completed project will be occupied or used by a public agency) and no public agency awards a contract to a contractor.

CONTRACT INFORMATION:

Name of Project Owner: N/A Phone #: _____ Fax #: _____
 Project Name: _____ Project Number: _____
 Project Location (Street(s), City): _____ Project County: _____
 Total Project Amount: \$ _____ Amount of Public Funds Provided for the project: \$ _____
 Name(s) of Public Agency(ies) Providing Public Funds: _____
 Total square footage of privately owned road, highway, building, structure or improvement: _____
 Percent of total square footage of the completed project that will be occupied or used by a public agency: _____
 Date the public agency or agencies entered into an agreement to occupy or use the completed project: _____
 Will project use federal funds that require compliance with the Davis-Bacon Act? YES: _____ NO: _____
 Date Work Expected to Begin: _____
 Date Work Expected to be Complete: _____

THIS FORM WILL BE RETURNED TO THE PUBLIC AGENCY FOR CORRECTION AND RESUBMITTAL IF INCOMPLETE.

Signature of agency representative completing form: [Redacted]

Printed Name: [Redacted] Phone #: [Redacted] Date: [Redacted]

RETURN THIS COMPLETED FORM TO:
 Prevailing Wage Rate Unit • Bureau of Labor and Industries • 800 NE Oregon Street, #1045 • Portland, OR 97232-2180
 Telephone (971) 673-0852 • FAX (971) 673-0769 • pwremail@boli.state.or.us

Note: If this project is federally funded and subject to the Davis-Bacon Act, this form must still be submitted to the Oregon Bureau of Labor and Industries, as the project is subject to the Oregon Prevailing Wage Rate Law for categories where it is higher than federal wage rates.

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #1045
PORTLAND, OR 97232-2180
PHONE: (971) 673-0852
FAX: (971) 673-0769

For Office Use Only:
Project DB # _____

PUBLIC WORKS FEE INFORMATION FORM

For use by public agencies that have contracted with a contractor on a public works project regulated by ORS 279C.800 to 279C.870, in compliance with ORS 279C.825. Also for use by public agencies that are a party to a public works project pursuant to ORS 279C.800(6)(a)(B) or (C).

PUBLIC AGENCIES: Please complete and mail this form to BOLI at the above address, along with the public works fee of one-tenth of one percent of the contract price (contract amount x .001), payable to BOLI. **The minimum fee is \$250.00; the maximum fee is \$7,500.00.** Without the following completed information, the bureau may be unable to properly credit you for payment received.

Public Agency: Sample Form (to be filled out after bid opening)..... Agency #:
Agency Contact Person: Phone:
Agency Mailing Address:
Project Manager Name: Phone:
Project Name:
Contract Name (if part of larger project): N/A.....
Project Number: Project Location:
Date Project Awarded: Contractor CCB#:
Contractor Business Name (DBA) :
Contractor Address:
Contract Amount: \$ Amount Due: \$
(Contract Amount x 0.001, \$250 min, \$7500 max)

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CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 N.E. OREGON ST., #1045
PORTLAND, OR 97232-2180
PHONE: (971) 673-0852
FAX: (971) 673-0769

For Office Use Only:
Project DB # _____

PUBLIC WORKS FEE ADJUSTMENT FORM

PUBLIC AGENCIES: Please complete and mail this form to BOLI at the above address after completion of the public work project and not less than 30 days after the final progress payment is made to the contractor. Public agencies are required to determine the final contract price, including all change orders or other adjustments to the original contract price, and to calculate the adjusted prevailing wage rate fee based on the revised contract price. Documentation must be included to support the final contract price. Documentation of the final contract price may consist of change orders or other contract documents substantiating the amount of the contract. The prevailing wage rate fee of one-tenth of one percent (0.001) shall be applied to the final contract price, with credit taken for fees already submitted. The public agency must submit any additional fee payable to BOLI, or submit any request for refund, with this adjustment form. **THE MINUM FEE IS \$250.00. THE MAXIMUM FEE IS \$7,500. NO ADDITIONAL FEE IS REQUIRED TO BE PAID, AND REFUNDS WILL NOT BE MADE, IF THE BALANCE DUE OR THE REFUND DUE IS LESS THAN \$100.00.**

Public Agency: Sample Form (to be filled out after project completion) Agency #: _____

Agency Contact Person: _____ Phone: _____

Agency Mailing Address: _____

Project Manager Name: _____ Phone: _____

Project Name: _____

Contract Name (if part of larger project): N/A

Project Number: _____ Project Location: _____

Date Project Awarded: _____ Contractor CCB#: _____

Contractor Business Name (DBA) : _____

Contractor Address: _____

Final Contract/Project Amount: \$ _____ Final Fee Due: \$ _____

(Include all change orders and adjustments to the contract price)

(Final Contract Amount x 0.001, \$250 min, \$7500 max)

Original Contract Amount: \$ _____ Initial Fee Paid: \$ _____

(Initial Contract Amount x 0.001)

Total Contract Amount Adjustment: \$ _____ Balance Due*: \$ _____

or

Refund Due*: \$ _____

(*Final contract fee less initial fee paid)

Sample Calculation:

Final Contract Amount:	\$400,000.00	Final Fee Due:	\$400.00
Original Contract Amount:	<u>-300,000.00</u>	Initial Fee Paid:	<u>-300.00</u>
Total Adjustment:	\$100,000.00	Additional Amount Due:	\$100.00

INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

- a. Terms used in these Instructions to Bidders are defined in the General Conditions of the Contract. The term "Successful Bidder" means the lowest, qualified, responsible Bidder to whom the Owner (on the basis of Owner's evaluation as hereinafter provided) makes an award. The term "Bidding Documents" means the Solicitation Documents as defined under OAR 137-049-0200, and includes all documents listed as "Contract Documents" in the Agreement, which are issued prior to the bid closing time.

2. COPIES OF BIDDING DOCUMENTS

- a. Complete sets of the Bidding Documents for the deposit sum, if any, stated in the Invitation to Bid may be obtained from the Engineer (unless another issuing office or method is designated in the Invitation to Bid) in the manner specified in the Invitation to Bid.
- b. Complete full size sets of Bidding Documents as outlined in the Bid Form shall be used in preparing bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents or reduced size drawings.
- c. Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining bids on the work and do not confer a license or grant for any other use.

3. EXAMINATION OF BIDDING DOCUMENTS AND SITE

- a. Before submitting a bid, each bidder must: (a) examine the Bidding Documents thoroughly; (b) visit the site to familiarize himself with local conditions that may affect cost, progress or performance of the work; (c) familiarize himself with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the work and (d) study and carefully correlate bidder's observations with the Bidding Documents.
- b. Reference is made to the General Conditions for information regarding those reports or investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the work which have been relied upon by Engineer in preparing the Drawings and Specifications. Owner will make copies of such reports available to any bidder requesting them. These reports are not guaranteed as to accuracy or completeness, nor are they part of the Bidding Documents. Before submitting his bid, each bidder will, at his own expense make such additional investigations and tests as the bidder may deem necessary to determine his bid for performance of the work in accordance with the time, price and other terms and conditions of the Bidding Documents.
- c. On request, Owner will provide each bidder access to the site to conduct such investigations and test as each bidder deems necessary for submission of his bid.
- d. The lands upon which the work is to be performed, rights-of-way for access thereto and other lands designed before use by the Contractor in performing the work are identified in the Drawings or the Bidding Documents.
- e. The submission of a bid will constitute an incontrovertible representation by the bidder that he has complied with every requirement of this Article 3 and that the Bidding Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.

4. INTERPRETATIONS AND ADDENDA

- a. All questions about the meaning or intent of the Bidding Documents shall be submitted to the Engineer in writing. Questions received less than five (5) days prior to the date for opening of bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications are not binding unless confirmed by written Addendum, including discussions at prebid conferences.

- b. Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer. Addenda will be issued a minimum of 72 hours prior to bid closing unless the Addendum also extends the bid closing.
- c. Addendum are considered to be issued at the time copies of the Addendum documents are available to prospective bidders at the office of the Engineer or via an on-line document distribution system (as noted in the Invitation to Bid). Notice of the addendum will be sent to all parties recorded by Engineer as having received the Bidding Documents from the Engineer or having downloaded the Bidding Documents from the on-line document distribution system. Addendum will also be made available for pickup at the office of the Engineer by any interested party (*but only during periods and hours when the office is open to the public*). Either posting of the Addendum on-line, or mailing of the Addendum, shall be considered notice as required by OAR 137-049-0250.
- d. Each prospective bidder shall be responsible for verifying the number of addendum issued 72 hours prior to bid opening. Failure by the prospective bidders to verify the number of Addendum issued, or failure of the Addendum to be delivered to or downloaded by prospective bidders in a timely manner, shall not be grounds for a bid protest.

5. BID SECURITY

- a. Bid Security shall be provided to the Owner, in an amount of ten percent (10%) of the bidder's maximum bid price, in the form and format specified in the Bid Documents.
- b. The Bid Security of the successful bidder will be retained until such bidder has executed the Agreement and furnished the required Contract Security, whereupon it will be returned. If the successful bidder fails to execute and deliver the Agreement and furnish the required Contract Security within ten (10) calendar days of the Notice of Award (unless an alternate time limit is specified in the Bid Documents), Owner may annul the Notice of Award and the Bid Security of that bidder will be forfeited. The Bid Security of any bidder whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the "effective date of the Agreement" (which term is defined in the General Conditions) by Owner to Contractor and the required Contract Security is furnished or the thirty-first day after the bid opening. Bid Security of other bidders will be returned within seven days of the bid opening.
- c. Default of Bidder shall occur upon the failure of the Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any payment and performance bonds required by the Bidding Documents, or the Bidder notifies Owner in writing of the intent to withdraw his Bid, except as authorized under paragraph 13 herein.

6. CONTRACT TIME

- a. The number of days within which, or the date by which, the work is to be completed (the Contract Time) will be included in the Agreement.

7. PREBID SUBMITTAL

- a. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by the Contractor if acceptable to Engineer and for which prebid approval is required by the drawings or specifications, a prebid application for such acceptance must be submitted to the Engineer at least seven (7) days prior to bid opening unless otherwise noted in the specification section for that equipment. Written replies will be issued to the requesting party. Only written replies will be binding. Unsolicited prebid submittals for substitute or alternate equipment will not be reviewed.

8. ALTERNATE MATERIAL AND EQUIPMENT

- a. The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications or as approved in a prebid submittal. Whenever it is indicated in the Drawings or specified in the Specifications that an "or-equal" item of material or equipment may be furnished or used by the Contractor if acceptable to the Engineer, application for such acceptance will not be considered by Engineer until after the "effective date of the Agreement," except as set forth in paragraph 7 - Prebid Submittals. The procedure for submittal of any such application by Contractor and consideration by Engineer is set forth in paragraph 6.05 of the General Conditions which may be supplemented in the Supplementary Conditions.

9. SUBCONTRACTORS, ETC.

- a. All bidders are required to submit any and all subcontractor disclosure information required by these Bidding Documents or by current State law.
- b. In contracts where the Contract Price is on the basis of cost-of-the-work plus a fee, the apparent successful bidder, prior to the Notice of Award, shall identify in writing to Owner those portions of the work that such bidder proposes to subcontract and after the Notice of Award may only subcontract other portions of the work with Owner's written consent.
- c. No Contractor shall be required to employ such subcontractor, other person or organization against whom he has reasonable objection.
- d. Contractor certifies that it has not discriminated and will not discriminate against any disadvantaged business enterprise, minority-owned business, women-owned business, emerging small business, or business that a service-disabled veteran owns in obtaining any required subcontracts.

10. BID FORM

- a. Bids submitted must include the prescribed Bid Form, included in the Bidding Documents. The Bid Form must be completed in ink or by typewriter.
- b. The bid price of each item in the Bid Schedule of Prices associated with the Bid Form must be stated. In case of conflict between unit price and total price, unit price will take precedence.
- c. A Bid Form submitted by corporations must be executed in the corporate name by the president or vice-president (or other corporate officer accompanied by evidence of authority to sign) and must be attested by the secretary or assistant secretary. The corporate address and state of incorporation shall be shown in conjunction with the signature.
- d. A Bid Form submitted by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature and the official address of the partnership must be shown in conjunction with the signature.
- e. All names must be typed or printed below the signature.
- f. The Bid Form shall contain an acknowledgement of receipt of all Addenda (the number of which shall be filled in on the Bid Form).
- g. The address to which communications regarding the Bid Form are to be sent must be shown.

11. SUBMISSION OF BIDS

- a. Bids shall be submitted at the time and in the manner indicated in the Invitation to Bid and must be accompanied by any required Bid Security and other required documents. Any bid not so submitted may be considered non-conforming by the Engineer.

- b. The Bidder shall assume full and complete responsibility for timely delivery of the bid to the location and or in the manner and format designated for receipt of bids.
- c. Where paper bids are allowed, any Bid is sent through the mail or other delivery system shall be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face thereof.

12. MODIFICATION AND WITHDRAWAL OF BIDS PRIOR TO BID CLOSING

- a. Bids may be modified or withdrawn at any time prior to the Bid Closing.
- b. For paper bids, bid modification or withdrawal shall be by an appropriate document duly executed and delivered to the place where bids are to be submitted. A bid modification must be submitted in a sealed envelope (marked with all information listed in the Invitation to Bid, except that it is to be marked as a "Bid Modification), and shall include a statement that the modification amends and supercedes the prior Bid. A bid may be withdrawn by written notice submitted on the Bidder's letterhead, signed by an authorized representative, delivered to the location specified for bids in the Invitation to Bid.

13. MISTAKES

- a. If, within forty-eight (48) hours after bids are opened, any bidder files a duly signed written notice with the Owner and promptly thereafter demonstrates to the reasonable satisfaction of the Owner that there was a material and substantial mistake in preparation of his bid as specified by OAR 137-049-0350(2)(c), the Owner may allow the bidder to withdraw his bid, and the Owner may return all or a portion of the Bid Security . Thereafter, that bidder will be disqualified from rebidding the work.

14. OPENING OF BIDS

- a. When bids are opened publicly, they will be opened and evaluated (or read aloud for paper bids) at the time and place set forth in the Invitation to Bid. Bidders, or their representative, and other interested persons or parties may be present at the public opening of bids, to the extent allowed by laws and current regulations.
- b. An abstract of the amounts of the base bids and major alternatives (if any) will be made available after the opening of bids.
- c. When bids are opened privately, an abstract of the same information will be made available to bidders within seven (7) days after the date of bid opening.

15. BIDS TO REMAIN OPEN

- a. Unless otherwise provided in the Invitation to Bid or the Information for Bidders, all bids shall remain open and all bid prices shall remain valid for thirty (30) days after the date and time of the bid closing, but Owner may, in his sole discretion, release any bid and return the Bid Security prior to that date.

16. EVALUATION OF BIDS

- a. Owner reserves the right to reject any and all Bids, to waive any and all informalities (OAR 137-049-0350(2)(a&b)) and to negotiate contract terms with the successful bidder, and the right to disregard all nonconforming, nonresponsive or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between unit prices and total price will be resolved in favor of the unit price.
- b. A responsive bid must conform to all bidding requirements, unless waived by the Owner as noted herein.
- c. Responsible bidder/offerer determination for public projects will be in accordance with OAR 137-049-0390(2), as well as the criteria included on the "Public Contracts Responsible Bidder Determination Form" on the Oregon CCB website.

- d. In evaluating bids, Owner shall consider the qualifications and experience of the bidders, in addition to whether or not the bids comply with the prescribed requirements and alternatives and unit prices if requested in the Bid Forms. It is Owner's intent to accept alternatives (if any are accepted) in the order in which they are listed in the Bid form but Owner may accept them in any order or combination.
- e. Owner may consider the qualifications and experience of subcontractors and other person and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work for which the identity of subcontractors and other persons and organizations must be submitted as provided in the General or Supplementary Conditions. Operating costs, maintenance considerations, performance data and guarantee of materials and equipment may also be considered by the Owner.
- f. Owner reserves the right to reject the Bid of any bidder who does not pass any such evaluation to Owner's satisfaction.

17. AWARD OF CONTRACT

- a. If awarded, the Owner will award the contract to the Responsible Bidder submitting the lowest, Responsive Bid, provided that Bidder is not listed by the Construction Contractors Board as disqualified to hold a Public Improvement Contract, see ORS 279C.375(3)(a), or is otherwise ineligible for Award.
- b. The Owner reserves the right to delete certain bid items from the award.
- c. If the contract is to be awarded, Owner will give the successful bidder a Notice of Award within thirty (30) days after the day of the bid opening unless otherwise provided in the Invitation to Bid or the Information for Bidders.

18. PERFORMANCE AND OTHER BONDS

- a. Paragraph 5.01 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to payment, performance and other bonds. When the successful bidder delivers the executed Agreement to Owner, it shall be accompanied by the required Contract Security.
- b. Prior to execution of the Contract, the bidder shall furnish separate bonds covering the faithful performance of the contract and the payment of obligations arising thereunder, each in an amount to one hundred percent (100%) of the Contract sum. The cost of furnishing of such bonds shall be included in the bid. The surety issuing such bonds shall be licensed to issue bonds in the State in which the work occurs.

19. SIGNING OF AGREEMENT

- a. When Owner gives a Notice of Award to the successful bidder, it will be accompanied by at least three (3) unsigned counterparts of the Agreement and all other Contract Documents. Unless an alternate time limit is specified in the Bid Documents, within ten (10) calendar days thereafter, contractor shall sign and deliver at least three (3) counterparts of the Agreement to the Owner with all other Contract Documents attached. Within twenty (20) days thereafter, Owner will deliver all fully signed counterparts to Contractor. Engineer will identify those portions of the Contract Documents not fully signed by Owner and Contractor and such identification shall be binding on all parties.

BID FORM

City of Yachats, Oregon
PO Box 345
Yachats, OR 97498

1) TO ALL BIDDERS:

- a) **BID DOCUMENTS.** The Bidding Documents include the entire proposed Contract Documents, including but not limited to the Invitation to Bid, Information to Bidders, Instructions to Bidders (*general & supplementary as applicable*), this Bid Form (*including Schedule of Prices*), Subcontractor Disclosure forms as applicable, other bidding and contract forms, Agreement form, Conditions of Contract (*General, Supplementary and other conditions*), any applicable Prevailing Wage Rates, Full Size Drawings, specifications, appendices, as well as all addenda, plan revision sheets or plan addition sheets issued prior to bid closing.
- b) **BID SUBMITTAL FORMS.** The minimum bid submittal requirement for this project shall include this Bid Form including all bid forms and a completed schedule(s) of prices, bid bond as required and all other required attachments (*submittal of the entire bid manual is allowed, but not required*). All Bidding Documents are included in this Bid Form by reference, whether attached or not.
- c) Bidders shall use complete sets of Bidding Documents and full size drawings in preparing Bids. Neither the Owner nor the Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets or reduced size sets of Bidding Documents.

2) THE BIDDER, BY MAKING A BID, REPRESENTS THAT:

- a) The Bidder has examined and understands the Bidding Documents and the Bid is made in accordance therewith.
- b) The Bidder has examined and understands the Bidding Documents, to the extent that such documentation relates to the work for which the Bid is submitted, for other portions of the Project, if any, being bid concurrently or presently under construction.
- c) The Bidder has personally visited the site, become familiar with local conditions under which the proposed work is to be performed, has determined the extent, character and location of the proposed work, the nature and type of excavation to be done, the location and condition of existing streets and roadways giving access to the site of the work, the topography of the site of the work, and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.
- d) The Bidder is satisfied that the conditions of the work and materials as included herein is brief and is intended to identify the said quantities with the detailed requirements of the proposed Contract Documents.
- e) The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

3) INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS; DISCREPANCIES:

- a) The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Engineer errors, inconsistencies, discrepancies or ambiguities discovered, including any pages missing from the drawings, bid forms or specifications utilized in the preparation of the bid, or discrepancies between the drawings & the Bid Form or the specifications.
- b) Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Engineer a minimum of five (5) days prior to the date for receipt of

Bids. Clarifications will be issued by Addendum as outlined in the Instructions to Bidders.

- c) Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. The Bidding Documents are complementary and what is called out by any portion of the Bidding Documents (*drawings, specifications, any bidding or contract forms, etc.*) shall be as binding as if called for by all.

4) THE BID:

- a) The Bidder does hereby propose to furnish all material, tools, equipment, and appliances, and to perform all labor and work necessary to construct and complete the project entitled

South Tank Seismic and Water Treatment Plant Backwash Recycle Improvements

and all specified work appurtenant thereto, and in connection with this project for the Owner within the time limit specified and for the bid prices submitted by the Bidder, and in accordance with the drawings, specifications and contract change order documents for the sums set forth in the attached schedule of prices.

- b) The conditions or qualifications under which the undersigned Bidder will accept award of the contract are as follows:

(Enter "none" if Bidder will accept all terms and conditions of the Contract Documents)

- c) The undersigned Bidder agrees that, if awarded the Contract, it will commence work within ten (10) calendar days after the date of receipt of written Notice to Proceed and that it will complete the work within the specified number of days set forth in the Information for Bidders, for the bid prices provided by the Bidder and awarded by the Owner.

5) BID GUARANTEE:

- a) Enclosed is a bid guarantee equal to ten percent (10%) of the total bid, consisting of a bid bond drawn on _____ in the amount of \$ _____.
(Name of Surety)
- b) The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all Bids have been rejected.

6) BIDDER CERTIFICATION: The undersigned Bidder certifies that:

- a) The undersigned declares that it is the only party interested in this Bid Form, and that the information provided with this Bid is in all respects fair and without fraud and that it is made without collusion with any representative of the Owner, and that the prices have been arrived at independently without collusion, communication or agreement with any other bidder or with any competitor, as to any matter relating to prices for the purpose of restricting competition.
- b) The Bidder has examined the site of the work;
- c) The Bidder understands the manner of payment for the cost of the project;
- d) Per OAR 137-049-0200(1)(a)(J), "Contractor agrees to be bound by and will comply with provisions of ORS 279C.840 (Oregon prevailing wages) or 40 USC 276a (Davis-Bacon Act)" as applicable." Contractor agrees to submit any required notifications and copies of certified payrolls to BOLI, and also directly to the Owner, for all covered work associated with the project.
- e) The undersigned Bidder certifies that it is registered and in good standing with the Construction Contractors

Board or licensed and in good standing by the State Landscape Board, as specified in OAR 137-049-0230, at the time of bid submittal, and that all subcontractors whose sub-bids are utilized by the Bidder in preparing the bid are also registered and in good standing at the time of bid submittal.

- f) The undersigned Bidder certifies their bidder status as follows (*as defined in ORS 279A.120 [ORS 279C.365(1)(h)]*):

Resident Bidder: YES ☐ NO ☐

If the bidder is a nonresident bidder, indicate the percent of preference given to resident bidders in the state in which you reside. _____%

- g) As required by OAR 137-049-0440(3), the undersigned Bidder certifies that it has not discriminated and will not discriminate against minority, women or emerging small business enterprises in obtaining any required subcontracts.
- h) The undersigned Bidder certifies to the provisions required by ORS 279C.505(2) pertaining to Drug Testing Programs for Public Improvement Contracts.
- i) The undersigned Bidder certifies that the surety issuing all required bonds is duly authorized and licensed to transact surety business in the state of Oregon.
- j) The provisions of ORS 305.385, relating to Oregon tax laws will be complied with.
- k) The Bidder has reviewed and understands all permits which are required for the project, and will conform to all conditions of said permits;
- l) The Bidder, its subcontractors, and all employers which will work on this project are subject employers under the Oregon Workers Compensation Law and shall comply with ORS 656.017, which requires them to provide Workers Compensation coverage for all their subject workers.
- m) All subcontractors performing work as described in ORS 701.005(2) will be registered and in good standing with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time of bid submittal, and during the entire time that subcontractors perform work under this Contract.
- n) Bidder acknowledges that in the event the any or all bids are rejected or deemed non-responsive, that Bidder, sub-bidders or suppliers shall have no claim for recovery of bidding costs, or loss of anticipated profits or revenue or other economic loss arising out of or resulting from such rejection, including lost opportunity costs (*see also GC 15.03.B*).
- o) The undersigned Bidder agrees & certifies that any Performance Bond provided will also remain in full force and effect as a maintenance/warranty bond during the entire guaranty/warranty period, unless a separate warranty/maintenance bond acceptable to the Owner is provided by the Contractor as applicable.
- p) By submitting a bid on one or multiple Bid Schedules, the Bidder certifies its willingness to enter into a contract on any or all bid schedules for which the Bidder submitted the lowest responsive and responsible bid. Whether submitting a bid one or multiple Bid Schedules, Bidder certifies that it is capable of completing all Work within the contract time period(s) specified, accounting for concurrent time periods under the different Bid Schedules if applicable, and will provide adequate equipment and personnel to accomplish the work within the specified contract times.
- q) The undersigned Bidder agrees & certifies that the requirements of the Bidding Documents relating to providing an experienced, competent resident project superintendent will be fully complied with, and that the Bidder understands the consequences of failure to provide an acceptable project superintendent.
- r) Bidder accepts the provisions of the Agreement as to liquidated damages, and agrees that liquidated damages

in the amounts listed in the Agreement, accruing on a daily basis, are part of the consideration for the bid and that this amount is a reasonable sum for such damages.

- s) Bidder accepts the provisions of the Contract Documents relating to stipulated prices, whether in the schedule of prices, on the drawings or in the specifications.
- t) Bidder agrees to be responsible for all patent and/or royalty payments associated with completion of the work, as applicable (*GC 6.07*).
- u) As required by ORS 468A.710 for any asbestos abatement work (*including work on or around asbestos cement pipe*), the Bidder certifies that the Bidder is either licensed under ORS 468A.720 (*or plans to use an appropriately licensed subcontractor*).

7) ACCEPTANCE OF BID (AWARD):

- a) It is the intent of the Owner to award the Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities or irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests (OAR 137-049-0350(2)(a)).
- b) In submitting this Bid, it is understood that the Owner reserves the right to reject any and all Bids, to adjust the scope of the work within reasonable limits, and to postpone award for a reasonable time.
- c) The undersigned Bidder agrees that on written acceptance of this bid, it will, within ten (10) days of receipt of such Notice of Award, execute a formal contract agreement with the Owner in the form attached hereto, and that it will provide acceptable bonds (*including Performance Bond, Payment Bond & BOLI bond as applicable*) and certificates of insurance as required by the Contract Documents. In case of default in execution of the contract or in delivery of acceptable bonds or insurance certificates, the bid guarantee accompanying this Bid Form shall be forfeited to, and remain the property of, the Owner.

8) ACKNOWLEDGEMENT OF ADDENDA:

- a) The Bidder has received and duly considered the following Addenda to the specifications and the following revisions or additions to the plans:

Addenda: all addenda through No. _____, inclusive (*Bidder to put zero (0) if there are no addenda*).

- b) Prior to submitting a bid, the Bidder shall be responsible for verifying the number of addendum, plan revision sheets or plan addition sheets issued (*see Instructions to Bidders*).

9) **BID DATE, SIGNATURES, ETC:**

Bid dated _____, 20__

Communications concerning this Bid shall be addressed to:

Name of Entity Submitting Bid: _____
(full legal name of bidding entity)

Contact Person: _____ email address: _____

Business Mailing Address: _____

Telephone Number: _____ Fax Number: _____

If Bidder is an Individual:

By: _____
(Individual's Signature)

Name (type or print): _____

Doing business as: _____

Oregon CCB License #: _____ Federal Tax ID #: _____

If Bidder is a Partnership:

Partnership Name (type or print): _____

By: _____
(Signature of General Partner – attach evidence of authority to sign)

Name (type or print): _____

Title: _____

Oregon CCB License #: _____ Federal Tax ID #: _____

If Bidder is a Corporation:

Corporation Name (type or print): _____

State of Incorporation (type or print): _____

Type of Corporation (General Business, Profession, Service, LLC, etc): _____

By: _____
(Signature– attach evidence of authority to sign if other than president or vice-president)

Name (type or print): _____

Title: _____

Attest: _____
(Signature of Corporate Secretary)

Oregon CCB License #: _____ Federal Tax ID #: _____

If Bidder is a Joint Venture:

Name of Joint Venture (type or print): _____

First Joint Venture Name (type or print): _____

By: _____
(Signature of joint venture partner– attach evidence of authority to sign)

Title: _____

Oregon CCB License #: _____ Federal Tax ID #: _____

Second Joint Venture Name (type or print): _____

By: _____
(Signature of joint venture partner– attach evidence of authority to sign)

Title: _____

Oregon CCB License #: _____ Federal Tax ID #: _____

Third Joint Venture Name (type or print): _____

By: _____
(Signature of joint venture partner– attach evidence of authority to sign)

Title: _____

Oregon CCB License #: _____ Federal Tax ID #: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated under the applicable category above, attach additional pages if necessary.)

Location: Yachats, Oregon
Project: South Tank Seismic Valve and Water Treatment Plant Backwash Water Recycle Improvements
Job Number: 3096.4010.0

Schedule of Prices

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Price
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See specification section 01025 for additional description of each schedule item.

1.	South Tank Seismic Valve Improvements	ALL	L.S.	Lump Sum	\$_____
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2.	Water Treatment Plant Backwash Water Recycle Improvements	ALL	L.S.	Lump Sum	\$_____
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Total Bid \$_____

BID BOND

(minimum ten percent (10%) of the total bid)

KNOW ALL MEN BY THESE PRESENT, that we _____
(Name of Contractor)

as Principal, hereinafter called the Principal, and _____
(Name of Surety)

a corporation duly organized under the laws of the State of _____ as Surety,
hereinafter called the Surety, are held and firmly bound unto the **City of Yachats, Oregon** as
Obligee, hereinafter called the Obligee, in the full sum of _____
Dollars (\$_____), for the payment of which sum well and truly to be made, the said
Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors, and
assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for: **South Tanks Seismic Valve and Water
Treatment Plant Backwash Water Recycle Improvements**

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall
enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond
or bonds as may be specified in the Bid Documents with good and sufficient surety for the faithful
performance of such Contract and for the prompt payment of labor and material furnished in the
prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give
such bond or bonds, if the Principal shall pay to the Obligee the full sum set forth on the face of this
Bid Bond, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____ 20____.

Principal: _____
(signature)

Surety: _____
(signature)

By: _____
(print name)

By: _____
(print name)

Title: _____

Title: _____

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM
(OAR 137-049-0360)

PROJECT NAME South Tank Seismic Valve and Water Treatment Plant Backwash Water Recycle Improvements

BID CLOSING: Date: May 17, 2022 Time: 2:00 p.m.

DISCLOSURE DEADLINE: Date: May 17, 2022 Time: 4:00 p.m.

This form must be submitted in the manner specified in the Invitation to Bid within two (2) working hours of the advertised bid closing date and time; no later than the DISCLOSURE DEADLINE stated above. Unless otherwise specified in the Invitation to Bid, a completed copy of this disclosure form shall be submitted as follows:

- For Online Bids. Completed pdf copy submitted via the on-line bidding system as noted in Invitation to Bid.
- For Paper Bids. Form shall either be submitted in the same envelope as the bid, or shall be submitted in a separate sealed envelope clearly marked **“Disclosure Form for the South Tank Seismic Valve and Water Treatment Plant Backwash Water Recycle Improvements”** showing the date and time of the disclosure submittal deadline, as well as the Bidders name.

This form shall be submitted regardless of the bid total. Unless otherwise stated in the Invitation to Bid, this document shall not be faxed or emailed. It is the responsibility of the Bidder to submit this Disclosure Form and any additional sheets required.

Deliver Form to: Westech Engineering, 3841 Fairview Industrial Drive SE, Suite 100, Salem, OR 97302

Person Designated to Receive Form: Christopher J. Brugato, P.E. Phone: (503) 585-2474

Form Submitted By (Bidder Name): _____

Contact Name: _____ Phone #: _____

Is the bid total greater than \$100,000? YES ☐ NO ☐ (If NO, bidder is not required to provide 1st tier subcontractor information below).

Bids which are submitted by Bid Closing, but for which the separate and sealed Disclosure has not been submitted by the specified deadline, will be considered Non-Responsive and will not be considered for award!

If bid total is greater than \$100,000, list below the Name, Address, and Category of work of each 1st tier subcontractor that will be furnishing labor or labor and materials that are required to be disclosed. Enter ‘NONE’ if there are no subcontractors that need to be disclosed. (IF NEEDED ATTACH ADDITIONAL SHEETS).

1 st Tier Subcontractor Name	Subcontract Dollar Value	Category or Categories of Work Each Subcontractor will be Performing	**Subcontractor Oregon CCB #

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

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

***Per ORS 701.005(5)(a), ORS 701.021(1) and ORS 701.026(1), any contractor or subcontractor must be licensed through the Oregon Construction Contractor Board (CCB) in order to “undertake, offer to undertake or submit a bid to do work” in the State of Oregon. Contractor registration “at the time the offer is made” is a matter of bid responsiveness as specified under OAR 137-049-0230(1).

INSTRUCTIONS FOR FIRST-TIER SUBCONTRACTOR DISCLOSURE

All Bidders are required to submit the First Tier Subcontractor Disclosure Form, regardless of the Bid Total.

In addition, when the contract value for a Public Improvement is greater than \$100,000, bidders are required to disclose information about certain first-tier subcontractors (see ORS 279C.370(3)). Specifically, when the contract amount of a first-tier subcontractor is greater than or equal to: (i) 5% of the project bid, but at least \$15,000, or (ii) \$350,000 regardless of the percentage, the Bidder must disclose the following information about that subcontract within two (2) hours of bid closing:

- The subcontractor's name, and
- The dollar value of each subcontract, and
- The category or categories of work that each subcontractor will be performing

If the Bidder will not be using any subcontractors that are subject to the above disclosure requirements, the Bidder is required to indicate "NONE" on the First Tier Subcontractor Disclosure Form.

To determine disclosure requirements, it is recommended that the Bidder disclose subcontract information for any subcontractor as follows:

- (1) Determine the lowest possible contract price. That will be the base bid amount (exclusive of any options that can only be exercised after contract award, if any).
- (2) Provide the required disclosure information for any first-tier subcontractor whose potential contract services (subcontractor base bid amount, exclusive of any options that can only be exercised after contract award, if any) are greater than or equal to:
 - (i) 5% of that lowest contract price, but at least \$15,000, or
 - (ii) \$350,000 regardless of the percentage.

Total all possible work for each subcontractor in making this determination (ie. if a subcontractor will provide \$15,000 worth of labor or labor and materials in one category of work and \$40,000 on another category of work, then the potential amount of subcontractor's labor or labor and materials is \$55,000. Assuming that \$55,000 exceeds 5% of the lowest contract price, provide the disclosure for both the \$15,000 and the \$40,000).

SUBMISSION. A Bidder shall submit the disclosure form within two (2) working hours of Bid Closing in the manner specified by the Invitation To Bid. See instructions on the SUBCONTRACTOR DISCLOSURE FORM.

RESPONSIVENESS. Compliance with the disclosure and submittal requirements outlined herein and in ORS 279C.370(3) is a matter of Responsiveness. As required by OAR 137-049-0360(5), bids that are submitted by Bid Closing, but for which the Disclosure form has not been submitted by the specified deadline, will be considered Non-Responsive and will not be considered for Contract award.

PART 2:

CONTRACT FORMS

AGREEMENT

THIS AGREEMENT, by and between the **City of Yachats, Oregon** hereinafter called the **Owner**, and _____, hereinafter called the **Contractor**.

WITNESSETH, that the Contractor and the Owner, for the consideration hereinafter named, agree as follows:

ARTICLE I - SCOPE OF THE WORK: The Contractor hereby agrees to furnish: All materials, labor and equipment and incidentals, and to perform all work shown on the drawings and described in the specifications for the project prepared by **WESTECH ENGINEERING, INC.**, Salem, Oregon, hereinafter referred to as **Engineer**; entitled:

South Tank Seismic Valve and Water Treatment Plant Backwash Water Recycle Improvements

The work shall include those items listed in the Schedule of Prices on the Bid Form as follows:

All Bid Items

and shall be in accordance with the requirements and provisions of the Contract Documents as defined in Article IV of this Agreement, which Contract Documents are enclosed herewith, and are hereby made a part of this Agreement.

The Contractor also agrees to comply with all applicable federal, state, and local laws, municipal ordinances, and rules and regulations of all authorities having jurisdiction over the construction, and specifically, the applicable provisions of Oregon law relating to public contracts (ORS Chapter 279C) which by this reference are incorporated in the Contract Documents and made a part hereof.

ARTICLE II - CONTRACT TIME AND LIQUIDATED DAMAGES:

If the Owner chooses to award the project, the Notice of Award will be issued and contracts will be executed as soon as feasible after the bid opening date. After contract execution, the Owners will work with the Contractor to select the appropriate date for the Notice to Proceed, within the timeframes summarized below.

Unless an earlier start date is requested by the Contractor, the Owner will issue the Notice to Proceed by no later than March 20, 2023. The Owner would prefer to start the work as soon as possible after the award of the project. However, the Owner wants to provide as much flexibility as possible for the Contractor.

Bids shall be prepared based on the Contractor's anticipated starting date. No adjustments to the Contract Price will be made if the Contractor chooses to delay the start of the work in accordance with these provisions.

The contract time will commence to run on the day indicated in the Notice to Proceed (NTP). Work is to commence within ten (10) days of the date of issuance of the Notice to Proceed and shall be substantially complete within **One-Hundred and Twenty (120)** calendar days after issuance of the Notice to Proceed.

Unless otherwise specified in the Contract Documents or otherwise approved by the Owners in accordance with the General Conditions of the Contract Documents, all work shall be entirely completed (Final Completion) and ready for final payment within fifteen (15) calendar days after the date of substantial completion.

Liquidated Damages: The Owner and the Contractor recognize that time is of the essence of this Agreement and that the Owner will suffer financial loss if the work is not substantially completed within the time specified in the paragraph above, plus any extensions thereof allowed in accordance with the General Conditions of the Contract Documents. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by the Owner if the work is not substantially completed on time. Accordingly, instead of requiring any such proof, the Owner and the Contractor agree that as liquidated damages for delay (but not as a penalty), the Contractor shall pay the Owner the amounts listed below for each and every day that expires after the time specified for Substantial Completion.

Liquidated damages shall apply against the successful bidder (the Contractor) and accrue to the Owner at the rate of **three hundred dollars (\$300)** for each day that expires after the time specified for Substantial Completion until the work is substantially complete.

After Substantial Completion, if the Contractor shall neglect, refuse, or fail to complete the remaining work within the Contract Time for Final Completion or any proper extension thereof granted by the Owner, the Contractor shall pay the Owner **three hundred dollars (\$300)** for each calendar day that expires after the time specified above for the work to be complete and ready for final payment.

Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

The parties further agree that this amount of liquidated damages is a reasonable forecast of just compensation for the harm caused by any breach and that this harm is one which is impossible or very difficult to estimate. In addition to the liquidated damages above, the Contractor shall reimburse the Engineer for the cost incurred for engineering, inspection and project management services required beyond the Contract Time limit as outlined herein. The Contractor shall also reimburse the Engineer for all costs incurred for inspection and project management services required due to punchlist items which are not completed within the Contract Time limit or the date specified on the Certificate of Substantial Completion, whichever is later. If the Contractor fails to reimburse the Engineer directly, the Owner will deduct the cost from the Contractor's final pay request.

ARTICLE III – PAYMENT: The Owner shall pay to the Contractor for the performance of the work the total amounts determined by lump sum and unit prices listed in the Bid Form. Based on the estimated quantities and the stated units & prices, the total Contract sum is _____ **dollars and** _____ **cents (\$_____)**. Progress payments shall be made in accordance with Article 14 of the “General Conditions” of the Contract. The required submittal date for pay requests will be as determined by the Owner, and shall be far enough prior to the end of each month to meet the Owner’s established review & processing timelines. Retainage shall be as specified in the Information to Bidders.

ARTICLE IV - CONTRACT DOCUMENTS: The Contract Documents which comprise the entire agreement between the Owner and Contractor are attached to this Agreement, made a part hereof, and consists of the following: Bidding Documents, including but not limited to Invitation to Bid, Information for Bidders, Instructions to Bidders, Supplementary Instructions to Bidders, Bid Form including bid forms & Schedule of Prices, Subcontractor Disclosure Forms, Bid Bond, Agreement, Performance Bond, Payment Bond, Conditions of the Contract (General, Supplemental General and other conditions), Addenda No. _____ through _____, Notice of Award, Notice to Proceed, Technical Specifications & Appendices, and full size Construction Drawings, containing _____ () sheets, as well as proof of insurance (insurance certificates) and applicable Prevailing Wage Rates.

The Contract Documents are complementary and what is called out by any portion of the Contract Documents (drawings, specifications, or any contract forms) shall be as binding as if called for by all.

In construing this Agreement, it is understood that: (1) if the context so requires: (a) the singular pronoun shall be taken to mean and include the plural pronoun; (b) the masculine pronoun shall be taken to mean the feminine and neuter pronoun; (2) all captions used herein are intended solely for the convenience of reference and shall in no way limit any of the provisions of this Agreement; and (3) anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both.

ARTICLE V - PREVAILING WAGE. Contractor must pay the current prevailing wage rates as established by the Bureau of Labor and in accordance with ORS 279C.800 – 279C.870 and contained herein, including daily, weekly, weekend and holiday overtime as required. Contractor is responsible for submitting any required notifications and copies of certified payrolls to BOLI, and also directly to the Owner.

ARTICLE VI – TAX CERTIFICATION. The Contractor hereby certifies in writing, under penalty of perjury, that he/she is, to the best of his/her knowledge, not in violation of any tax laws described in ORS 305.380(4).

ARTICLE VII – INSURANCE CERTIFICATES. Evidence of insurance coverage must be submitted on current “ACORD” forms (or other insurance certificate containing the same information) that **EITHER** includes a statement that “30 days cancellation notice shall be provided” **OR** the Contractor’s insurance agent shall submit a written letter stating that copies of insurance certificates will be sent to the Owner and

Bond No. _____

PAYMENT BOND

Any singular reference to Contractor, Surety, Obligee, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address):

OWNER:

City of Yachats, Oregon
PO Box 345
Yachats, OR 97498

CONTRACT

Date: _____ (Contractor to fill in, match date on signature page of Agreement)

Amount: **\$** _____

Project Name: South Tank Seismic Valve and Water Treatment Plant Backwash Water
Recycle Improvements

BOND

Date: _____ (Contractor to fill in, match date on signature page of Agreement):

Amount: **\$** _____

Modifications to this Bond: None

CONTRACTOR AS PRINCIPAL

SURETY

Company: (Corporate Seal)

Company: (Corporate Seal)

Signature: _____

Signature _____

Name _____

Name _____

Title _____

Title _____

FOR INFORMATION ONLY — Name, Address and Telephone

Agent Or Broker, Name & Address:

OWNER'S REPRESENTATIVE

Westech Engineering, Inc
3841 Fairview Industrial Dr. SE, Suite 100
Salem, OR 97302-1192
(503) 585-2474

Agent/Broker Phone #

ARTICLES

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, and administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference. The Contractor and Surety, jointly and severally, agree that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Construction Contract not increasing the Contract Price more than twenty-five percent (25%). The term "amendment" wherever used in this Bond, and whether referring to this Bond, the Construction Contract or the loan documents, shall include any alteration, extension, or modification of any character whatsoever.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Claimant is defined as persons claiming to have supplied labor or materials for the prosecution of the work provided for in the Construction Contract, including any person having a direct contractual relationship with the Contractor furnishing the Bond or direct contractual relationship with any subcontractor, or an assignee of such person, or a person claiming monies due to the State Accident Insurance Fund Corporation, the State Department of Employment Trust Fund, or the Department of Revenue, in connection with the performance of the Construction Contract, has a right of action on the Contractor's Bond as provided in ORS 279C.380 and 279C.400 only if:
 - 4.1 the person or the assignee of the person has not been paid in full; and
 - 4.2 the person gives written notice of claim, as prescribed in ORS 279C.600, to the Contractor and the Secretary of State, if the Construction Contract is with a state agency, or the clerk or auditor if the public body is other than a state agency.

The intent of this Bond shall be to include without limitation, the terms "labor, materials or equipment, that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.
5. The Contractor and Surety hereby jointly and severally agree with the Owner that every Claimant, who has not been paid in full before the expiration of a period of one hundred eighty (180) days (200 days for the filing of fringe benefit claims) after the date on which the last of such Claimant's work or labor was done or performed, or materials were furnished by such Claimant, for which claim is made, may have a right of action on this Bond. The Owner shall not be liable for the payment of any costs or expenses including attorneys' fees, which the Owner may incur in connection with its defense of any such right of action.

6. No suit or action shall be commenced on this Bond by any Claimant:
 - 6.1 Unless Claimant shall have given written notice to the Contractor and the Secretary of State, if the Construction Contract is with a state agency, or the clerk or auditor of the public body which let the Construction Contract if the public body is other than a state agency, within one hundred eighty (180) days (200 days for the filing of fringe benefit claims) after such Claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, or hand delivered in an envelope addressed to the Contractor, and such other entity who is to receive notice, at any place where that party maintains an office, conducts business, or at its residence, or delivered to that location.
 - 6.2 After the expiration of two (2) years from the date on which the Claimant last performed labor, materials or equipment. Any limitation embodied in this Bond, which is prohibited by any law controlling the project, shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by law.
7. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire at or he Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond and any amendments thereto as outlined in Paragraph 1, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
12. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
13. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
14. **DEFINITIONS**
 - 14.1 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

None.

Bond No. _____

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Oblige, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address):

OWNER (Name and Address):

CONTRACT

Date: _____ (Contractor to fill in, match date on signature page of Agreement)

Amount: \$ _____

Project Name: South Tank Seismic Valve and Water Treatment Plant Backwash Water
Recycle Improvements

BOND

Date: _____ (Contractor to fill in, match date on signature page of Agreement):

Amount: \$ _____

Modifications to this Bond: None

CONTRACTOR AS PRINCIPAL

SURETY

Company: (Corporate Seal)

Company: (Corporate Seal)

Signature: _____

Signature _____

Name _____

Name _____

Title _____

Title _____

FOR INFORMATION ONLY – Name, Address and Telephone

Agent Or Broker, Name & Address:

OWNER'S REPRESENTATIVE

Westech Engineering, Inc
3841 Fairview Industrial Dr. SE, Suite 100
Salem, OR 97302-1192
(503) 585-2474

Agent/Broker Phone #

ARTICLES

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executor, administrators, successors and assigns to the Owner for the performance of the Construction Contract and any extension thereof, and during the twenty-four (24) month warranty/guaranty period, which contract, extension and guaranty are incorporated herein by reference. This bond shall remain in full force and effect as a maintenance/warranty bond during the entire guaranty/warranty period, unless replaced with a separate warranty/maintenance bond acceptable to the Owner.
2. If the Contractor performs the Construction Contract (including any repairs required during the warranty period), the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.
3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:
 - 3.1 The Owner has notified the Contractor and the Surety at its address described on the signature page herein, that the Owner is considering declaring the Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen (15) days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and;
 - 3.2 The Owner has declared Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty (20) days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and;
 - 3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.
4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or
 - 4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors, which agents or independent contractors shall be acceptable to the Owner; or
 - 4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or
 - 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

4.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

4.4.2 Deny liability in whole or in part and notify the Owner citing reasons therefor.

5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen (15) days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:
 - 6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and
 - 6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.
8. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two (2) years after Contractor Default or within two (2) years after the Contractor ceased working or within two (2) years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
10. Notice to the Surety, the Owner or the Contractor shall be mailed by certified or registered mail or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. **DEFINITIONS**

- 12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.
- 12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.
- 12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.
- 12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

None.



STATE OF OREGON

STATUTORY PUBLIC WORKS BOND

Surety bond #: _____ CCB # (if applicable): _____

We, _____, as principal, and _____, a corporation qualified and authorized to do business in the State of Oregon, as surety, are held and firmly bound unto the State of Oregon for the use and benefit of the Oregon Bureau of Labor and Industries (BOLI) in the sum of thirty thousand dollars (\$30,000) lawful money of the United States of America to be paid as provided in ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, for which payment well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by this agreement.

WHEREAS, the above-named principal wishes to be eligible to work on public works project(s) subject to the provisions of ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and is, therefore, required to obtain and file a statutory public works bond in the penal sum of \$30,000 with good and sufficient surety as required pursuant to the provisions of section 2, chapter 360, Oregon Laws 2005, conditioned as herein set forth.

NOW, THEREFORE, the conditions of the foregoing obligations are that if said principal with regard to all work done by the principal as a contractor or subcontractor on public works project(s), shall pay all claims ordered by BOLI against the principal to workers performing labor upon public works projects for unpaid wages determined to be due, in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and OAR Chapter 839, then this obligation shall be void; otherwise to remain in full force and effect.

This bond is for the exclusive purpose of payment of wage claims ordered by BOLI to workers performing labor upon public works projects in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360.

This bond shall be one continuing obligation, and the liability of the surety for the aggregate of any and all claims which may arise hereunder shall in no event exceed the amount of the penalty of this bond.

This bond shall become effective on the date it is executed by both the principal and surety and shall continuously remain in effect until depleted by claims paid under ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, unless the surety sooner cancels the bond. This bond may be cancelled by the surety and the surety be relieved of further liability for work performed on contracts entered after cancellation by giving 30 days' written notice to the principal, the Construction Contractors Board, and BOLI. Cancellation shall not limit the responsibility of the surety for the payment of claims ordered by BOLI relating to work performed during the work period of a contract entered into before cancellation of this bond.

IN WITNESS WHEREOF, the principal and surety execute this agreement. The surety fully authorizes its representatives in the State of Oregon to enter into this obligation.

SIGNED, SEALED AND DATED this _____ day of _____, 20 _____

Surety by:

Principal by:

(Seal)
Company Name

Name

Signature

Signature

Title (e.g. Attorney-in-Fact)

Title

**SEND BOND TO: Construction Contractors Board
PO Box 14140
Salem, OR 97309-5052
Telephone: (503) 378-4621**

Address

City State Zip

PART 3:

CONDITIONS OF THE CONTRACT

GENERAL CONDITIONS

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents. In case of inconsistency between the Contract Documents and any Addenda, the Addenda supersede other Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Allowance*—a specified monetary sum, specified quantity or time not otherwise defined by the specifications and drawings, but which the Contractor is required to include in the bid or price. An Allowance may be either a cash allowance or a quantity allowance.
 4. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 5. *Approve*—Where used in conjunction with the Owner's response to submittals, requests, applications, inquiries, reports, and claims by the Contractor, the meaning of the term "approved" will be held to the limitations of the Owner's and Engineer's responsibilities and duties as specified in the General Requirements. In no cases will "approval" by the Owner or Engineer be interpreted as a release of the Contractor from responsibilities to fulfill requirements of the Contract Documents.
 6. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 7. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 8. *Bidder*—The individual or entity who submits a Bid directly to Owner. The term "Proposer" shall be used interchangeably with the term "Bidder," and the term "Proposal" shall be used interchangeably with the term "Bid."
 9. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 10. *Bidding Requirements*—The advertisement or invitation to bid, Information for Bidders, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements or attachments.
 11. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 12. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 13. *Consultant*—An individual or entity having a direct contract with the Engineer, Engineer's Consultant and/or Owner for performance of work on the Project.
 14. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 15. *Construction Submittals*—See "Shop Drawings" definition.
 16. *Contract Documents*—Those items so designated in the Agreement. Only the printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals are not Contract Documents. The reports and drawings of subsurface and physical conditions are not Contract Documents unless specifically identified as such in the Supplementary Conditions, if any.
 17. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject

- to the provisions of Paragraph 11.03 in the case of Unit Price Work).
18. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
 19. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
 20. *Cost of the Work*—See Paragraph 11.01 for definition.
 21. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
 22. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver. However, the Contractor shall have no rights or remedies arising from execution of the Agreement prior to receiving a Notice to Proceed from Owner.
 23. *Engineer*—The individual or entity retained by the Owner to act as engineer of record during the construction of the work.
 24. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
 25. *Final Completion*—The point at which the Owner has determined that all Work is complete, the facilities are operating as specified and according to applicable design criteria, all other contract requirements have been satisfied, and final payment has been made in accordance with the requirements of the Contract Documents.
 26. *General Requirements*—Sections of Division 1 of the Specifications.
 27. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
 28. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
 29. *Latent Defect*—A defect in the Work of which the Owner has no actual knowledge.
 30. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
 31. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
 32. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
 33. *Notice of Award*—The written notice by Owner (or Owner's Representative) to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner (if Owner decides to proceed with the work) will sign and deliver the Agreement to the apparent successful bidder. However, the Notice of Award shall not be construed as an agreement, meeting of the minds, contract or any other legal obligation between Owner and Contractor. The Contractor shall have no rights or remedies arising from execution of the Agreement prior to receiving a Notice to Proceed from Owner.
 34. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
 35. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
 36. *PCBs*—Polychlorinated biphenyls.
 37. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
 38. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities

comprising the Contractor's plan to accomplish the Work within the Contract Times.

39. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
40. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
41. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
42. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
43. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
44. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
45. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
46. *Shop Drawings*—All construction submittals, drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
47. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
48. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
49. *Stipulated Price Work*—Work to be paid at unit or lump sum prices established by Owner in the Bidding Documents, as distinguished from unit or lump sum prices submitted, or bid, by the Bidder.
50. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
51. *Substantial Completion*—Unless additional requirements are included in the Supplementary Conditions, Substantial Completion is that degree of completion of the project's facilities and operating systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial use and operation of the Work, and (i) all required functional, performance and acceptance or startup testing has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of Engineer in accordance with the requirements of the Specifications (including test operation of equipment, electrical and control systems to demonstrate that the total system operates as specified, and that all system components operate correctly and communicate with all other system components as necessary for a complete and operable system); (ii) all final building, plumbing, mechanical and electrical inspections required have been completed and any identified critical defective or incomplete Work replaced or corrected; (iii) occupancy permits and certifications (if any) have been issued by jurisdictions having authority; (iv) all appurtenant operations and maintenance features and safety features (ie. handrails, motor guards, safety signs & notices, emergency eye-wash/showers, etc.) have been installed and are fully functional; and (v) all required record drawings and/or O&M manuals/information (where applicable) have been submitted and accepted by the Owner. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
52. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
53. *Supplementary Conditions*—That part of the Contract Documents which amends or

supplements these General Conditions.

54. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
55. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
56. *Unit Price Work*—Work to be paid for on the basis of unit prices.
57. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

1.02 Terminology

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*:
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or

adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*:

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Final Completion (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide*:

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When “furnish,” “install,” “perform,” or “provide” is not used (in connection with services, materials, or equipment) in a context clearly requiring an obligation of Contractor, “provide” is implied. “Provide” shall be understood to mean “provide complete in-place,” that is, “furnish and install, complete”.

- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor shall deliver to the Owner and Engineer, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor is required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to five printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. Owner will provide a Notice to Proceed at a reasonable time after the effective date of the Agreement. In no event will the Owner have any obligations or duties to Contractor under the Agreement until the Notice to Proceed is given to Contractor, and the Contractor shall have no rights or remedies arising from execution of the Agreement prior to receiving a Notice to Proceed from Owner.

2.04 *Starting the Work*

- A. Unless otherwise specified in the Information for Bidders or the Agreement, Contractor shall start to perform the Work within ten (10) days of the date indicated in the Notice to Proceed. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Per the requirements in the Specifications, Contractor shall submit to Engineer for timely review copies of a Project Schedule, Schedule of Submittals and Preliminary Schedule of Values as applicable. Unless otherwise required in the Specifications, these shall be submitted prior to the Preconstruction Conference, or within five (5) days after the date

of the Notice to Proceed, whichever is sooner.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Unless otherwise approved by the Owner, before any Work at the Site is started a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Acceptance of Schedules*

- A. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer as required in the Specifications.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard,

specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements at the site, including but not limited to grades, elevations, dimensions, locations, and/or interconnection of new work with existing or other work. Contractor shall immediately report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby. Any errors due to Contractor's failure to verify all such field measurements shall be promptly rectified by Contractor without additional cost to Owner or extension of Contract Time.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall immediately report it to

Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).
2. Field Orders and Engineer's written interpretation & clarifications will take precedence over all other Contract Document components referenced herein. Figure dimensions on Drawings take precedence over scaled dimensions. Drawings with the higher level of detail take precedence over less detailed Drawings. Greater number, amount or size takes precedence over lesser number, amount or size.
3. Where a conflict occurs between or within the specifications and drawings, the more stringent or higher quality requirements shall apply (Engineer shall decide which stipulation will provide the best installation). In resolving other inconsistencies among two or more components of the Contract Documents, precedence shall be given in the following order:
 - a. Permits from outside agencies as may be required by law
 - b. Change Order(s)
 - c. Addenda
 - d. Agreement
 - e. Supplementary Conditions
 - f. General Conditions

- g. Bidding Documents, including Contractor's Bid Form
- h. Specifications—Division 01
- i. Drawings.
- j. Specifications—Division 02-16
- k. Bonds

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents can only be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by a written Change Order.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways (any variations or deviations in the Work arising from any of the methods set forth in Paragraph 3.04.B will not authorize any change in the Contract Price or Contract Time. The sole method to amend the Contract Price or Contract Time is pursuant to Paragraph 3.04.A):
 - 1. A Field Order;
 - 2. Engineer's approval of a Shop Drawing or Sample (including Engineer's review comments); or
 - 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. 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.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, 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.
- B. 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 sixty (60) days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the sixty (60) day acceptance period will be corrected by the transferring party.
- C. 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.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien

against such lands in accordance with applicable Laws and Regulations.

- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. The Contractor and each Subcontractor shall evaluate and satisfy themselves as to the site conditions and limitations under which the Work is to be performed, including, without limitation, (1) the location, condition, layout, and nature of the project site and surrounding areas; (2) generally prevailing climatic conditions; (3) anticipated labor, supply, and costs; (4) availability and cost of materials, tools, and equipment; and (5) other similar issues. The Owner assumes no responsibility or liability for the physical condition or safety of the project site or any improvement located on the project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make adjustments in either the Contract Price or Contract Times arising from a failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph 4.02.A.
- B. *Reports and Drawings:* The Supplementary Conditions identify (if any):
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site;
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- C. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such “technical data” is identified in the Supplementary Conditions. Except for such reliance on such “technical data,” Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety

precautions and programs incident thereto; or

- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

- A. *Notice:* If Contractor discovers or should have discovered that any subsurface or physical condition that is uncovered or revealed either:
 - 1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Contract Documents; or
 - 3. differs materially from that shown or indicated in the Contract Documents; or
 - 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, within 24 hours after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.
- C. *Possible Price and Times Adjustments:*
 - 1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more

- of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
 3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others.
 1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, immediately after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Unless otherwise specified in the Contract

Documents, Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings (if any) known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may reasonably rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental

Condition created with any materials brought to the Site by, or released as a result of the intentional or negligent act or failure to act of Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer,

and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, hold harmless and reimburse Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. Except as provided otherwise by the Information for Bidders or by Laws or Regulations, these bonds shall remain in effect until completion of the correction period specified in Paragraph 13.07, or a minimum of one year after the date when final payment becomes due, whichever is later. Contractor shall also furnish such other bonds as are required by the Contract Documents or by agencies with jurisdiction.
- B. All bonds shall be in the form prescribed by the

Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within ten (10) days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies from which bonds and insurance are furnished by the Contractor shall have a rating of not less than A- in the most current edition of Best's Rating Guide, in addition to such additional requirements and qualifications as may be provided in the Supplementary Conditions. Owner shall have the right of final approval of sureties and insurers.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner and Engineer, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain. Owner and Engineer shall be included as additional insureds (as required by Paragraph 5.04.B.1), as well as any other parties or entities identified in the Supplementary Conditions or required as a condition of permits or approvals obtained by Contractor.
- B. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to

identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

- C. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- D. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 Contractor's Insurance

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds Owner and Engineer (subject to any customary exclusion regarding professional liability), and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner, Engineer and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 - a. Evidence of insurance coverage submitted on the "ACORD" form, or any other insurance certificate containing the language regarding cancellation of coverage, shall be revised to strike out the words "endeavor to", and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives";
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a

certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. Unless otherwise provided in the Supplementary Conditions or required by Laws and Regulations, the deductible shall not exceed \$10,000. This property insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses that may be incurred in the repair or replacement of any existing property or structures included in or affected by the Work (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being

incorporated in the Work;

5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made.
- B. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 shall contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner and Engineer, as well as other additional insureds that may be listed in the Supplementary Conditions.
1. Evidence of insurance coverage submitted on the "ACORD" form, or any other insurance certificate containing the language regarding cancellation of coverage, shall be revised to strike out the words "endeavor to", and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents or representatives".
- C. If Owner requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Contractor shall, if possible, include such insurance, and the cost thereof will be incorporated by appropriate Change Order.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Contractor waives all rights against Owner and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against

Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen (15) days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest reasonably may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If Owner has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by Contractor in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the Owner shall so notify the Contractor in writing within ten (10) days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Contractor shall provide Owner with such additional information in respect of insurance provided as Owner may reasonably request.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to

Substantial Completion of all the Work as provided in Paragraph 14.05, the Contractor shall, prior to such use or occupancy, be solely responsible to notify his insurer(s) providing the property insurance pursuant to Paragraph 5.06, and ensure that any changes in coverage necessitated thereby are made. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy. Failure by Owner to require submittal of such endorsements prior to such use or occupancy shall not be construed as a waiver of Contractor's obligation to ensure that such endorsements are provided.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall be responsible for ensuring that the finished work complies accurately with the Contract Documents.
- B. For purposes of giving or receiving notice, directives, change orders, or any other information from the Engineer or Owner to the Contractor, the Contractor shall designate one person as Project Manager to receive such notice, directives, change orders, or other information.
- C. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to Contractor. The Contractor's superintendent shall be present at the Site at all times while Work is in progress and shall be available by phone for emergencies 24 hours per day, 7 days per week. If at anytime the superintendent leaves the Site while Work is in progress, Engineer shall be notified and provided with the name of the Contractor's representative having responsible charge.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, well qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain

good discipline and order at the Site.

- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Unless otherwise allowed or required in the Contract Documents, Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. Contractor agrees to assign to Owner, at the time of final completion of the Work, any and all manufacturer's warranties relating to materials and labor used in the Work, and Contractor further agrees to perform the Work in such a manner to preserve any and all manufacturer's warranties in full force and effect. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in

Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

- 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances and conditions described below. Requests for review of substitute or "or-equal" items of material and/or equipment will not be accepted by Engineer from anyone other than Contractor.

The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed "or-equal" item. Unless otherwise specifically provided in the contract documents for specific material or equipment, no requests for approval of substitute materials or equipment will be permitted during the bidding process. Substitutes will be considered only after the Effective Date of the Agreement, in accordance with the procedures in the Contract Documents.

Reimbursement by the Contractor for costs associated with review by Engineer of proposed substitute items will be as summarized under Paragraph 6.05.E, whether or not the substitute item is approved for use. Engineer may preclude the use of certain alternate or substitute materials or equipment in cases where, in the opinion of Engineer or Owner, efficient utilization of existing materials or supplies requires the acquisition of compatible equipment or supplies, or where there is only one manufacturer or seller of the product of the quality required.

- 1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to

that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

- a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service;
 - 4) the alternate material or equipment proposed is not precluded under Paragraph 6.05.A;
 - 5) it will not materially increase anticipated maintenance or operating costs;
 - 6) it is compatible with existing system components.
- b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item, provided that the proposed substitute material or equipment is not precluded under Paragraph 6.05.A..

- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor’s achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

- a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish at Contractor's expense additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute. The amount, form and duration of any such guarantee or bond shall be acceptable to Owner.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer and Engineer's consultants for

evaluating each such proposed substitute.

Contractor shall also reimburse Owner for the reasonable charges of Engineer and Engineer's consultants for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute. Reimbursement rates for Engineer or related entities for evaluation of proposed substitutes shall be on the basis as established in the Supplementary Conditions.

- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Contract Documents require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement or issuance of the Notice to Proceed, and if Contractor has submitted a list thereof in accordance with the Contract Documents, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties

and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, hold harmless and reimburse Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Unless otherwise provided in the Contract Documents, Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the

Agreement, except that Owner shall pay all costs for System Development Charges (SDCs) related to the Work. Unless otherwise provided in the Contract Documents, Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. Costs for all such taxes are to be included in the Contract Price.

6.11 *Use of Site and Other Areas*

- A. *Limitation on Use of Site and Other Areas:*
 - 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with

construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

- 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
- 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, hold harmless and reimburse Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all current Drawings, Specifications, Addenda, Change Orders, Field

Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and annotated final Shop Drawings (marked-up to reflect field changes, if any) shall be delivered to Engineer.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3

caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable, and such notice has been accepted by Owner (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer written notice immediately, and in no instance more than 24 hours after the alleged emergency, if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and

Samples to Engineer for review and approval in accordance with the requirements of the Specifications.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 - 6. any inspection, test, or approval by others; or
 - 7. any correction of defective Work by Owner.

D. *Additional Warranty Provisions.*

- 1. Contractor further warrants and guarantees to the Owner and Engineer that all Work is guaranteed for a specified period from the date of final acceptance by the Owner. Except for equipment or portions of the work with longer warranties specified in the Contract Documents, the Work shall be guaranteed for warranty period specified in the Contract Documents, measured from the date of final acceptance by the Owner. If no warranty period is specified elsewhere in these Contract Documents, the Work shall be guaranteed for 2 years from the date of final acceptance by the Owner. If, within the warranty period, repairs or changes are required in connection with the Work, the Contractor shall promptly, without expense to the Owner:
 - a. Place in satisfactory condition all guaranteed Work;
 - b. Correct all damage to the building, site, equipment or contents which is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract; and,
 - c. Correct any work, material, equipment, or contents of building, structure or site disturbed in fulfilling the guarantee.
- 2. Repairs, replacements or changes made under the warranty requirements shall be warranted for the remainder of the specified warranty period, or for a minimum of 1 year (whichever is longer), beginning on the date of the acceptance of the repairs, replacements or changes.
- 3. If the Contractor fails within 10 days to proceed to comply with the terms of this warranty, the Owner may have the defects corrected. The Contractor and the Contractor's surety shall be liable for all expense incurred. In case of an emergency where delay would cause serious loss or damage, repairs may be made without notice to the Contractor, and the Contractor or the Contractor's surety shall pay the cost.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, hold harmless, and reimburse Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not

limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, and consultants arising out of the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and

design criteria that such services must satisfy.

Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer. The design professional shall be licensed in the state wherein the project is located.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in the Specifications.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

6.22 *Environmental Indemnity*

- A. Contractor shall indemnify and hold Owner harmless, its agents and employees from and against, any and all claims, costs, losses, damage, liabilities, penalties and fines arising out of or resulting from (i) the violation by Contractor of any federal, state or local statute, law, rule, regulation, ordinance, order, permit or governmental approval or authorization relating to the protection of the environment or human health, safety, or welfare ("Environmental Law"); and (ii) any release, spill, discharge, or disposal of any "hazardous material" which shall include, without limitations, any "hazardous substance," "hazardous material," "toxic substance," "pollutant," "contaminant," "oil," or "petroleum," or words of similar impact under any Environmental Law.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or

through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- D. Should Contractor cause damage to the work or property of any other contractor at the site, or should any claim arising out of or resulting from Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or Engineer's Consultants or any other person, Contractor shall

promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by mediation. If mediation is unsuccessful, Contractor shall still defend against further litigation as follows. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, hold harmless and reimburse Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, and the successors in interest of the foregoing, from, for and against, suits, actions, claims, damages, penalties, liabilities, losses and expenses (including but not limited to all fees and related costs, disbursements and expenses of engineers, architects, attorneys and expert witness' fees) arising directly or indirectly or consequentially out of or resulting from any action, legal or equitable, brought by a separate contractor against Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them to the extent based on a claim caused by, arising out of, or resulting from Contractor's negligent or other failure of performance in the Work.

7.02 *Coordination*

- A. The Owner will have the authority to contract with other contractors, utility companies or Public Agencies for the performance of other work on the Project at the Site.
- B. Contractor shall have sole responsibility for coordination of his work with any and all activities or construction for or by other contractors, utility companies or Public Agencies at and adjacent to the Project Site.

7.03 *Legal Relationships*

- A. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- B. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer, or provide Engineer with notice of any communications with Contractor.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Prior to issuance of the Notice to Proceed, and upon written request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Owner's representative during the construction period will be that person or entity who is retained by, authorized and paid by the Owner to represent the Owner's interests. Engineer will be Owner's representative during the construction period only to the extent authorized (and contracted for) by Owner.

9.02 *Visits to Site*

- A. Unless otherwise specified in the Contract Documents, and only to the extent authorized (and contracted for) by Owner, Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods,

techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and

Samples, see Specifications.

- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within thirty (30) days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's written decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or

from time to time, order additions, deletions, or revisions in the Work by a Change Order. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

- B. Owner or Engineer may, in anticipation of ordering an addition, deletion or revision to the Work, request Contractor to prepare a proposal of cost and times to perform Owner's contemplated changes in the Work. Contractor's written proposal shall be transmitted to the Engineer promptly, but not later than seven (7) days after Contractor's receipt of Owner's written request and shall remain a firm offer for a period of not less than forty-five (45) days after receipt thereof by Engineer. Owner or Engineer's request for proposal or multiple requests for proposals shall not justify a claim for an adjustment in Contract Price or Contract Times (or Milestones), nor obligate the Owner to authorize work under the proposal. Contractor is not authorized to proceed on an Owner contemplated change in the Work prior to Contractor's receipt of a Change Order incorporating such change into the Work, or Owner's written authorization pending execution of a Change Order.
- C. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05.
- D. In Signing a Change Order, the Owner and Contractor acknowledge and agree that:
 - 1. the stipulated compensation (Contract Price or Contract Times, or both) set forth in the Change Order includes payment for: (i) the Cost of the Work covered by the Change Order, (ii) Contractor's fee for overhead and profit, (iii) interruption of progress schedules, (iv) delay and impact, including cumulative impact, on Work under the Contract Documents, and (v) extended overhead;
 - 2. the Change Order constitutes full mutual accord and satisfaction for the change to the Work;
 - 3. no reservation of rights to pursue subsequent claims on the Change Order will be made by either party;
 - 4. no subsequent claim or amendment of the Contract Documents will arise out of or as a result of the Change Order;
 - 5. except as otherwise provided in the Change Order, the Contract, as amended, between

Owner and Contractor remains in full force and effect.

- E. Agreements on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of or related to the Change Order, including but not limited to all direct and indirect costs and impacts associated with such change and any and all adjustments to the Contract Price and the Contract Time. In the event a Change Order increases the Contract Price, the Contractor shall include the Work covered by such Change Order in applications for payment as if such Work were originally part of the contract documents.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.
- B. Extra work will not be considered as authorized additional work or for an adjustment in the Contract Price or the Contract Time unless a Change Order is executed by both Owner and Contractor. Furthermore, the parties agree that under no circumstance will an act or failure to act on the part of the Owner or Engineer constitute a waiver of the written Change Order requirement for extra or changed work. A written Change Order is a strict condition precedent for payment for extra work.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the

Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:*
1. *By Contractor.* Written notice stating the general nature of each Claim shall be delivered by Contractor to Engineer promptly (but in no event later than seven (7) days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the Contractor. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer within thirty (30) days after the start of such event (unless Owner allows additional time for Contractor to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by Contractor's written statement that the adjustment claimed is the entire adjustment to which Contractor believes it is entitled as a result of said event.
 2. *By Owner.* Owner shall provide Engineer with written notice stating the general nature of each claim within a reasonable time after discovering an event giving rise thereto.
- C. *Engineer's Action:* Engineer will review each Claim and, within thirty (30) days after receipt of the last submittal of Contractor or Owner, take one of the following actions in writing:

1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said thirty (30) days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within thirty (30) days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with and within the time periods specified by this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include

social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above only to the extent authorized in writing by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained. Owner reserve the right to furnish such materials as it deems advisable, and Contractor shall have no claims for costs and profit on such furnished materials.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work, but only to the extent authorized and approved in writing by Owner.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including fuel, transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site.

Individual pieces of equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.

- c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

1) Rentals of construction equipment at rental rates listed for such equipment from rate sheets from established and reputable local rental companies, or other similar source acceptable to the Owner and Engineer. Such rental rates will be used to compute payments for equipment whether the equipment is under the Contractor's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment will be the rate resulting in the least total cost to the Owner for the total period of use. If it is deemed necessary by the Contractor to use the equipment not listed by the references specified herein, an equitable rental rate for the equipment will be established by the Engineer. The Contractor may furnish cost data which might assist the Engineer in the establishment of the rental rate. Payment shall be subject to the following:

- a) Payment for equipment which is already on the Project site and which is used in the completion of extra work will not be allowed;
- b) All equipment shall, in the opinion of the Engineer, be in good working condition and suitable for the purpose for which the equipment is to be used;
- c) Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which

has no direct power unit shall be powered by a unit of at least minimum rating recommended by the manufacturer;

- d) Individual pieces of equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore;

e) Rental time will not be allowed while equipment is inoperative due to breakdowns; and

f) Rental time will not be allowed while equivalent Contractor owned equipment is held at standby.

2) The rental time to be paid for equipment of the site will be the time the equipment is in productive operation on the extra work being performed and, in addition, will include the time required to move the equipment to the location of the extra work and return it to the original location or to another location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than the extra work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or

otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or

equipment wrongly supplied, and making good any damage to property.

- 5. Other overhead or general expense costs of any kind, lost opportunity costs and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- 6. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer a detailed and itemized cost breakdown together with supporting data. Supporting data shall include but not be limited to daily submissions of timesheets indicating hours and trades worked (including worker classifications corresponding to Prevailing Wage rate classifications where applicable), equipment and date/time equipment was employed, and materials expended.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

- 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for

additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs by more than twenty-five percent (25%) from the estimated quantity of such item indicated in the Agreement (unless otherwise provided by the Contract Documents); and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

**ARTICLE 12 – CHANGE OF CONTRACT PRICE;
CHANGE OF CONTRACT TIMES**

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted in accordance with the provisions of Paragraph 10.05, and delivered to Engineer within seven (7) days of the start of the event giving rise to the claim.

- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 10 percent (10%);
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent (5%);
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of ten percent (10%)

of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent (5%) of the amount paid to the next lower tier Subcontractor, limited to a maximum fee of twenty-five percent (25%) including all tiers of subcontractors and Contractor;

- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent (5%) of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted in accordance with the provisions of Paragraph 10.05, and delivered to Engineer within seven (7) days of the start of the event giving rise to the claim.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.
- C. All requests for time extensions shall be supported by Schedule analysis showing the effect on the entire Project taking into account concurrent Work and the critical path, including float. Partial demonstration of impact on particular operations only will not be acceptable to show the criticality of any event on the Project Schedule as a whole.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph

12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Contract Times may be extended because of delays in the completion of the Work due to abnormal weather conditions provided that the Contractor shall, within seven (7) days of the start of the event causing such delay, notify Engineer in writing of the cause of the delay and request an extension of time. The Contractor shall demonstrate that the abnormal weather directly impacted a planned activity on the critical path of the Project Schedule at the time the abnormal weather occurred. Engineer will make recommendations to Owner to extend the Contract Times for completing the Work when, in Engineer's judgment, the findings of facts and extent of delay justify such an extension. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C. Contractor shall not be entitled to any additional compensation of any kind arising out of or relating to abnormal weather conditions.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in

Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor. Failure by Contractor to schedule and obtain any required inspections, testing and/or certifications in a manner so as to allow for the timely progress or completion of the work will not be grounds for an extension of Contract Time.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer and other agencies with jurisdiction timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests. Failure by Contractor to schedule and obtain any inspections, testing or certifications (required by the drawings, Contract Documents or agencies with jurisdiction) in a timely manner will not be grounds for an extension of Contract Time.
- B. Except as otherwise required in the Contract Documents, Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in

Paragraph 13.04.C;

- 3. retesting required because of non-conformance to the requirements of the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer. Tests required by Contract Documents to be performed by Contractor that require test certificates be submitted to Owner or Engineer for acceptance shall be made by an independent testing laboratory or agency licensed or certified in accordance with Laws and Regulations and applicable state and local statutes.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely written notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.
- G. Costs of retesting as required in accordance with Paragraph 13.03.B.3 shall be paid by the Contractor.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that

portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction, unless Contractor fails to provide written notice as required in Paragraph 13.03.F. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period (Warranty Period)*

- A. Unless a longer period is specified in the Information for Bidders, the correction period shall be one year from Substantial Completion. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the restoration of or repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. Where a portion of the work or a particular item of equipment is placed in continuous service for the benefit of Owner before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date only if so provided in the Specifications, or by express written approval by Owner.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed

and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim there-for as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven (7) days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all

or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim there-for as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed, including any required testing.

14.02 *Progress Payments*

- A. *Applications for Payments:*
 - 1. At least twenty-eight (28) days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work

completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing by Owner, the Application for Payment shall also be accompanied by a bill of sale, paid invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
 - a. Written consent of any surety is required prior to payment for any materials stored on or off the project site. Contractor shall be responsible for obtaining such consent.
 - b. Owner's Representative(s) shall have the right to make inspections of the storage areas at any time.
 - c. Such materials shall be protected from diversion, destruction, theft and/or damage to the satisfaction of Owner, shall be specifically marked for use on the project, and shall be segregated from other materials at the storage facility.
3. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within ten (10) days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment

requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

- c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
- d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may recommend that the Owner retain off-sets from the amount due for events which include, but are not limited to, any of the conditions summarized below or under Paragraph 14.02.D.1 or 2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- f. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- g. the Contract Price has been reduced by Change Orders;
- h. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09;
- i. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A; or
- j. liability for liquidated damages has been incurred by the Contractor as set forth in the Agreement.

C. Payment Becomes Due:

- 1. Thirty (30) days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

- 1. Owner may refuse to make payment of the full amount recommended by Engineer

because:

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended;
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A; or
 - e. Owner has not received the Certified Payrolls from Contractor (if required) and must withhold the additional retainage until Contractor submits its Certified Payrolls.
2. Owner may reduce the amount to be paid for the following items:
- a. Liability for liquidated damages incurred by Contractor as set forth in the Agreement, or
 - b. Owner compensation to Engineer for labor plus expenses because of any the following Contractor-caused events:
 - 1) witnessing retesting of corrected or replaced defective Work;
 - 2) return visits to manufacturing facilities to witness factory testing or retesting;
 - 3) excessive submittal reviews (in excess of two reviews by Engineer) due to Contractor's failure to address all specification requirements and/or previous review comments, or due to providing incomplete submittals, or resubmittal of substantially the same submittal;
 - 4) evaluation of proposed substitutions and in making changes to Contract Documents occasioned thereby;
 - 5) overtime worked by Contractor necessitating Engineer, related entities, Resident Project Representative or site staff, if any, to work overtime; or

- 6) costs incurred for inspection & project management services by Engineer required beyond the end of the Contract Time due to Contractor's failure to complete the work within the Contract Time, as set forth in the Agreement.
- c. Reimbursement rates for Engineer or related entities to be calculated at the rate set forth in the Supplementary Conditions.
3. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
4. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work to be complete and ready for its intended use, including acceptable completion of all required testing, inspections and/or certifications (required by the drawings, Contract Documents or agencies with jurisdiction), Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a

tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven (7) days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within fourteen (14) days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said fourteen (14) days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to

be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.
- B. If, during final inspection, any of the Work is found to be still incomplete, or does not comply with the Contract Documents and requires correction Work by the Contractor necessitating subsequent Site inspection efforts by the Engineer or Owner to ascertain if the Work has been properly installed and completed, the Contractor shall be liable to the Owner for the cost of such inspection work or any subsequent reinspection as provided by Paragraph 14.02.D.2.b.

14.07 *Final Payment*

A. *Application for Final Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final

inspection and has delivered, in accordance with the Contract Documents, final copies of all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled;
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work; and
 - e. a waiver of all claims by Contractor against Owner.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten (10) days

after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Acceptance of such written notice by Owner and final payment of Contractor by Owner shall constitute Final Completion. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Final Payment Becomes Due:*

1. Thirty (30) days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with

the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven (7) days written notice of its intent to terminate the services of Contractor:
 1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven (7) days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than thirty (30) days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven (7) days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 1. completed and acceptable Work executed in

accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others (subject to limitations under Paragraph 15.03.B); and
 4. reasonable expenses directly attributable to termination.
- B. Contractor, subcontractors or suppliers shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination, including lost opportunity costs.
- C. Owner shall be credited for (1) payments previously made to Contractor for the terminated portion of the Work; (2) claims that Owner has against Contractor under the contract; and (3) the value of materials, supplies, equipment or other items that are to be disposed of by Contractor that are part of the Contract Price.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than ninety (90) consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within thirty (30) days after it is submitted, or (iii) Owner fails for thirty (30) days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within thirty (30) days after it is submitted, or Owner has failed for thirty (30) days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

15.05 *Environmental Litigation*

- A. If the performance of all or any part of the Work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, the Owner, at the request of the Contractor, shall determine whether the order is due in any part to the acts or omissions of the Contractor or subcontractor at any tier not required by the terms of this Contract, such suspension, delay, or interruption shall be considered as if ordered by the Owner in the administration of this Contract under the terms of this subsection, except that it will not be possible for the Owner to fix the date for resumption of the Work.
- B. The term 'environmental litigation,' as used herein, means a lawsuit alleging that the Work will have an adverse effect on the environment or that the Owner has not duly considered, either substantively or procedurally, the effect of the Work on the environment. Specific laws, ordinances and resolutions regarding pollution prevention and natural resource preservation that may affect this Project are as follows:
 - 1. Federal Clean Water Act.
 - 2. Applicable state or local laws, statutes & regulations.

15.06 *Provisions Relating to Environmental and Natural Resource Laws and Rules; Remedies When Requirements Change*

- A. If the Contractor is delayed or must undertake additional Work by reason of existing regulations or ordinances of agencies not cited in the public contract or due to the enactment of new or the amendment of existing statutes, ordinances or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the submission of the successful Bid, the Owner may:
 - 1. Terminate the Contract;
 - 2. Complete the Work itself;
 - 3. Use non-agency forces already under contract with the Owner;
 - 4. Require that the underlying property owner be responsible for cleanup;

- 5. Go out to bid for a new contractor to provide the necessary services under the competitive bid requirements of state law as applicable; or
- 6. Issue the Contractor a Change Order setting forth the additional Work that must be undertaken.

- B. In addition to the obligation imposed under Paragraph 15.06.A to refer to federal, state and local agencies with regulations dealing with the prevention of environmental pollution and the preservation of natural resources, a public bid document must also make specific reference to known conditions at the construction Site that may require the Contractor to comply with the statutes, ordinances or regulations identified under Paragraph 15.06.A.
- C. If the Contractor encounters a condition not referred to in the Bid Documents and not caused by the Contractor and not discoverable by a reasonable prebid visual Site inspection and the condition requires compliance with the regulations referred to under Paragraph 15.06.A, the Contractor shall immediately give notice of the condition to the Owner.
- D. Except in the case of an emergency and except as may otherwise be required by any environmental or natural resource regulation, the Contractor shall not commence Work nor incur any additional job Site costs in regard to the condition encountered and described in Paragraph 15.06.C without written direction from the Owner.
- E. Upon request by the Owner, the Contractor shall estimate the emergency or regulatory compliance costs as well as the anticipated delay and costs resulting from the encountered condition. This cost estimate shall be promptly delivered to the Owner for resolution.
- F. Within a reasonable period of time, the Owner may:
 - 1. Terminate the Contract;
 - 2. Complete the Work itself;
 - 3. Use non-agency forces already under contract with the Owner;
 - 4. Require that the underlying property Owner be responsible for cleanup;
 - 5. Go out to bid for a new Contractor to provide the necessary services under the competitive bid requirements of state law as applicable; or
 - 6. Issue the Contractor a Change Order setting forth the additional Work that must be undertaken.
- G. If the Owner chooses to terminate the Contract

under Paragraph 15.06.F.1, the Contractor shall be entitled to all costs and expenses incurred to the date of termination, including overhead and reasonable profits, on the percentage of the Work completed. The Owner shall have access to the Contractor's Bid Documents when making its determination of the additional compensation due to the Contractor.

- H. If the Owner causes work to be done by another Contractor under Paragraphs 15.06.A.3 or 15.06.A.5, or under Paragraphs 15.06.F.3 or 15.06.F.5, the Contractor shall not be held liable for actions or omissions of the other Contractor.
- I. The Change Order under Paragraph 15.06.A.6 or under Paragraph 15.06.F.6 shall include the appropriate extension of Contract Time and compensate the Contractor for all additional costs, including overhead and profit, reasonably incurred as a result of complying with the applicable regulations. The Owner shall have access to the Contractor's Bidding Documents when making its determination of the additional compensation due to the Contractor.

15.07 *Contractor's Tender Upon Termination*

- A. Upon receiving a written notice of termination of this contract, or if Contractor elects to terminate this Contract, Contractor shall immediately cease all activities under this Contract and take reasonable action to mitigate its losses upon termination, unless, in the case of termination by Owner, Owner expressly directs otherwise in its Notice of Termination. Upon termination of this Contract for any reason, Contractor shall deliver to Owner all documents, information, work in progress and other property that are or would be deliverable had the Contract been completed. Upon Owner's request, Contractor shall surrender to anyone Owner designates, all documents, research or objects or other tangible things prepared previously and needed to complete the Work.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding.. The mediation shall be conducted by a qualified mediator (such as a County Circuit Court judge) located in the County where the project is located, unless otherwise approved by Owner. The request for mediation shall be submitted in writing. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within sixty (60) days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding thirty (30) days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions (if any); or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.
- D. Should litigation proceedings be initiated by Contractor or Owner, the prevailing party is entitled to and shall receive reimbursement for reasonable attorney, engineering and other professional fees incurred from the losing party.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.
- B. Notice shall be considered to have been given on the date that the notice is either delivered in person as provided above, or on the date that the notice is deposited in the United States mail, postage prepaid as registered or certified mail as provided above.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUPPLEMENTARY GENERAL CONDITIONS

SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

GENERAL

These Supplementary Conditions make additions, deletions or revisions to the General Conditions of the Contract Documents. All provisions which are not so added to, deleted or revised remain in full force and effect. Terms used in these Supplementary Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

SC-1.01.A. Modify Paragraph 1.01.A. to read as follows.

“A. Wherever used in the Bidding Requirements or Contract Documents (*including the technical specifications*), the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. ”

SC-1.01.A.28. Modify Paragraph 1.01.A.28 to add the wording shown below in italics.

“28. Hazardous Waste—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time, *and as further defined in ORS 466.005(7).*”

SC-1.01.A.46. Add the following definition for “shall” after Paragraph 1.01.A.45, and renumber subsequent paragraphs as applicable.

“46. Shall —The term is considered a mandatory obligation, and synonymous with the phrase “has a duty to” when referring to a capable actor, and with the word “must” when referring to a requirement regarding an inanimate object or a status.

SC-1.01.A.51. Modify Paragraph 1.01.A.51 to provide the following clarification under item (iii) within this paragraph.

“51. (iii) occupancy permits and certifications (if any) have been issued by jurisdictions having authority, *which shall include final inspection & acceptance of work by all public agencies with jurisdiction over the road or right-of-way where the work occurred;*

SC-2.01 Add the following paragraph immediately after 2.01.B:

“C. Public Works Bond: Before starting any Work on the project, Contractor shall have a public works bond filed with the Construction Contractors Board, unless exempt under 279C.836(7), 279C.836(8), or 279C.836(9). Contractor shall also include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project unless exempt under 279C.836(7), 279C.836(8), or 279C.836(9). Contractor shall include copies of both its public works bond (and the public works bonds from any subcontractors listed in the first tier subcontractor disclosure form) with the copies of the bonds required in 2.01.A above.”

SC-5.03.A. Add the following to Paragraph 5.03.A (Certificates of Insurance):

“As noted above and in GC paragraph 5.04.B.1, the Owner and Engineer shall be included as additional insured (with the exception of the worker’s compensation coverage, and subject to any customary exclusion regarding professional liability, errors & omissions coverage).

In addition to Owner and Engineer, the following parties or entities shall also be included as additional insureds under the contract, as a minimum:

1. All agencies or entities required under the terms of permits which must be obtained for work performed under the contract.

The insurance certificate and/or separate Accord schedule(s) may include language certifying that “any and all entities required by written contract are additional insureds”, **OR** all of the required “additional insured” entities may be listed individually on the insurance certificate.

Coverage shall be primary and non-contributory with any other insurance and self-insurance. Policies shall be written on an occurrence basis, and include coverage for respective officers, directors, members, partners, employees, agents, consultants and subconsultants of each additional insured (GC5.04.B.1).

Insurance certificates shall include notations or language noting the coverage limits specified herein. Insurance certificates shall include notations, language or additional schedule(s) specifically noting job site pollution coverage, and specifically noting that there are no XCU exclusions.”

SC-5.04.B.4.a. Notice of Insurance Cancellation (Liability Insurance). Replace Paragraph 5.04.B.4 with the following:

“4. Evidence of insurance coverage submitted on current “ACORD” forms (or other insurance certificate containing the same information) shall **EITHER** include a statement that “30 days cancellation notice will be provided”; **OR** the Contractor’s insurance agent shall provide a written letter (*to be submitted with the insurance certificates*) stating that copies of insurance certificates will be sent to the Owner and the Owner’s Representative a minimum of every 30 days, throughout the term of the required insurance under the contract.”

SC-5.04.C. Add the following new paragraph immediately after Paragraph 5.04.B.

“C. The limits of liability for liability insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers’ Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
 - a. State: Statutory
 - b. Applicable Federal (e.g., Longshoremen’s)..... Statutory
 - c. Employer’s Liability \$ 500,000
 - d. In accordance with ORS 279C.530, Contractor shall promptly, as due, make payment to any entity furnishing care incident to sickness or injury, to employees of Contractor, of all sums which Contractor agrees to pay for such care and all moneys which Contractor deducted from the wages of employees pursuant to any law, contract, or agreement for the purpose of providing or paying for such service.
 - e. Contractor and Subcontractors that employ workers who work under this Contract in the State of Oregon shall comply with ORS 656.017 and provide required Workers’ Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.
2. Contractor’s General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall show the following limits as a minimum, and shall also include:
 - Completed operations and product liability coverages.
 - No exclusion with respect to property under the care, custody, and control of the Contractor.
 - Job site pollution coverage based on scope under Paragraph 6.22.A of the General Conditions.
 - a. Each Occurrence (Bodily Injury and Property Damage).. \$1,000,000
 - b. Personal and Advertising Injury \$ 1,000,000
 - c. General Aggregate \$ 2,000,000
 - d. Products & Completed Operations Aggregate..... \$ 2,000,000
 - e. Property Damage liability insurance shall NOT exclude Explosion, Collapse, and Underground (XCU) coverages (no XCU exclusion).
 - f. Excess or Umbrella Liability
General Aggregate..... \$ 2,000,000

Each Occurrence.....\$ 2,000,000

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury

Each Person\$ 1,000,000

Each Accident.....\$ 1,000,000

b. Property Damage

Each Accident.....\$ 1,000,000

c. Combined Single Limit of\$ 1,000,000

SC-5.06.A. Replace Paragraph 5.06.A with the following, and delete Paragraph 5.06.B:

“A. The Owner will not require the Contractor to purchase a Builder’s Risk “all-risk” insurance policy for this project. However, this or similar insurance may be purchased by the Contractor at his option, since the Contractor remains fully responsible for the work related to the project, including repair of any and all damage (to the Work, or existing property or existing structures included in or affected by the Work), whether caused by the Contractor, subcontractor(s) or others, until final acceptance of the work by the Owner.

SC-6.01.A Add the following to the end of Paragraph A:

“The contract drawings and specifications represent the finished project and/or finished structures. Except as specifically noted, they do not dictate the means or methods of construction. The Contractor shall provide all measures necessary to protect the work and/or the structures during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction equipment, water & moisture protection & control, drying, etc. The Owner and the Owner’s Representative shall not be responsible for the Contractor’s means, methods, techniques, procedures, or sequence of construction. Any information provided on the drawings or in the specifications regarding sequence of operations shall be interpreted as being for the purpose of illustrating some of the issues which must be considered and addressed by the Contractor in order to achieve the specified finish project and/or structures within the specified contract timeframes, and does not modify the Contractor’s responsibility in this regard.”

SC-6.01 Add the following new Paragraph D:

“D. Contractor shall designate a qualified and experienced “competent person” at the site whose duties and responsibilities shall include, without limitation, enforcement of State of Oregon and federal OSHA regulations regarding excavations, the prevention of accidents, and the maintenance and supervision of construction site safety precautions and programs.”

SC-6.03.B Replace the first sentence with the following:

“All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents.”

SC-6.14.B Add the following new Paragraph B:

“B. Where required by OSHA, Contractor shall designate a qualified and experienced “competent person” at the site whose duties and responsibilities shall include, without limitation, enforcement of State of Oregon and federal OSHA regulations regarding excavations, the prevention of accidents, and the maintenance and supervision of construction site safety precautions and programs.”

SC-6.19.D Replace Paragraph 6.19.D with the following:

“D. Additional Warranty Provisions.

1. Contractor further warrants and guarantees to the Owner and Engineer that all Work is

guaranteed for a specified period from the date of final acceptance by the Owner. If no warranty period is specified elsewhere in these Contract Documents, the Work shall be guaranteed for 2 years from the date of final acceptance by the Owner. If, within the warranty period, repairs or changes are required in connection with the Work, the Contractor shall promptly, without expense to the Owner:

- a. Place in satisfactory condition all guaranteed Work;
 - b. Correct all damage to the building, site, equipment or contents which is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract; and,
 - c. Correct any work, material, equipment, or contents of building, structure or site disturbed in fulfilling the guarantee.
2. Repairs, replacements or changes made under the warranty requirements shall be warranted for the specified warranty period, or for 2 years, beginning on the date of the acceptance of the repairs, replacements or changes.
 3. If the Contractor fails within 10 days to proceed to comply with the terms of this warranty, the Owner may have the defects corrected. The Contractor and the Contractor's surety shall be liable for all expense incurred. In case of an emergency where delay would cause serious loss or damage, repairs may be made without notice to the Contractor and the Contractor or the Contractor's surety shall pay the cost."

SC-8.11.A Delete this paragraph A in its entirety.

SC-10.01.A Add the following to the end of Paragraph 10.01.A:

"A change in the Contract Price or the Contract Time shall be accomplished only by a written amendment, a written Change Order, or a written Work change directive. Accordingly, no course of conduct or dealings between the parties, no expressed or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alterations or additions to the Work shall be the basis of any claim for an increase in any amount due under the Contract Documents or a change in any time period provided for in the Contract Documents."

SC-10.01.B Add the following to the end of Paragraph 10.01.B:

"Agreements on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Price and the Contract Time. In the event a Change Order increases the Contract Price, the Contractor shall include the Work covered by such Change Order in applications for payments as if such Work were originally part of the Contract Documents."

SC-10.01.B Add the following wording after the end of Paragraph 10.01.B:

- "1. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or under applicable local, state or federal Laws and Regulations. If the Contractor concludes that this is the case, the Contractor presents the Owner and Engineer with written findings (*within the timeframe required above*) which summarizes the reasons as to why it is not possible for the requested work to be performed safely, or would violate applicable local, state or federal Laws and Regulations.
2. Unless such findings are presented and accepted by the Owner and Engineer, failure by the Contractor to provide the Engineer with a written proposal (*cost & time*) within the timeframe specified above, will result in the Contractor being subject to Liquidated Damages in the amount of \$300 per day or the amount specified under the Contract (*whichever is greater*),

which liquidated damages shall continue to accrue until such written proposal is submitted.”

SC-14.07.A.2.f Add the following new paragraph immediately after Paragraph 14.07.A.2.e:

- “f. In accordance with ORS 279A.120, when an out-of-state Contractor is awarded a Contract, Contractor is required to report to the Department of Revenue the Contract Price, terms of payment, length of Contract, and other information as Department of Revenue may require. Contractor shall provide Owner with verification that Contractor has satisfied this requirement prior to requesting final payment.”

SC-14.02.D.2.c Modify Paragraph 14.02.D.2.c to add the language indicated below in italics

- “c. Reimbursement rates for Engineer or related entities to be calculated as follows. *Owner compensation to Engineer will be calculated at an average rate of \$136 per each extra personnel hour for labor plus expenses and/or consultant costs.*

END OF SUPPLEMENTARY CONDITIONS

SAMPLE INSURANCE CERTIFICATE

PREVAILING WAGE RATES FOR PUBLIC WORKS CONTRACTS IN OREGON

Contractor is responsible for submitting any required notifications and copies of certified payrolls to BOLI, and also directly to the Owner.

Per OAR 839-025-0020(5)b&c, Oregon BOLI wage rates are included by reference.

For complete copies of the referenced wage rate publication(s), see
http://www.oregon.gov/boli/WHDPWR/Pages/pwr_state.aspx

As allowed under OAR 839-025-0020(5)c, the webpage(s) accessed with the URL above include the title (*and full text*) of each applicable wage rates publication or determination and the date of each publication or determination as well as the date of any applicable amendments.

PART 4:

SPECIFICATIONS

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1: GENERAL

1.1 MEASUREMENT AND PAYMENT AND DESCRIPTION OF BID ITEMS

a. Partial payment of bid items shall be in conformance with the General Conditions. Partial payment for work completed, and materials on site, which will become an integral part of the finished work, shall be determined by the Owner and shall be made on the basis of duly certified and approved estimates of the work, which, in the opinion of the Owner, has been satisfactorily completed. It is understood that the determination by the Owner as to whether or not a certificate or estimate for payment should be issued, or the amount of said payment, shall be based entirely upon the opinion of the Owner. Said determination shall include without limitation the following factors:

b. All phases of the work being accomplished in a proper manner and being pursued in a proper sequence of operation, particularly with regard to testing, clean-up and surface restoration.

1) The observance by the Contractor of the requirement that all work and operations be preceded by necessary submittals and approvals.

2) On the monthly estimates, partial payments for work performed but not completed, may be made in accordance with the following schedule, except as otherwise noted in the specifications:

Cost of material delivered to the site.	95% of the invoice cost of the material.
Materials installed backfilled and compacted, prior to testing.	80% of unit price for material in place.
Clean-up and surface restoration completed.	95% of unit price.
Testing and Startup Completed	100% of unit price upon satisfactory completion.

3) Retainage will be deducted from the above amounts as specified in the Contract Agreement.

4) The contract price shall constitute full compensation for furnishing all plant, labor, equipment and materials, and performing all operations required to complete the work, as specified, and as shown on the drawings, or as otherwise directed.

c. See Section 01026 for the schedule of values submittal required to facilitate partial payments.

1.2 BID ITEMS

a. Bid Item 1 – South Tank Seismic Valve Improvements – Lump Sum

The lump sum price shall constitute full compensation for construction of the South Tank Seismic Valve Improvements including: mobilization, bonds, permits, insurance, construction staking, clearing and grubbing, erosion control, traffic control, earthwork, site surface restoration, site furnishings, testing, electrical, controls, mechanical, structural, and piping work for installation of the new seismic valve control system and diaphragm valve pilot control modifications, and all associated improvements shown and specified in the Contract Documents including all incidentals not listed elsewhere.

b. Bid Item 2 – Water Treatment Plant Backwash Water Recycle Improvements – Lump Sum

The lump sum price shall constitute full compensation for construction of the Water Treatment Plant Backwash Water Recycle Improvements including: mobilization, bonds, permits, insurance, construction staking, clearing and grubbing, stripping, erosion control, traffic control, earthwork, geotextiles, fencing, handrails, site surface restoration, site furnishings, testing, electrical, controls, mechanical, structural, and piping work for installation of the recycle pump station and all associated improvements shown and specified in the Contract Documents including all incidentals not listed elsewhere.

SECTION 01026
SCHEDULE OF VALUES

(To be submitted after bid opening and contract award)

PART 1: GENERAL

1.1 SCOPE

- a. Work under this section includes preparation and submittal of schedule of values documentation as specified below.

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents.

1.3 DESCRIPTION

- a. Submit to the Owner's Representative a schedule of values allocated to the various portions of the work within 10 days after the effective date of the Agreement.
- b. Upon request from the Owner's Representative, support the values with data which will substantiate their correctness.
- c. The schedule of values, unless objected to by the Owner's Representative, shall be used only as the basis for the Contractor's Application for Payment for lump sum bid items or change order pricing as applicable.

1.4 FORM AND CONTENT OF SCHEDULE OF VALUES

a. Form and identification:

- 1) Type schedule on 8-1/2" x 11" white paper.
- 2) Contractor's standard forms and automated printout may be used.
- 3) Identify schedule with:
 - a) Title of project and location
 - b) Owner's Representative
 - c) Project number
 - d) Name and address of Contractor
 - e) Contract designation
 - f) Date of submission

b. Detail:

- 1) Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.

- c. Format:
- 1) The schedule of values shall conform with the following.
 - a) Follow the table of contents of this project manual as the format for listing component items.
 - b) Identify each line item with the number and title of the respective major section of the Specifications.
 - c) Sub-values: For each major line item, list sub-values of major products or operations under the item.
 - d) Subject to the requirements above, Contractor's standard forms and automated printout may be used.
 - d. For the various portions of the work, each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - e. The sum of all values listed in the schedule shall equal the total contract sum.
 - f. Materials on Hand. For items on which progress payments will be requested for stored materials, break down the value into:
 - 1) The cost of the materials, paid for, delivered and unloaded, with taxes paid.
 - 2) The total installed value.
 - g. The schedule of values is subject to review and approval by the Engineer and Owner's Representative.

PART 2: PRODUCTS

None.

PART 3: EXECUTION

None.

PART 4: SPECIAL PROVISIONS

None.

SECTION 01040
MOBILIZATION, BONDS, PERMITS AND INSURANCE

PART 1: GENERAL

1.1 SCOPE

- a. This section includes but is not limited to work necessary to move in personnel and equipment, set up all offices and facilities and prepare for construction and provide necessary permits, licenses, construction bonds and required insurance, and to locate, reference, protect and/or replace existing property, survey monuments and markers, and demobilization once the project is complete.

PART 2: PRODUCTS

None.

PART 3: EXECUTION

3.1 GENERAL

- a. Set up construction facilities in a neat and orderly manner within designated or approved work area. Supply all labor and equipment necessary to accomplish the work as specified. Conform to applicable requirements of these Contract Documents, including but not limited to:
 - 1) Required notifications
 - 2) Protection of construction survey stakes, hubs and other markers
 - 3) Protection of survey monuments of record, including but not limited to property and street monuments
 - 4) Temporary traffic control
 - 5) Temporary utility connections
 - 6) Protection of property
 - 7) Dust control
- b. Move personnel, equipment, supplies and incidentals to the project site. Establish offices, buildings and other facilities necessary for work required.
- c. Contractor to conform to all permit requirements, including providing forty-eight (48) hours notice to approving agencies, and all utilities prior to the start of construction.
- d. The Contractor shall serve all necessary notices incidental to the due and lawful prosecution of the work.
- e. When the agencies with an interest in the project require the posting of signs for public notification, the Contractor shall construct and post such signs in conformance with the requirements of the respective agencies. The Contractor shall be responsible for supplying the materials necessary to post the signs and notifications, including posts, plywood backing and sign painting and/or placards. Unless otherwise required by respective agencies, project sign must be mounted within 15 days of Notice to Proceed.

3.2 PERMITS, BONDS & INSURANCE

- a. The Contractor shall procure all building, electrical, mechanical, and plumbing permits (as appropriate) required by all approving agencies. Costs of the permits will be paid directly by the Owner. The Contractor shall coordinate with the governing jurisdiction as required to determine appropriate fees and provide the Owner with notice of fee amounts. The Owner will pay the required fees within 3 business days after written notification. The Contractor shall coordinate all inspections required for such permits. The Contractor shall coordinate for any and all special inspections required for such permits, with the cost for said special inspections to be paid by the Contractor.
- b. Owner to pay all project permit costs. The contractor shall coordinate with the governing jurisdiction to determine appropriate fees and provide the Owner with 48 hours notice prior to the required payment of fees or costs. Cost for re-testing shall be borne by the Contractor.

PART 4: SPECIAL PROVISIONS

None.

SECTION 01042
CONSTRUCTION SEQUENCING

PART 1: GENERAL

1.1 SCOPE

- a. This section includes construction sequencing and provision of temporary facilities necessary to maintain all existing facilities during the performance of this work unless otherwise specified.

1.2 REQUIREMENTS

- a. The Contractor shall construct the project so as to minimize disruption to existing facilities. One week advance notice shall be given to the Owner's Representative, police, fire, transit, school district, ODOT, and Lincoln County prior to beginning work on any facility which requires disruption of normal operation.
- b. Contractor to provide for the flow of sewers, drains, or watercourses during the course of the work. All existing facilities to be restored to the satisfaction of the Owner's Representative.
- c. Make excavations and borings ahead of work, as necessary, to determine the exact location of interfering utilities or underground structures.
- d. Contractor to coordinate with other trades for completion of the work in a timely manner.
- e. When any unit is removed from service, all associated modifications shall be performed. The work shall be performed in such a manner as to avoid removing a unit from service more than once.
- f. Water Treatment Plant. All facilities must be kept in effective operation at all times including the backwash pond. With sufficient advanced notice, the water level in the pond can be lowered for short periods of time. This will only be allowed twice during the project. Contractor shall refer to the notes on the plans for additional constraints.
- g. Water Storage Tank. No interruption in service greater than 4 hours in length is permitted. If water for fire fighting is needed while work is occurring all work shall be halted and the existing control valve shall immediately be restored to normal operation until the firefighting demand stops.

1.3 TEMPORARY CONSTRUCTION

- a. The Contractor shall furnish and install all necessary temporary construction required to maintain the operation of the facility, including bulkheads, plugs, stop planks, stop plates, blind flanges, pipelines, pipe connections, flumes, cofferdams, pumping equipment, valves, etc.
- b. All costs including labor, equipment and materials that are required shall be paid by the Contractor.

- c. All temporary facilities shall be of the Contractor's design, subject to approval by the Owner's Representative and operations personnel.
- d. All phases of work requiring interference of normal operation of the existing facility shall be scheduled in accordance with agreements made on the job between the Contractor, Owner and Owner's Representative. The Contractor shall notify the Owner at least one week before such work is to begin.

PART 2: PRODUCTS

None

PART 3: EXECUTION

None

PART 4: SPECIAL PROVISIONS

None.

SECTION 01043
COORDINATION AND CONTROL OF THE WORK

PART 1: GENERAL

1.1 SCOPE

- a. This section includes coordination and control of the work.

PART 2: PRODUCTS

None.

PART 3: EXECUTION

3.1 GENERAL

- a. Unless otherwise specified or noted on the drawings, all grading, rocking, paving, utility and related work shall conform to Oregon Standard Specifications for Construction - OSSC (ODOT/APWA), 2018 edition, or local jurisdiction standards, whichever is more stringent.
- b. Specification Language. Portions of the Specifications may be written in imperative and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” or “shall conform with” shall be included by inference where a colon (:) is used within sentences or phrases. Example – Aggregate: ASTM C33.
- c. The Contract Documents are complementary and what is called out by any portion of the Contract Documents (drawings, specifications, or contract forms) shall be as binding as if called for by all.

3.2 NOTICE TO PROPERTY OWNERS, CONTRACTOR RESPONSIBILITY

- a. When work performed by Contractor will impact or interrupt water/sewer/storm drainage utility service or interrupt vehicular or pedestrian access to any public or private property, Contractor shall notify all the affected parties one week prior to and again 24-48 hours prior to the anticipated impact or interruption in service (Contractor is responsible to coordinate with the City staff a minimum of 1 week prior in order to verify area of impact or interruption).
- b. Contractor shall provide written notice (door hangers or equivalent) a minimum of 24 hours (and a maximum of 48 hours) before beginning operations of which will interfere with or interrupt water/sewer/storm drainage utility service (or interrupt vehicular or pedestrian access) to all residences, structures or businesses impacted by the work.
- c. The written notice shall specify the day, date, approximate time (ie. morning or afternoon) when the work will commence, and anticipated duration of the work, and shall include the name and cell number for the designated contact person with the Contractor.
- d. In addition to the written notice, a representative of the Contractor shall knock on the front

door of all affected residences or businesses on the morning that the work will commence, and attempt to notify the residents or businesses that this work will commence that day. The Contractor shall document in writing the date and approximate time that this attempt was made for the residences or businesses for each segment of the work.

- e. Written notice shall also be provided to the City Public Works based on the same schedule, and shall include a photocopy of door hangers used.
- f. If work is interrupted or stopped for 7 calendar days or more, new notice shall be provided to all affected parties again prior to resuming work.
- g. If failure by the Contractor to provide timely notice as specified above results in delays to the ability to make the connections or perform the work for which such notice is required, such delays shall not entitle the Contractor to additional compensation or to an increase in contract time.

3.3 COORDINATION OF STARTUP AND TEST OPERATION OF COMPLETE SYSTEM

- a. The Contractor shall be responsible for the coordination with all trades, subcontractors and/or suppliers as necessary for the testing and test operation of all equipment, electrical and control systems to demonstrate that the total system operates as specified and shown, and that all system components operate correctly and communicate with all other system components as necessary for a complete and operable system.
 - 1) The Contractor shall schedule a witness test by the Owner's representatives and staff, at a time acceptable to the Owner, with a minimum of 72 hours (*three business days minimum*) notice provided to allow all parties to be scheduled. Unless otherwise approved by the Owner's representative, this shall not occur on weekends, or on a Monday, Friday or the day before a holiday.
 - 2) Such test operation shall be performed with the Owner's Representative and the Owner's operators present, and after the startup and testing and certification (*by each respective manufacturer's representative*) of all equipment, control systems, telemetry and communications systems, and after all control system programming is completed and installed, whether such programming is by the Contractor or by the Owner.
 - 3) The Contractor's personnel shall operate or arrange for the operation of all systems and equipment under normal and alarm conditions and simulate all operating modes of all of the equipment, including all alarm conditions, and verify proper alarm notification via autodialer or telemetry as applicable.
 - 4) Any and all trips by the respective trades, subcontractors and/or suppliers as required to accomplish this shall be incidental work for which no additional payment will be made.

3.4 WARRANTY INSPECTIONS.

- a. In addition to the initial training specified for new equipment & systems, the Contractor shall provide one (1) field inspection (*and coordinate inspection by representatives of major equipment manufacturers*) near the end of the first year of service to inspect the

equipment, make any necessary adjustments and coordinate for followup instruction of operating personnel to assure proper performance of the system.

- b. Where a 2 year warranty is provided, the Contractor shall provide another field inspection near the end of the second year of service to inspect the equipment, make or coordinate any necessary adjustments and instruct operating personnel to assure proper performance of the system.
- c. These services shall be scheduled with the Owner, and shall be furnished without cost to the Owner.

3.5 EXISTING SURVEY MONUMENTS DISTURBED DURING CONSTRUCTION

- a. The Contractor shall be responsible for locating and marking all existing survey monuments of record (including but not limited to property and street monuments) prior to construction.
- b. If any survey monuments are removed, disturbed or destroyed during construction of the project, the Contractor shall retain and pay for the services of a Registered Professional Surveyor licensed in the State of Oregon to reference and replace all such monuments in accordance with ORS 209.150.
- c. Each monument shall be replaced within a maximum of 90 days of its being removed, disturbed or destroyed. The surveyor shall notify the County Surveyor in writing of all such monuments replaced, and provide all documentation required by the County Surveyor. All monument replacement work shall be completed prior to final payment by the Owner.

3.6 FIELD RECORD DRAWINGS AND AS-BUILTS

- a. The Contractor shall maintain a neatly marked set of full size record drawings showing the locations and depths of all new and existing waterlines, storm and sanitary sewer laterals, buried conduits and other utilities encountered or installed during construction. Drawings shall be kept current with the work as it progresses and shall be subject to inspection by the Owner's Representative at any time. Failure to keep field record drawings current may result in the issuance of a stop work order or delay in the processing of pay requests until the record drawings are made current.
- b. Prior to final payment, the Contractor shall submit a clean set of full size record drawings to the Owner's Representative. All information shown on the Contractor's field record drawings shall be subject to verification by the Owner's Representative.
- c. The record drawings shall accurately show all as-built conditions, locations and alignments, and shall include all information required by individual sections herein, as well as the following. If significant errors or deviations are noted by the Owner's Representative, an as-built survey prepared and stamped by a registered professional Land Surveyor shall be completed at the Contractor's expense.
 - 1) Sanitary Sewer Mainline - Service tap stationing, manhole and cleanout stationing, and invert.

- 2) Sanitary Sewer Services - Length from mainline and depth at property line with side ties to property pin.
 - 3) Water Mainline - Station and depth of all fittings, valves and service taps.
 - 4) Water Services - Length from mainline and side tie to property pin.
 - 5) Storm Sewer - Manhole and catch basin stationing and invert elevations.
 - 6) Existing Utilities - Station locations and depth at location where new utilities cross-existing utilities.
 - 7) Buildings & Mechanical/Piping Systems - As-built configuration, alignments and details, including any changes to the information shown on the drawings.
 - 8) Electrical & Controls – Complete as-built information showing actual conduit alignments (buried & above grade), the final locations of panels, field mounted instruments and panels, terminal boxes, junction boxes, receptacles, light switches and other materials shall be shown, as well as conduit routing between them to the extent it differs from the design drawings, as well as as-built electrical & control schematics, in addition to any other information required by Division 16.
- d. As-built information shall be based on the benchmark used for the design survey unless that benchmark was destroyed during construction. If the design survey benchmark was destroyed during construction, an alternate approved benchmark shall be used as the basis for as-built information. The benchmark used as the basis of the as-built information shall be clearly noted on the drawings.

3.7 CONFORMITY WITH DRAWINGS AND ALLOWABLE DEVIATIONS

- a. Finished surfaces in all cases shall conform to lines, grades, cross sections and dimensions shown on the approved drawings. Deviations from the approved drawings and working drawings will in all cases be determined by the Owner's Representative and authorized in writing.

3.8 CONTRACTOR RESPONSIBILITY TO OBTAIN ALL REQUIRED INSPECTIONS

- a. The Contractor shall be responsible to ensure that all inspections required by the drawings, contract documents or agencies having jurisdiction are completed by authorized inspectors prior to proceeding with subsequent work which covers or which is dependent on the work to be inspected.
- b. Work completed or covered without obtaining required inspections will be considered as unauthorized work as outlined below, and may be ordered removed at the Contractor's expense. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.

3.9 CONTRACTOR RESPONSIBLE TO PROVIDE ACCESS FOR INSPECTIONS

- a. Contractor shall be responsible to provide the Owner, Engineer and their subconsultants and

representatives with safe and proper access to all portions of the work as necessary for inspection and/or testing purposes (*see also applicable General Condition provisions*).

- b. The Contractor shall be responsible for coordinating and scheduling to provide such inspection access at reasonable times, so as not to interfere with or delay the progress of the work by the Contractor or subcontractors.

3.10 COOPERATION OF CONTRACTOR

- a. The Contractor shall conduct his operations so as to interfere as little as possible with those of the Owner, other Contractors, utilities, or any public authority on or near the work. The Owner reserves the right to perform other work (by contract or otherwise) on or near the project during progress of the work. The Owner reserves the right to permit other public bodies, public utility companies and others to do work on or near the project during progress of the work. If a conflict arises, the Owner shall determine when and how the work shall proceed.
- b. Claims for delay or inconvenience due to operations by such other parties for work which is specified or referenced in the Contract Documents, or which is shown, noted or referenced on the drawings, will not be allowed.

3.11 ORAL AGREEMENTS

- a. No oral agreement or conversation with any officer, agent or employee of the Owner, either before or after execution of the Agreement, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Agreement. Any such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Owner.

3.12 MANDATORY PROJECT SUPERINTENDENT

- a. Failure to provide or maintain a primary project superintendent as required by the provisions below and elsewhere in these contract documents shall be considered sufficient cause for termination of the Contract, or such other action the Owner's Representative may deem to be appropriate (*including but not limited to issuance of a stop work order until the Contractor addresses the situation in a manner acceptable to the Owner's Representative, notification of bonding company, etc.*). A stop work order issued due to failure to provide and maintain an acceptable project superintendent shall not be grounds for a claim for additional contract time or additional contract price.
- b. The Contractor shall designate one person as primary project superintendent to oversee and coordinate construction. This project superintendent's work time shall be devoted exclusively to this project to ensure that work coordination, quality and time lines are met. If the Contractor is a joint venture, Contractor shall designate one person from the joint venture organization, with the required qualifications, to act as project superintendent.

The project superintendent shall be capable of reading and thoroughly understanding the plans and specifications, and shall be thoroughly experienced in the type of work being performed. The Owner's Representative may, at his/her sole discretion, request a summary of such prior experience be submitted prior to start of the work, or at any time during the project.

The project superintendent shall be acceptable to the Owner's Representative, including having a satisfactory record of experience and performance, and a satisfactory record of integrity.

c. The Project Superintendent shall:

- 1) Be appointed in writing.
- 2) Keep one complete set of Contract Documents available on the project at all times at a location available for reference by personnel performing the work, and maintain complete copies of all change orders, submittals, project correspondence and other project information at an accessible location for reference by supervisory personnel directing or performing the work.
- 3) Ensure that the finished work complies completely and accurately with the Contract Documents.
- 4) Have full authority and responsibility to promptly supply the materials, equipment, tools, labor and incidentals required for the work.
- 5) Have full authority and responsibility to execute orders or directions of the Owner's Representative without delay.
- 6) Be available at all times to the Owner and Owner's Representative for contact by telephone or radio.
- 7) Carefully protect and preserve the Surveyor's and/or Engineer's marks and stakes.
- 8) Furnish the Owner's Representative every reasonable facility necessary for obtaining information regarding the nature, quantity and quality of any part of the work.
- 9) Allow the Owner's Representative reasonable access to the Contractor's books and records at all times. The Owner's Representative will honor a request for confidentiality to protect trade secrets.
- 10) Ensure that all Contractor and subcontractor personnel understand and conform with the conduct requirements of the Contract Documents relating to interactions with private citizens and property owners or their representatives.
- 11) Be on the project at all times work is underway, except as permitted.

d. For short periods of time during the performance of minor or incidental portions of the work, the Contractor may designate another person to act for the superintendent on a temporary basis, subject to approval of the acting superintendent by the Owner's Representative.

- 1) This designation of acting superintendent must be in writing, and shall be arranged a minimum of one (1) week in advance with (and be approved by) the Owner, and shall state the person's name, position and scope of authority (*ie. it must state that the designated person is authorized as acting superintendent for*

the Contractor, with full authority to act in that capacity).

- 2) The specific duration of the appointment shall also be stated in writing (*ie. blanket designations of an acting superintendent is not acceptable, since each significant absence of the primary superintendent must be arranged with the Owner's Representative prior to such absence, except in cases of emergency*).
- 3) The acting superintendent shall be available to the Owner's Representative at all times for contact by telephone or radio.

3.13 EMERGENCY MAINTENANCE PERSONNEL

- a. The Contractor shall submit to the Owner/Owner's Representative the names, addresses and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated, in writing by the Contractor, to act as his representatives and shall have full authority to act on his behalf.
- b. At least one of the designated employees shall be available for a telephone call any time an emergency arises.

3.14 CONDUCT

- a. The Contractor and his personnel shall at all times be civil and courteous around private citizens and property owners. If ever directed to leave private property by the property owner or his representative, the Contractor and his personnel shall do so immediately. If any property owner or his representative makes demands, the Contractor is to remain courteous and report the matter to the Owner's Representative. Foul language, obscene gestures, or rudeness directed to private citizens will not be tolerated.
- b. Use of radios and personal stereos with headphones (including walkmans, iPods, MP3 players, etc.) will not be permitted.
- c. If, in the Owner's Representative's opinion, the Contractor or any of his men fail to conduct themselves as stipulated above or follow the direction of the Owner's Representative, the Owner's Representative shall bar the offending individual from the project. His order shall be final.

3.15 DEFECTIVE OR DAMAGED EQUIPMENT OR MATERIALS

- a. All equipment and materials shall be carefully inspected by the Contractor upon arrival at the jobsite for defects or damage (including freight or shipment damage). Unless delivery of defective or damaged equipment or material is rejected by the Contractor and is not unloaded, the Contractor shall immediately notify the Owner's Representative about any damaged or defective material or equipment delivered to the jobsite.
- b. No material or equipment shall be installed which is known to be defective or damaged, without the prior written approval from the Owner's Representative. Any defective or damaged material or equipment discovered after installation shall be removed and replaced with new material or equipment at the Contractor's expense (in a manner satisfactory to the Owner's Representative), unless otherwise specifically approved in writing by the Owner's

Representative. Such written approval (pre-installation or post-installation), if granted, shall be based on a written application from the Contractor, as well as documentation from the material/equipment manufacturer and the bonding company, as summarized below.

- c. The request for acceptance of any defective or damaged material or equipment shall be submitted in writing by the Contractor to the Owner's Representative. Such request shall include the following as a minimum (Contractor shall be responsible for obtaining these items prior to submitting the official request for the Owner's review). Additional requirements may be imposed by the Owner as applicable (at its sole discretion).
 - 1) Written certification from the material or equipment manufacturer that the damage can be repaired to restore the material or equipment to its full, original capacity and function, and that after such repair it will fully comply with all specification requirements and all manufacturer's recommendations, with no restriction or limitation on any required warranty. The manufacturer's certification shall include a detailed summary of all proposed repair procedures (as well as the qualifications or certifications required of the party who will complete the repair), as well as a summary of post-repair inspections and tests to be completed by the manufacturer's representative.
 - 2) Written consent from the Contractor's surety acknowledging that the surety concurs with the request, and that the provisions of all bonds will remain in full effect and force, without limitation or restriction.
- d. Notwithstanding the Owner's right (at its sole discretion) to accept defective or damaged equipment or materials (subject to completion of acceptable repairs/inspection/testing), this shall impose no obligation on the Owner to grant such acceptance.
- e. If the Owner or the Owner's Representative decide to reject any defective or damaged material or equipment (before or after submittal of a request by the Contractor), the Contractor shall be responsible to immediately and permanently mark or label the material or equipment as defective, and remove it from the job site within five (5) business days of verbal or written notice by the Owner's Representative of such rejection.

3.16 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

- a. All work that does not conform to the requirements of these Contract Documents shall be considered as unacceptable.
- b. Contractor shall immediately remove unacceptable and defective work found to exist prior to acceptance of, or final payment for, the work. Replace with work and materials, which conform to the Contract Documents, or remedy otherwise in an approved manner. This provision shall have full effect regardless of the fact that the unacceptable work may have been done or the defective materials used with the full knowledge of the Inspector.
- c. Work done beyond the lines shown on the drawings or ordered, work done without required inspection, or any extra work done without authority will be considered as unauthorized and will not be paid for under the provisions of these Contract Documents. Work so done may be ordered removed at the Contractor's expense. Work done without lines and grades being given may also be considered as unauthorized and will be subject to rejection.

3.17 UTILITY CONFLICTS

- a. The Contractor shall not deviate from the design line and grade stated in these Contract Documents without the approval of the Owner's Representative.
- b. The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work within the recommended limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents. The Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed as necessary prior to excavating or boring to allow the Contractor to prevent grade or alignment conflicts. Contractor shall employ hand tools or other non-invasive methods to determine the exact location and depth of the underground utilities at the designated locations, including both utilities marked in the field and those shown on the drawings.
- c. The Contractor shall be responsible for informing the Owner's Representative of the need for a grade and/or alignment adjustment. Contractor shall be responsible for exposing potential utility conflicts far enough ahead of construction to make necessary grade or alignment modifications without delaying the work. If grade or alignment modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the regulating authority prior to construction. Where failure to expose potential utility conflicts in advance results in the necessity of removing and/or relocating newly laid pipe; this additional work shall be performed by the Contractor at no additional expense to the Owner.

3.18 PROTECTION OF EXISTING FACILITIES

- a. The Contractor shall protect from damage due to his operations, all existing facilities including but not limited to survey monuments, fence lines, trees, underground utilities, drainage facilities, landscaping, roadway surfaces etc., which are not specifically designated for removal or alteration. The locations of these facilities as shown on the plans were derived from the best information available. However, the completeness and accuracy of these locations as shown is not guaranteed. It shall be the responsibility of the Contractor to verify the existence, size and locations of underground facilities in advance of construction. Any existing facilities not designated for removal or alteration, which are damaged by the Contractor's operations shall be restored or replaced to an "in kind" or better condition at the expense of the Contractor. The Contractor shall notify all public and private utility companies serving in the area in advance of construction, so underground utility locations can be confirmed and existing facilities relocated if necessary to facilitate construction. Contractor shall make excavations and borings ahead of work, as necessary, to determine the exact location, size and depth of existing underground utilities.
- b. At least a week in advance of beginning work, the Contractor shall notify the registered underground protection service, all public bodies and other owners of such facilities of the proposed location of his operations, advising them that their property may be affected and that such measures as they may deem necessary should be promptly taken to protect, adjust, remove and/or build them. Contractor shall comply with rules set forth in OAR 952-001-0010 through OAR 952-001-0090.
- c. Three conditions which may be encountered will be dealt with as follows:

- 1) Structures, which are adjacent to but not included within the limits of an excavation required for performance of the work, shall be acceptably protected, supported and maintained in service by the Contractor at his expense.
- 2) Structures within the limits of the work which can be satisfactorily supported and maintained in service and which do not require removal and rebuilding in the judgment of the Owner's Representative, shall be thus supported by the Contractor at his expense, including cost of repair of damage incidental to his operations.
 - a) Supports for water and gas mains, sewers, conduits and similar structures shall be constructed of timber or other acceptable materials, shall be supported on undisturbed foundations and shall be sufficiently substantial to ensure against settlement when pipe trenches or other excavations are backfilled. In all cases where permits or inspections fees are required by utilities in connection with changes to or temporary support of their conduits, the Contractor shall secure such permits and pay all inspection fees.
 - b) The Contractor shall assume full responsibility for maintaining all public utility structures in service and shall support and protect, or remove and rebuild them at his own expense. Such services shall not be interrupted without permission of the owner of the Public utility structure.
- 3) In cases where the Contractor's failure to pothole and verify the location, depth and size of existing utilities in advance of the work results in direct interference with the installation of the work, the contractor shall either remove and/or relocate newly laid pipe as required to resolve the conflict, or relocate the existing pipeline or other utility structure at no additional cost to the Owner. Any such relocations shall be approved by the Engineer and the regulating authority. The Contractor will not be paid for time lost or delay due to such direct interference. Where it is the policy of any utility owner to perform such work with his own forces, the Contractor shall cooperate to the fullest extent with such utility owners. All work shall be done in a manner to protect the public and the work.

3.19 PROTECTION OF PROPERTY

- a. Protect all public and private property, insofar as it may be endangered by operations and take every reasonable precaution to avoid damage to such property.
- b. Restore and bear the cost of any public or private improvement, facility, or structure within the right-of-way or easement which is damaged or injured directly or indirectly by or on account of any act, omission, or neglect in the execution of the work and which is not designated for removal but visibly evident or correctly shown on the plans. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property, all at no expense to the Owner.
- c. Give reasonable notice to owner's and occupants of buildings or property within or adjacent to the work to permit the occupants to remove vehicles, trailers, and other possessions as

well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the right-of-way which are designated for removal or which might be destroyed or damaged by work operations.

- d. Protect all designated trees and planted areas within the right-of-way or easements. Exercise care and conduct operations so as to minimize damages to other planted areas.
- e. Review with Owner's Representative the location, limits and methods to be used prior to clearing work. Clearing and grubbing shall be performed in strict compliance with all local, State and Federal laws.
- f. The Contractor shall be responsible for the protection of public and private property adjacent to the work and shall exercise due caution to avoid damage to such property. Where such damage occurs, restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property, all at no expense to the Owner.
- g. The Contractor shall repair and replace all existing improvements within the right-of-way, easement, and permit of entry areas which are not designated for removal (examples are curbs, sidewalks, storm drains, water mains, sanitary sewers, driveways, fences, walls signs, utility installations, pavements, structures, sprinkler lines) which are damaged or removed as a result of the contractor's operations. Repairs and replacements shall be equal to or better than existing improvements and shall match them in finish and dimension.
- h. Trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in, as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded after replacement of topsoil and covered with suitable mulch except as noted otherwise.
- i. The costs to the Contractor for protecting, repairing, removing, replacing, or restoring existing improvements not required as a part of this work shall be incidental to other bid items.
- j. Until acceptance of the project, at all times protect from damage and preserve all materials, supplies, equipment of any description, and all work already performed, from the nature of the work, the action of the elements, and damage by any person or persons, or from any other cause whatsoever.

3.20 RESTORATION & REPAIR TIME FRAME

- a. Repair and restoration of any public or private improvement, facility, or structures as specified under the contract documents or by standards of jurisdictions with authority, shall be completed by the contractor in a timely manner, subject to any specific timeframes in the individual specification sections, drawings notes, general conditions or directives by jurisdictions with authority.
- b. Where damage caused by the contractor results in a danger to public health or safety of persons or the work or property at the site or adjacent thereto, the Contractor is obligated to act immediately to prevent threatened damage, injury, or loss, and complete any

repairs as soon as possible, at no additional cost to the Owner.

3.21 RESTORATION AND CLEANUP

- a. Periodically, or as directed by the Owner's Representative, as the work progresses, and immediately after completion of the work, clean up and remove all refuse, debris, equipment, and unused materials of any kind resulting from the work. Upon failure to do so within 72 hours after directed, the work may be done by the Owner or third party and the cost thereof be deducted from any payment due the Contractor.
- b. As a condition precedent to final acceptance of the project, remove all equipment and temporary structures, and all rubbish, waste, lathe, flagging, etc., and generally clean up the right-of-way and premises to conform substantially to conditions as they existed before the commencement of work, as approved.
- c. All disturbed areas shall be graded to form a smooth, free draining surface. Contractor shall seed and mulch all exposed slopes not scheduled to be landscaped.

3.22 HOURS OF WORK

- a. Construction working hours shall be from 7:00 A.M. to 6:00 P.M. local time, Monday through Friday, excluding Federal, State and local holidays, unless otherwise approved by the Owner.

3.23 DISPOSAL OF DEBRIS

- a. All debris resulting from construction operations, i.e., packaging, waste materials, damaged equipment, etc., shall be trucked from the site by the Contractor and disposed of at an approved off site location.
- b. The Contractor shall police the hauling of debris to ensure that all spillage from haul trucks is promptly and completely removed.
- c. All debris shall be disposed of in accordance with Federal, State and City rules and regulations.
- d. Excavated materials not suitable or not required for backfill or embankment shall be deposited on one or both of the following waste sites:
 - 1) Waste sites designated in the Contract Documents.
 - 2) Waste sites provided by the Contractor.
- e. All costs for disposing of this excess material shall be incidental to other items of work contained in the bid unless otherwise specified.
- f. All waste sites (whether on-site or offsite) shall be operated in such a manner as to meet all safety and health requirements of State and local agencies. Sites operations, or the result of such operations, which create a nuisance problem, or which result in damage to public or private properties will not be permitted.

- g. Do not deposit materials on any unimproved dedicated street right-of-way without written permission of the Owner's Representative and the agency with jurisdiction over the right-of-way.

3.24 TRESPASS

- a. The Contractor will be solely responsible for any trespass upon private property or injury thereto resulting from or in connection with his operations. He will be liable for any claims made because of his trespass or his deposit of debris of any kind on private property.

3.25 FINAL INSPECTION

- a. When all construction work on the project is complete and all extra work bills, forms and documents required under the Contract are submitted, notify the Owner's Representative in writing. Owner's Representative will make an inspection of the project and project records within 15 days of receiving said notice. If, at such inspection, all construction provided for and ordered under the Contract is found completed and satisfactory and all certificates, bills, forms, and documents have been properly submitted such inspection shall constitute final inspection.
- b. If work is found unsatisfactory, or if all certificates, bills, forms and documents have not been properly submitted, the Owner's Representative will so notify the Contractor. After correction are made, or all certificates, bills, forms, or documents are properly submitted, notify the Owner's Representative in writing. Owner's Representative will make another inspection within five (5) days after such notice, and if all work is satisfactory, then this inspection shall constitute the final inspection.

3.26 USE OR POSSESSION PRIOR TO FINAL COMPLETION

- a. The Owner or his agents shall have the right to take possession of or use for his own benefit any completed or partially completed part of the work. Such possession or use shall not be deemed an acceptance of the occupied portion of the project. While the Owner is in such possession, the Contractor shall be relieved of the responsibility for injury or damage to the said completed portion of the work other than that resulting from the Contractor's fault or negligence. Continued operation or use of facilities being rehabilitated shall not be construed as use or possession prior to final completion.
- b. Prior to the Owner or his agents taking possession of or using any completed or partially completed part of the work, written notice shall be given by the Owner's Representative to the Contractor at least 24 hours in advance of the Owner actually assuming possession.

3.27 TEMPORARY WATER, HEATING, LIGHTING AND POWER

- a. The Contractor shall provide all water, heat, lighting and power required to construct and protect the work until the work is placed in service by the Owner for beneficial use of the Owner.
- b. The source for temporary power shall be from the electric utility or Owner approved Contractor supplied auxiliary power units.
- c. The source for temporary water shall be from the City water utility or from Owner's

distribution system, if the Owner's system is capable of supplying the temporary water.

- d. The Contractor shall pay the Owner for all-electric power and water utilized by the Contractor in the construction of the facility.
- e. The installation for electric power shall meet the requirements of local authorities and of OSHA.
- f. The Contractor shall obtain all permits and pay all costs for connecting temporary services at no expense to the Owner.

3.28 BARRICADES

- a. The Contractor must provide and maintain proper barricades, fences, signal lights, flares or watchmen to properly protect the work, equipment, persons, animals and property against injury.
- b. In areas of public travel and/or on all approaches leading to this work, all barricades and obstructions shall be illuminated at night. All lights for this purpose shall be kept burning from sunset to sunrise.
- c. Temporary traffic control devices and facilities shall be furnished, erected and maintained in accordance with all Local and State requirements.

3.29 MAINTAINING TRAFFIC & OWNER ACCESS

- a. Where Contract work is within streets or other public thoroughfares, the Contractor shall so plan and schedule his work as to cause as little interference with general public traffic. Street surfaces shall be maintained and kept clean where construction work under this Contract has been performed until inspection and acceptance of all such work.
- b. Access of fire, police and ambulance vehicles to property abutting and adjacent to such thoroughfares shall be maintained whether or not permission has been granted to restrict other traffic. The Contractor shall obtain all permits from Municipal, County, State or other authority having jurisdiction over traffic in thoroughfares, and shall comply with all regulations and directions of such authority concerning erecting barricades and detouring movement of traffic.
- c. The Contractor shall maintain the roads and all weather access-ways for operating personnel, deliveries of operating supplies, normal maintenance vehicles and other equipment incidental to the operation and maintenance of the Owner's facility.

3.30 SANITARY REGULATIONS

- a. Necessary housing accommodations shall be provided for the workers for changing clothes and for protection during inclement weather. Toilet accommodations shall also be maintained for the use of the employees on the work site. The accommodations shall be in approved locations, properly screened from public observance and shall be maintained in a strictly sanitary manner. The Contractor shall obey and enforce all other sanitary regulations and orders and shall take precautions against infectious diseases. The Contractor shall maintain at all times, satisfactory sanitary conditions around all shanties, tool and supply

houses and on all other parts of the work all in accordance with all Federal, State and Local ordinances, regulations and requirements.

3.31 DUST CONTROL

- a. The Contractor shall apply water or dust palliative, or both, for the alleviation or prevention of dust nuisance caused by his operations. Dust control operations shall be performed by the Contractor at the time(s) as required or as ordered by the Owner. Failure of the Owner to issue such order will not relieve the Contractor of this responsibility. Unless otherwise specified, no direct payment will be made for any such work performed or material used to control dust under these Contract Documents. The Contractor shall comply with all Federal, State and Local ordinances, regulations and requirements.

3.32 SMOKE PREVENTION

- a. Strict compliance with all ordinances regulating the production and emission of smoke will be required and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control. The Contractor shall comply with all Federal, State and local regulations.

3.33 CONTROL OF NOISE

- a. The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhaust of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals, libraries and schools, precautions shall be taken to avoid noise and other nuisance. The Contractor shall require strict observances of all pertinent ordinances and regulations.

3.34 WEATHER CONDITIONS

- a. In case of temporary suspension of the work or during inclement weather, or whenever the Owner's Representative shall direct, the Contractor shall carefully protect (and cause his subcontractors to similarly protect) all work and materials against damage or injury from the weather. If, in the opinion of the Owner's Representative, any work or materials have been damaged by reason of failure on the part of the Contractor or any of his subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

3.35 VERMIN CONTROL

- a. At the time of occupancy by Owner, any structure or structures entirely constructed under the Contract shall be free of rodents, insects, vermin or pests.

3.36 FAIR EMPLOYMENT PRACTICES ACT

- a. The Contractor agrees that neither he nor his subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of his race, age, color, sex, religion, national origin or ancestry or marital status. Breach of this covenant shall be regarded as a material breach of this Contract.

3.37 CONSTRUCTION ACCESS

- a. The Contractor shall be responsible for design, construction and maintenance of any and all structures required for access to the site for construction or delivery of materials, including but not limited to construction access roads and staging areas. The Owner's responsibility to provide access easements or right-of-ways to the construction site shall not be interpreted as relieving the Contractor of his responsibilities under this section.
- b. Unless otherwise shown or specified, the access road sections shown are based upon the anticipated loads following construction and not upon the loads during the construction period. Any increase in road size or depth required to accommodate the loads due to the Contractor's choice of construction methods or sequence of operations shall be the responsibility of the Contractor, and shall be supplied at no additional cost to the Owner.
- c. Any advice or recommendations solicited from or given by the Owner's Representative to the Contractor shall not relieve the Contractor of any of his responsibilities under this section.

3.38 USE OF EXPLOSIVES

- a. The use of explosives shall be prohibited.

PART 4: SPECIAL PROVISIONS

4.1 COORDINATION OF WORK

- a. The Contractor shall cooperate with the Owner's Engineer and other Contractors, for coordination and expeditious execution of his work in relation to total project work required. The following contact information is provided for reference only and may not be complete or current, and shall not relieve the contractor of all responsibility for contacting the appropriate utility or agency personnel as required.

Owner:	City of Yachats (Rick McClung).....	541-547-3243
Engineer:	Westech Engineering (Chris Brugato)	503-585-2474 or 503-931-3459
Power:	Central Lincoln PUD (Faye Monroe)	541-574-3601
Telephone:	Pioneer Connect (Ken Field)	541-929-8266
Cable TV:	Charter Spectrum (Josh Lightner)	541-921-9189

SECTION 01090
REFERENCE STANDARDS

PART 1: GENERAL

1.1 SCOPE

- a. This Section includes reference standards.

1.2 DESIGNATION OF ASSOCIATIONS, INSTITUTIONS, SOCIETIES AND STANDARDS

- a. Whenever in these Specifications reference is made to Associations, Institutions, Societies or Standards, they will be designated as follows:

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	American Disability Act
AFBMA	Anti-Friction Bearing Manufacturers Association
AFI	Air Filter Institute
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AIA	American Institute of Architects
AIHA	American Industrial Hygiene Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association Standard Specifications, OSSC (ODOT/APWA)
AREA	American Railway Engineering Association
ARI	Air Conditioning and Refrigeration Institute
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BLIS	Bureau of Labor and Industries Standards
BLM	Bureau of Land Management
CDBG	Community Development Block Grant
CEMA	Conveyor Equipment Manufacturer's Association
CISPI	Cast Iron Soil Pipe Institute
COE	Corps of Engineers

CRSI	Concrete Reinforcing Steel Institute
DEQ	Department of Environmental Quality
DFPA	Division for Product Approval of American Plywood Association
DSL	Division of State Lands
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FM	Factory Mutual
FmHA	Farmer's Home Administration (Rural Development)
FS	Federal Standards
IBC	International Building Code
IBR	Institute of Boiler and Radiator Manufacturers
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronic Engineers
IFC	International Fire Code
IRI	Industrial Risk Insurance
ISA	Instrument Society of America
ISO	Insurance Service Office
ITE	Institute of Traffic Engineers
JIC	Joint Industry Conferences of Hydraulic Manufacturers
MUTCD	Manual of Uniform Traffic Control Devices
NBS	National Bureau of Standards
NEC	National Electrical Code
NESC	National Electric Safety Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NLMA	National Lumber Manufacturer's Association
OAR	Oregon Administrative Rules
NSF	National Sanitation Foundation
OECD	Oregon Economic & Community Development (Business Oregon)
ODOT	Oregon Department of Transportation
OFC	Oregon Fire Code
OHA-DWS	Oregon Health Authority – Drinking Water Services
OPSC	Oregon Plumbing Specialty Code
ORS	Oregon Revised Statutes
OSHA	Occupational Safety and Health Administration
OSHD	ODOT, Oregon State Highway Division
OSSC/ODOT	Oregon Standard Specifications for Construction - OSSC (ODOT/APWA)
OSSC	Oregon Structural Specialty Code
PCA	Portland Cement Association
RD	Rural Development (USDA)
RUS	Rural Utilities Service (USDA)
SHPO	State Historic Preservation Office
SMACA	Sheet Metal and Air Conditioning Contractors National Association, Inc.
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code (see state structural code)
UFC	Uniform Fire Code (see state fire code)
UL	Underwriter's Laboratories, Inc.
UPC	Uniform Plumbing Code (see state plumbing code)
USBM	United States Bureau of Mines

WDOT Washington Department of Transportation

WWPA..... Western Wood Products Association

- b. Wherever specific standard numbers are indicated, i.e., ASTM C-150, it shall be understood to mean the latest revision thereof.
- c. Specification Language. Portions of the Specifications may be written in imperative and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” or “shall conform with” shall be included by inference where a colon (:) is used within sentences or phrases. Example – Aggregate: ASTM C33.

PART 2: PRODUCTS

None

PART 3: EXECUTION

None

PART 4: SPECIAL PROVISIONS

None.

SECTION 01300
CONTRACTOR CONSTRUCTION SUBMITTALS

PART 1: GENERAL

1.1 SCOPE

- a. Wherever submittals are required in the Contract Documents, the Contractor shall submit them to the Owner's Representative.
- b. Delivery prior to approval of any material or equipment for which submittals are required will be at the Contractor's risk. Material or equipment for which submittals are required shall not be incorporated into the work until after the submittals have been reviewed and approved.
- c. Construction Submittal Format & Number of Copies.
 - 1) Contractor will be allowed to provide electronic/pdf copies of highlighted/marked-up submittals and associated submittal cover sheet, conditional upon submittals being complete and configured in accordance with the requirements of this section.
 - 2) If the Contractor fails to provide submittals in full conformance with this section, the Owner's Representative may require all subsequent submittals to be submitted in hard copy format (three copies minimum).

1.2 PRECONSTRUCTION CONFERENCE SUBMITTALS

- a. Within 14 Days after the date of commencement as stated in the Notice to Proceed or at the preconstruction conference, whichever comes first, the Contractor shall submit the following items to the Owner's Representative for review:
 - 1) A preliminary list of Shop Drawings, Samples and proposed Substitutes.
 - 2) A preliminary schedule for submission of priority and major Shop Drawings (particularly long-lead time equipment) and Samples.
 - 3) A list of permits and licenses the Contractor shall obtain, indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.
 - 4) A project schedule in accordance with Section 01305 - Construction Schedules.
 - 5) List of all subcontractors, including class of work, contact person & phone numbers.

1.3 GENERAL SUBMITTAL REQUIREMENTS

- a. Prior to Submitting Information to the Owner's Representative:
 - 1) The Contractor shall carefully review the correctness and thoroughness of the material, verify all field measurements, and coordinate all aspects of each item being submitted.
 - 2) The Contractor shall carefully review and ensure that all submittals are tailored to the project by high lighting appropriate information and/or deleting or crossing out non-

applicable information, and that all options and equipment furnished are indicated, and ensure that the submittal is otherwise organized and marked as required herein or in the individual specification sections as applicable.

3) The Contractor shall verify his review by affixing his stamp of approval and signature to the front page of each copy of the submittal.

- b. Direct Supplier/Subcontractor Submittals Not Accepted. All submittals to the Owner's Representative, with the exception of the laboratory test certificates, shall be made only by the Contractor. Submittals from subcontractor or suppliers will not be accepted.
- c. Sequential Numbering. All submittal reports shall be numbered sequentially. Resubmittals shall be designated with the same number as the original submittal followed by a designation letter (ie. Submittal "5A" for the first resubmittal of submittal 5, Submittal "5B" for second, etc.).
- d. Specified Cover Sheet. All submittals shall be accompanied by a completed copy of the submittal report cover sheet included under Part 4 of this section.
 - 1) A separate submittal report cover sheet shall be prepared for each submittal. Generally, items under a single specification section can be included on the same submittal report. Each submittal report shall clearly designate the specification section(s) that apply to the material or equipment being submitted on.
 - 2) Except in the case of operations and maintenance manuals or as otherwise approved by the Owner's Representative, a single submittal report shall not be used for items under different specification sections.
 - 3) All submittal report cover sheets shall reference the item that it covers, the applicable specification section(s), the Contractor's name, the Contract title and location, and the date of submission. Submittal shall also indicate whether the information is for review and approval by the Owner's Representative, for record purposes or for the fulfillment of the operation and maintenance requirements.
- e. The Contractor shall provide copies of each submittal as follows unless otherwise directed in the individual Sections (*except where electronic/pdf copies of submittals are allowed as noted above*):
 - 1) Preconstruction Conference Submittals – Three (3) copies provided to Owner's Representative.
 - 2) Material and Equipment Construction Submittals – Three (3) copies provided to Owner's Representative if pdf submittal is dis-allowed as noted above.
 - 3) Quality Control Submittals – The Contractor or the laboratory shall submit one copy of all test certificates, and calibration certificates directly to the following; Owner, the Owner's Representative and Owner's Field Representative.
 - 4) Informational Submittals – The Contractor shall submit one copy of all licenses and permits directly to the following; Owner, Owner's Representative and Owner's Field Representative.

- f. Substitutions. Manufacturers submitting proposals for equipment which will require changes to the design shown on the Drawings or specified herein shall also include detailed information on structural, electrical, mechanical and other miscellaneous changes or modifications required to adapt their equipment to the design shown, as specified below and in the General Conditions. Provision of such information or acceptance for review shall not be construed as approval of such substitute.
- g. Highlighting and/or Marking. All submittals shall be tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information *(as well as being marked, labeled or identified as required in the individual specification sections, as applicable)*. All options and equipment furnished shall be so indicated.
- h. Complete Submittals Required. Failure to provide complete submittals, or failure to follow the instructions outlined in this section *(including but not limited to highlighting applicable information and/or crossing out non-applicable information)*, will result in the incomplete submittal being returned to the Contractor without review, at the discretion of the Owner's Representative.
- i. Electrical / Control / Telemetry / SCADA Submittals. Contractor shall provide all of the electrical / control / telemetry / SCADA product data in Division 13 & Division 16 (as well as electrical items shown on the drawings but not included in the specifications) at the same time, unless specifically allowed otherwise in writing by the Owner's project electrical engineer. Piecemeal submittals will be returned as incomplete.

1.4 MATERIAL AND EQUIPMENT SUBMITTALS:

- a. Variances Shall be Noted.
 - 1) The Contractor shall indicate on the submittals all variances from the requirements in the specifications or on the Drawings. Failure to note variances from the specification requirements may result in the submittal being returned to the Contractor without review.
 - 2) If the proposed equipment includes modifications from standard features or options typically provided by the manufacturer for similar applications, these shall be clearly noted on the submittal.
- b. Project Sign Submittals. Submittals shall include shop drawings for notice or informational signs required by agencies with an interest in the project, including submittal information on posts, plywood backing and sign painting and/or placards.
- c. Material & Equipment Submittals. Submittals for all materials and equipment used by the Contractor in the performance of the work shall include the following as applicable.
 - 1) Manufacturers' Literature: Literature indicating the compliance of the product with the Specifications shall be included with all submittals. This shall include catalog sheets and other descriptive bulletins. Manufacturer's literature shall also include, but not be limited to the following:
 - a) Manufacturer's catalog data
 - b) Materials of construction
 - c) Manufacturer's name and model number
 - d) Installation instructions and drawings

- 2) Manufacturers' or Suppliers' Certificates: Certificates shall state that the products have been sampled and tested in accordance with the proper industrial and governmental standards and meet the requirements of the Contract Documents. An authorized agent of the manufacturer shall sign certificates.
 - 3) Design Data: Design data shall include the calculations, supporting theories, safety factors and assumptions used in designing the product.
 - 4) Samples: Samples shall be provided as required in the individual sections. Samples shall be of the precise material proposed to be furnished. The number of samples and sample size shall be of the industry standard unless otherwise stated in the individual sections.
 - 5) Shop Drawings: Shop drawings shall include the following as applicable to the equipment or system along with any special requirements listed in the individual Specification Sections:
 - a) Scaled details
 - b) Scaled dimensional drawings
 - c) Sectional assembly drawings
 - d) Fabrication information
- d. Structural/Seismic Calculations for Equipment or Materials:
- 1) When specified herein, noted on the drawings, or when required to conform with the provisions of the Oregon Structural Specialty Code (OSSC) or other referenced standards, structural/seismic calculations stamped by a professional engineer licensed in the State of Oregon shall be submitted for materials or equipment specified and/or proposed for use by the Contractor.
 - 2) Where required or requested by any building official, the Contractor shall be responsible to provide any and all calculations and/or certifications required, at no additional cost to the Owner.

1.5 SUBSTITUTIONS

- a. Substitute items of material or equipment are those items which are determined by the Owner's Representative NOT to qualify as an "or equal", or which require any level of redesign work on the part of the Engineer to incorporate into the project (*see requirements under General Conditions*).
- b. Submittals for substitute materials or equipment shall include but not be limited to manufacturer's literature, design criteria, dimensions and installation instruction.
- c. The submittal shall include any certifications or test results required to demonstrate that the proposed materials or equipment meets the requirements of the specifications and is equivalent or better than the specified materials or equipment.
- d. If the substitution requires a change in the design (*including dimensional changes to any structure or other component*), the submittal shall include all pertinent design information and details for the required design change, with supporting documentation.

- e. Reimbursement by Contractor for evaluation or redesign costs due to such substitution shall be dealt with as outlined under General Conditions 6.05.E as applicable.

1.6 QUALITY CONTROL SUBMITTALS

- a. Quality Control submittals are defined as those required by the Specifications to present documentary evidence to the Owner's Representative that the Contractor has satisfied certain requirements of the Contract Documents. Such submittals may include but are not limited to:
 - 1) Laboratory Certificates: Certificates shall include the results of tests by an independent laboratory for comparison to Specification requirements, mix design data and approval, plan inspection reports and certification, and other required information from the laboratory. All information submitted shall be signed by an authorized agent of the laboratory.
 - 2) Installation and Calibration Certificates: Certificates shall be submitted for equipment as indicated in the individual sections. These certificates shall indicate manufacturer's satisfaction with the installation, the accuracy of calibration and alignment, and the operation of the equipment. An authorized agent of the manufacturer must sign such certificates.

1.7 INFORMATIONAL SUBMITTALS & SUBMITTALS FOR RECORD

- a. Informational submittals formalize the flow of information between the Contractor and the Owner's Representative. Such submittals may include but are not limited to:
 - 1) Construction Schedules: Unless otherwise specified, the Contractor shall submit construction schedules as outlined under Section 01305, Construction Schedules contained herein.
 - 2) Licenses and Permits: The Contractor shall obtain all licenses and permits required by Local, State and Federal laws and submit copies of them to the Owner's Representative, including but not limited to the following.
 - a) Copies of all construction permits and licenses required by all approving agencies, including as applicable cities, counties, state agencies, utility service districts, etc.
 - b) Copies of all building, structural, electrical, mechanical, and plumbing permits (as appropriate) required by all approving agencies.
 - c) Copies of County, ODOT and/or railroad right of entry permits (as applicable), including copies of permit conditions.

1.8 OPERATION AND MAINTENANCE INFORMATION

- a. The Contractor shall furnish copies of O&M manuals in accordance with specification section 01705.

1.9 OWNER'S REPRESENTATIVE'S REVIEW OF SUBMITTALS

- a. Except as may otherwise be indicated, the Owner's Representative will review the submittals

with reasonable promptness for their compliance with the design concept and the Contract Documents and return prints of each submittal to the Contractor with comments noted thereon. The Owner's Representative's maximum review period for each submittal or resubmittal will be 21 days.

- b. If the review indicates that the material or equipment is in general conformance with the design concept and complies with the Drawings and Specifications, submittal copies will be marked "REVIEWED". In this event the Contractor may begin to incorporate the material or equipment covered by the submittal.
- c. If the review indicates that limited corrections are required, the submittal will be marked "FURNISH AS CORRECTED". The Contractor may begin incorporating the material and equipment covered by the submittal in accordance with the noted corrections.
 - 1) Unless otherwise approved in writing by the Owner's Representative, the Contractor shall provide a written summary (*letter, memo or email*) confirming how each such "FURNISH AS CORRECTED" review comments will be addressed. A separate letter/memo/email shall be provided for each submittal (*subject line referencing the submittal number and title*), with confirmation of each applicable submittal review comment from the submittal review by the Owner's Representative, with numbering to match the applicable submittal review comment.
 - 2) If the requirement for written confirmation of "FURNISH AS CORRECTED" review comments is waived in writing by the Owner's Representative, no further action is required by the Contractor.
 - 3) Where submittal information is to be incorporated into an O&M Manual, a corrected copy of all applicable submittals shall be prepared for inclusion in the O&M Manual.
- d. If a submittal is returned marked "REVISE AND RESUBMIT", the Contractor shall revise it and shall resubmit the required number of copies to the Owner's Representative for review.
 - 1) Resubmittal of only portions of multi-page or multi-drawing submittals will not be allowed unless specifically requested or allowed by the Owner's Representative (in the submittal review). For example, if a Shop Drawing submittal consisting of 10 drawings contains one drawing noted as "REVISE AND RESUBMIT", the submittal as a whole is deemed "REVISE AND RESUBMIT", and 10 drawings are required to be resubmitted.
 - 2) However, if a submittal includes numerous different items, each of which was reviewed and commented on separately, only those noted as "REVISE AND RESUBMIT" need to be resubmitted.
- e. If a submittal is returned marked "REJECTED", it shall mean either that the proposed material or product does not satisfy the specification or the submittal is so incomplete that it cannot be reviewed. In such cases, copies will be returned to the Contractor for correction. The Contractor shall then resubmit the required number of copies of the corrected submittal.
 - 1) Any material or equipment on-site which is rejected by the Owner's Representative shall be removed from the job site by the Contractor within two (2) working days of notification of rejection of the submittal.
- f. Except at its own risk, the Contractor shall not undertake work covered by submittals marked as "REVISE AND RESUBMIT" or "REJECTED" until a new submittal is made and returned without exceptions.
- g. The Owner's Representative's review of submittals is only for general conformance with the design concept of the project and general compliance with the information given in the

Contract Documents. Corrections or comments made on the submittals or shop drawings during this review (or absence of such corrections or comments) do not relieve the Contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her work with that of all other trades; and for performing all work in a safe and satisfactory manner.

- h. Upon acceptance, the Owner's Representative will return a copy of the review submittal to the Contractor and the Owner.
- i. In the event that multiple reviews are performed on the same submittal (*or portions of the same submittal*) due to revisions, clarifications, duplicate submittals or other reasons, all submittal review comments are complementary and what is noted by any submittal review iteration shall be as binding as if noted on all.

PART 2: PRODUCTS

None.

PART 3: EXECUTION

None.

PART 4: SPECIAL PROVISIONS

4.1 SUBMITTAL REPORT FORM

- a. See following pages:

WESTECH ENGINEERING INC. SUBMITTAL REPORT

PROJECT: South Tank Seismic Valve and Water Treatment Plant Backwash Recycle Improvements

FROM: _____

TO: Westech Engineering

COPIES: 1 for pdf submittals, or three (3) if hard copies are required by Owner's Representative

SUBMITTAL NUMBER _____

Category of Information being Submitted:

☐ EQUIPMENT/MATERIAL SUBMITTALS/SHOP DWGS ☐ MANUFACTURER'S DATA
☐ REPORTS ☐ METHOD STATEMENT ☐ INFORMATION FOR RECORD
☐ SAMPLES ☐ OTHER ☐ OPERATIONS&MAINTENANCE MANUALS

DESCRIPTION: _____

SPECIFICATION SECTION & TITLE: _____

I hereby certify that the material submitted has been checked for compliance with the specification and any exceptions have been clearly noted.

Signed (*Contractor's authorized representative*) Date

Printed Name Title

RESPONSE TO SUBMITTAL (by Owner's Representative):

☐ REVIEWED ☐ FURNISH AS CORRECTED ☐ REJECTED
☐ REVISE AND RESUBMIT ☐ SUBMIT SPECIFIC ITEM ☐ SEE ATTACHED LETTER, ____/____

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections or comments made on the submittals or shop drawings during this review (or absence of such corrections or comments) do not relieve the contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of his or her work with that of all other trades; and for performing all work in a safe and satisfactory manner.

Signed Date

Printed Name Title

SECTION 01305
CONSTRUCTION SCHEDULES

PART 1: GENERAL

1.1 SCOPE

- a. This Section includes, but is not necessarily limited to, the preparation, furnishing, distribution, and periodic revision of construction schedules as herein specified and as necessary for the proper and complete performance of this Work.

1.2 RELATED SECTIONS

- a. 01300 - Construction Submittals

1.3 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following as a minimum:

- b. Overall Project Schedule

- 1) Initial Project Schedule

- a) The initial project schedule shall be submitted a minimum of 1 day prior to the preconstruction conference, or within 5 days after the effective date of the Notice to Proceed, whichever is sooner.
 - b) Regardless of review or comments regarding the schedule by the Owner's Representative, the Contractor remains responsible for ensuring that all work is sequenced and coordinated to complete the work within the specified contract time and contract milestones, including providing adequate time for inspections, testing and/or startup.
 - c) If required, resubmit revised project schedule within 7 days after receipt of review comments, if any.
 - d) No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

- 2) Periodic Updating: Updated project schedules shall be submitted with all pay requests, accurately depicting progress to the time of the pay request submission and showing the anticipated project schedule from that time forward.

- 3) Number of Copies: Submit three (3) copies to be retained by the Owner's Representative, plus the number of copies required by the Contractor for distribution to subcontractors and/or suppliers.

- c. Two-Week Work Schedule:
- 1) The deadline for submittal (by email, fax or delivery) of the two-week work schedules shall be as follows, with copies to the Owner and the Owner's Representative:
 - a) Projects with weekly progress meetings: By the end of business on the business day before the meeting, to allow time for the Owner and Owner's Representative to review.
 - b) Projects without weekly progress meetings: By no later than 4:00 p.m. of the last regular workday of each week.

PART 2: PRODUCTS

2.1 OVERALL PROJECT SCHEDULE

- a. Form of Overall Project Schedule: The overall project schedule shall:
- 1) Be in the form of a bar chart showing the proposed operations. The schedule shall be complete and show in detail the manner in which the contractor proposes to complete the work within the specified time.
 - 2) Be prepared in the chronological order showing the beginning and end of each item of work.
 - 3) Include the date that the schedule was prepared and/or last modified.
 - 4) Identify each path by:
 - a) Major specification section number or title.
 - b) Distinct graphic delineation.
 - 5) Use a horizontal time scale and identify the first work day of each week.
 - 6) Allow space for updating.
 - 7) Not be larger than 24" x 36" unless approved by the Owner's Representative.
- b. Content of Overall Project Schedule: The overall project schedule shall:
- 1) Provide a complete sequence of construction by activity.
 - 2) Show product procurement and delivery dates.
 - 3) Include purchase lead time and delivery schedule for major equipment.
 - 4) Show the following information for Shop Drawings, project data, and samples:
 - a) Submittal dates.
 - b) Dates review copies of submittals will be required.
 - 5) Show decision dates for selection of finishes.

c. Sub-Schedules

- 1) The Contractor shall provide separate subschedules showing submittals, review times, procurement schedules, and delivery days.
- 2) The Contractor shall provide subschedules to define critical portions of the overall project schedule.

d. Updating Overall Project Schedules

- 1) Changes: Show all changes occurring since previous submission of the updated schedule.
- 2) Progress: Indicate progress of each activity and show completion dates.
- 3) Other Items:
 - a) Include major changes in scope.
 - b) Include activities modified since previous updating.
 - c) Include revised projections due to changes.
 - d) Include other identifiable changes.

e. Distribution of Overall Project Schedules

- 1) Reviewed Schedules: The Contractor shall distribute copies of the reviewed schedules to:
 - a) Job site file
 - b) Subcontractors
 - c) Other concerned parties.
- 2) Instructions to Recipients: Instruct subcontractors to report all inability to comply with the Schedule, and provide an explanation with suggested remedies.

f. Failure to Submit Required Overall Project Schedules

- 1) Partial or final pay requests will not be processed unless an acceptable and updated overall project schedule has been submitted as specified herein.

2.2 TWO-WEEK LOOK-AHEAD WORK SCHEDULES

- a. Submittal of Two-Week Work Schedule: The two-week work schedules shall be submitted by no later than the close of business each Friday, with copies to the Owner and the Owner's Representative (*email or delivery of hard copies*).
- b. Form and Content of Two-Week Work Schedule: The two-week work schedules shall:
 - 1) Be prepared on 8½ x 11 paper or 11x17 paper.
 - 2) Identify the work crew & foreman (as applicable) and the location and type of work the crew will be doing each day.

- 3) Identify each subcontractor (subcontractor name & contact person), as well as the location and type of work the subcontractor will be doing each day.
- 4) Include proposed notification dates of any interruptions of service or other work for which the Contract Documents require the Contractor to issue notifications. Failure to include notification dates will not relieve the Contractor of responsibility for such notifications.
- 5) Where the project includes multiple bid schedules, the two-week work schedules shall address work under each schedule and area separately.

c. Failure to Submit Two-Week Work Schedules

- 1) If the Contractor fails to submit the required Two-Week Look-Ahead Work Schedules as outlined herein, the Owner, at his option, may issue a Stop Work Order on the project until the required schedules are submitted and approved by the Owner.
- 2) The Contractor shall not be entitled to any additional contract time or additional compensation for any such delays due to work stoppages resulting from his failure to submit the required work schedules.

PART 3: EXECUTION

None

PART 4: SPECIAL PROVISIONS

None.

SECTION 01568
EROSION AND POLLUTION CONTROL

PART 1: GENERAL

1.1 SCOPE

- a. It shall be the responsibility of the Contractor to prevent pollution of air, water and soil resulting from his operations.
- b. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems and to prevent dust attributable to his operations from entering the atmosphere. This work shall be in accordance with Federal, State and Local codes.
- c. Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to drains or streams.
- d. Noise pollution shall be minimized through the use of proper mufflers on all construction equipment.
- e. The Contractor shall seed and mulch all disturbed areas or areas damaged by his operations.

1.2 CONSTRUCTION SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include, but not be limited to, the following:
 - 1) Submittals for Review. Submittals shall include but not limited to the following:
 - a) If the Contractor plans to provide alternate erosion control measures from those shown & noted on the drawings, or if additional information or submittals is required by any erosion control permit associated with the project, complete erosion control plans, details, and maintenance procedures shall be submitted for review and reference by the Owner's Representative and applicable agencies.

PART 2: PRODUCTS

2.1 GENERAL

- a. Dust palliatives (additives) shall conform to OSSC (ODOT/APWA) Section 00340, Watering.
- b. Other erosion control structures and products as shown on the drawings.

2.2 MULCHING MATERIAL

- a. When used, hydromulch shall be applied with grass seed at a rate of 2000 lbs. per acre between April 30 and June 10 or between September 1 and October 1, unless otherwise specified on the drawings or by erosion control permits. On slopes steeper than 10 percent, hydroseed and mulch shall be applied with a bonding agent (tackifier).

Application rate and methodology to be in accordance with seed supplier recommendations.

- b. Mulch shall be either hydromulch or finely chopped fescue or rygrass mulch conforming with OSSC (ODOT/APWA) Section 01030.15
 - 1) **CEREAL GRAIN STRAW (wheat or similar) IS NOT AN ACCEPTABLE SUBSTITUTE** without specific written approval.
- c. When use is allowed by jurisdiction in lieu of hydroseed/hydromulch, dry, loose, weed free fescue or rygrass used as mulch shall be applied at a rate of 4000 lbs. per acre (*double the hydromulch application requirement*). Anchor by working in by hand or with equipment (rollers, cleat trackers, etc.). Mulch shall be spread uniformly immediately following seeding, without clumps.

PART 3: EXECUTION

3.1 CLEANUP OF STREETS, SIDEWALKS AND DRIVEWAYS

- a. Hard surfaced streets, haul roads and (if directed by the Owner's Representative) detours and bypass roads shall be swept by automatic self-contained sweepers as required to keep them free of dirt or debris.
- b. Excessive dirt on pavements shall be removed by means of hand shoveling or appropriate mechanical equipment and the area swept as directed above.
- c. Sidewalks and driveways shall be cleaned by means of shovels and handbrooms or appropriate mechanical equipment.
- d. Dust on unsurfaced streets or parking areas and any remaining dust on surfaced streets shall be controlled with an approved dust palliative as directed by the Owner's Representative.
- e. The Contractor shall comply with the above requirements on a daily basis. If the Contractor fails to perform the above work in a satisfactory manner, the Owner's Representative may stop all work, except cleanup operations, until the Contractor has satisfactorily complied with the above requirement.

3.2 WATER DISCHARGED TO DRAINS OR STREAMS

- a. The Contractor shall construct and maintain filters, sedimentation traps, or stilling basins with overflows to clarify waters containing suspended materials from fill areas, excavations, deep wells, well points and disposal sites before discharging to drains or streams.

PART 4: SPECIAL PROVISIONS

None.

SECTION 01705
O&M SUBMITTALS

PART 1: GENERAL

1.1 SCOPE

- a. This section includes requirements for submittals of operations & maintenance information and manuals.
- b. O&M manuals shall include the following as a minimum, organized and correlated as required under this section.
 - 1) Information required under this section.
 - 2) General project information required by the specifications (*including Contractor's general warranty per Section 01750*),
 - 3) Copies of all final building inspections as applicable.
 - 4) Copies of all final inspections by other agencies with jurisdiction as applicable.
 - 5) Submittal & O&M information for all equipment requiring maintenance, or for which O&M information is required by the specifications.
 - 6) Warranties covering all material and equipment for which manufacturer's warranty is required.
- c. Electrical O&M. Other electrical & controls information shall be provided as required under Division 13 or Division 16 as applicable.

1.2 COORDINATION OF O&M SUBMITTALS

- a. Initial Review Submittal. The Contractor shall submit to the Owner's Representative two (2) review copies of the complete O&M manuals for review by the Owner and/or agencies with jurisdiction.
- b. O&M manuals shall be submitted far enough in advance to allow the following requirements to be satisfied.
 - 1) The Contractor shall be responsible for submitting the O&M manuals far enough prior to the end of the Contract Period to allow the Owner's Representative adequate time to review the manuals. The Owner's Representative (*and agencies with jurisdiction*) will review the draft O&M manuals with reasonable promptness for their compliance with the Contract Documents.
 - 2) The Contract provides that the work will not be considered to be substantially complete until required O&M manuals are submitted and accepted by the Owner's Representative.
 - 3) A review copy will be returned to the Contractor for correction and revision. The Contractor shall then resubmit the required number of complete and corrected O&M manuals. If the manual are still incomplete, they may be returned again for revision by the Contractor.
 - 4) Complete revised O&M manuals shall be provided before the Contractor requests final inspection.

- 5) Partial Substantial Completion. If the Owner (*at its sole discretion*) decides to perform a final inspection and/or issue substantial completion prior to receipt of the final approved O&M manuals, the Owner reserves the right to require that any liquidated damages continue to accrue until such time as the final approved O&M manuals are received (*ie. any substantial completion determination will be a partial substantial completion, subject to receipt of final approved O&M manuals*).
- c. Number of Final Copies. After initial review as noted above, the Contractor shall submit to the Owner's Representative four (4) complete copies of the final revised O&M manuals. If additional revisions are required, the Owner's Representative will retain one copy and return the remainder to the Contractor for revision.
- d. Prior to Submitting Information to the Owner's Representative: The Contractor shall carefully review and ensure that all O&M submittals are tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information, and that all options and equipment furnished are indicated or listed.

PART 2: PRODUCTS

2.1 SEPARATE MANUALS REQUIRED

- a. Separate sets of O&M Manuals must be submitted for the South Tank Seismic Valve and the Water Treatment Plant Backwash Water Recycle Improvements.

2.2 COMPLETE MANUALS REQUIRED

- a. Review copies of the O&M manuals shall be complete volumes, organized and indexed for all associated items of equipment to be included in that binder, with labeled colored pages included where items remain to be inserted.
- b. The O&M information for individual equipment items is not to be submitted piecemeal. Where O&M manuals have multiple binders, the different binders (*mechanical, electrical, SCADA, etc*) can be submitted separately for review, but the binders must be numbered and accompanied by a draft overall index covering all binders.
- c. Placeholders for Pending Information. Since some of the required items may not be available for insertion into the O&M manuals until the end of the project (*ie. final inspection certificates, final startup reports, etc.*), it is acceptable to submit the manuals for initial review prior to these documents being available, although the places where these documents will be inserted is to clearly identified (*by use of labeled colored pages with wording identifying the document to be inserted, or similar method*).
- d. The final O&M manuals will be accepted only if complete, properly identified with Contract Specification Section Numbers and only after revised, where necessary, to conform to the previous review comments by the Owner's Representative's and/or agencies with jurisdiction.

2.3 O&M MANUAL INFORMATION & FORMAT

- a. Binder Cover Sheet.

- 1) Each binder shall be provided with a cover sheet (*in the view cover, and as the first page of each volume*), which shall include the following information as a minimum.
 - a) Project name & Location.
 - b) Owner Name.
 - c) Contractor Name.
 - d) Binder or Volume #
- b. Table of Contents shall be furnished as summarized below.
 - 1) Individual Binder TOC: A detailed Table of Contents (*covering all items in that binder*) shall be provided at the front of each binder.
 - 2) Overall TOC: Where multiple binders are required, an overall summary Table of Contents shall be provided (*summarizing the general content of each of the binders*). This TOC shall be inserted behind the individual binder TOC where multiple volumes are provided.
- c. Index Tabs / Tab Section TOC.
 - 1) Labeled index tabs shall be furnished for all binders containing data for more than one item of equipment. Index tabs shall separate each system or major equipment item.
 - 2) Tab Section TOC. Where an equipment tab section for an equipment system includes two or more separate items or discrete system components with separate submittal and/or O&M information, a sub-section "table of contents" shall be provided at the front of the equipment tab section, and sub-tabs shall be provided between the discrete equipment items.
- d. Highlighting and/or Marking.
 - 1) All manuals shall be tailored to the project by high lighting appropriate information and/or deleting or crossing out non-applicable information.
 - 2) All options furnished shall be indicated, either with a summary sheet at the front of each tab section or on the applicable page in the O&M information.
- e. Binders. A complete manual shall be provided for each site in 3-ring binder(s) with index tabs between all sections, as well as between each equipment system or major equipment item.
 - 1) Binders shall be locking D-Ring, view style binders, with exterior view pockets on the front, back and spine of the binder.
 - 2) Multiple binders shall be provided if required, although single binders are acceptable for each site if possible.
 - 3) If multiple binders are provided, they need to be labeled as Volume 1, 2, etc., with covers which indicate generally what is included in the manual.
 - 4) The manuals shall be labeled on the front cover, the spine, as well as a title page inside the front cover.
- f. Binder Size & Capacity. Binders shall not be filled to more than 90% of capacity (*as measured after all final material is submitted and inserted into the O&M Manuals*).
 - 1) Min & Max Binder Size. All O&M volumes shall have a maximum binder depth of 4 inches and a minimum binder depth of 1 inch.
 - 2) Space for Deferred Submittal Items. Contractors are responsible for reserving

- adequate space in binders for deferred submittal items (*ie. where placeholders as noted above are included*).
- 3) Overfilled Binders. If binders are overfilled (*either at initial submittal or final submittal*), the Contractor will be fully responsible for providing larger binders (*subject to the maximum size noted above*), or for splitting the O&M submittals into additional binders, and reformatting all the indexes, table of contents and other items as required, all at no additional cost to the Owner.
- g. Volume 1 Requirements. In addition the cover & TOC information noted above, the first equipment O&M binder shall include the following information as a minimum (*separated by index tabs*).
- 1) Supplier Summary.
- a) Summary sheet listing each supplier's name, address and telephone number along with manufacturer's job number and/or purchase order number for all equipment supplied. This summary shall be included at the front of the binder, behind the TOCs.
- b) The material or equipment supplier information shall also be included at the front of each individual tab section as applicable (*for the equipment under that tab section*).
- 2) Certificate of completion & warranty (*in letter form, per Section 01750*) from the Contractor certifying that all materials, equipment and workmanship incorporated into the project are in accordance with the drawings and specifications, and that all work is free of defects and in proper operating condition at the time of project completion. Any exceptions (*if any*) must be listed and the justification for the exceptions given. The certificate of completion letter shall also include a written warranty against defect for the length of the warranty period from the date of substantial completion, covering all workmanship and materials used in the project. The warranty statement may exclude defects or damage caused by abuse, modification, or improper maintenance or operation by: persons other than the Contractor, subcontractors, suppliers, or any other individual or entity for whom the Contractor is responsible; or normal wear and tear under normal usage.
- 3) Permits & Final Inspection Certificates. Include the following.
- a) Photocopies of building, plumbing, mechanical and /or electrical permits, as well as photocopies of the final inspection certificates for each.
- b) Photocopies of laboratory and field test reports.
- h. Paper. Manuals shall be printed on heavy, first quality paper, 8-1/2" x 11" size with standard three hole punching.
- i. Drawings. Drawings shall be reduced to 11" x 17". Where reduction is not possible, larger drawings shall be folded separately and placed in envelopes, which are to be bound into the applicable manual binder.
- j. As-built Information & Equipment Field Modifications.
- 1) Field modifications to equipment during installation shall be included or summarized in the manual so that the manual reflects as-built conditions.
- 2) Revisions to the manufacturer provided information may be submitted for

- incorporation into the manual where appropriate.
- 3) The Owner's Representative reserves the right to return all manuals to the Contractor for revision to reflect as-built conditions.
- k. O&M manuals shall include, but not be limited to, the following *(any additional information required by the individual specification sections or submittal review comments shall also be provided)*.
- 1) Equipment List (BOM). Behind the submittal information noted above, each tab section shall include a complete list of equipment and appurtenances provided, complete with manufacturer and model number *(ie. bill of materials)*. If there are any differences between the bill of materials included in the submittal information and that provided, provide a corrected bill of materials.
 - 2) Submittals. Include copies of submittals for equipment which may require maintenance or replacement, including a copy of the submittal review letter or comments. Include written confirmation specifically indicating the manner in which each correction noted on shop drawings or submittals approved subject to conditions was addressed.
 - 3) Manufacturer Warranties. Copies of all required or provided manufacturer warranties shall be included at the front of each applicable tab section. Provide photocopies of warranty registration cards filled out with the appropriate information, where applicable.
 - 4) Factory Tests & Reports.
 - a) Copies of factory tests & reports as required by the individual specification sections shall be included in the tab section for the applicable equipment.
 - 5) Startup & Commissioning Reports, Field Tests & Reports.
 - a) Copies of startup and commissioning reports and field test reports shall be provided for all equipment which requires commissioning and/or startup by manufacturer's representative.
 - b) Copies of equipment field startup and field test reports shall be included in the tab section for the applicable equipment.
 - 6) Written Configuration Summary for Programmable Equipment.
 - a) Provide written configuration summary sheet(s) for all programmable equipment, including a listing of all settings which are different from the manufacturer's defaults.
 - b) Summary of configured level, pressure, alarm or other settings, and action by equipment when these settings are reached *(on either rising or falling levels)*.
 - c) These summary sheets shall be in addition to digital or electronic copies of configuration settings which are provided for use and reference by the Owner.
 - 7) Training Summary. Overview of topics covered during training provided as required by the individual specification sections.

- 8) Service Contracts, etc.
- a) Copies of any service contracts provided shall be included near the front of the each applicable tab section (*behind any applicable configuration summary sheets*).
 - b) Where service is to be provided during the warranty period (*including but not limited to cellular service contracts*), provide a summary sheets listing the applicable equipment, the service contract or account number (*or similar identifying information*), as well as the name, phone number and email address of the person to contact for service requests, or in order to extend or modify service contracts at the end of the initial period.
- 9) Manufacturer Information. Where not included in submittal information referenced above, provide complete manufacturer information for each equipment item, including the following as applicable.
- a) Descriptive literature, bulletins or other data covering the equipment or system shall include, but not be limited to the following (*as applicable*), either in the included submittal data or in the O&M information.
 - (1) General arrangement drawing.
 - (2) Sectional assembly.
 - (3) Dimension print.
 - (4) Materials of construction.
 - (5) Parts list with assembly drawings.
 - (6) Recommended spare parts list with part and catalog number.
 - (7) Utility requirements.
 - (8) Lubrication recommendations and instructions.
 - (9) Drive dimensions and data.
 - (10) Pump seal data.
 - b) Description of equipment controls and associated instrumentation.
 - c) Assembly, installation, alignment, adjustment and checking instructions.
 - d) Operating instructions.
 - e) Maintenance instructions including trouble-shooting guidelines, lubrication and preventive maintenance instructions with task schedule.
 - f) Manufacturer's recommended inspection & maintenance schedules. For rotating equipment, this shall include recommended maintenance schedules based on calendar time and run time hours, both for the motors and the rotating equipment.
 - g) List of special tools and equipment required for operation and maintenance.
 - h) Schematic piping diagrams, where applicable.
 - i) Schematic wiring diagrams.
 - j) Programming instructions for any controllers or other programmable equipment. Copies of the any required software, including registration

cards, shall be provided in conjunction with the O&M manuals.

- k) Printout and/or electronic copy of any programming and/or setpoints for controllers or other programmable equipment, including VFDs, as well as a printed summary of settings which are different from manufacture defaults.

PART 3: EXECUTION

Nothing additional.

PART 4: SPECIAL PROVISIONS

None.

SECTION 01750
PROJECT CLOSEOUT

PART 1: GENERAL

1.1 SCOPE

- a. This section details the general requirements pertaining to the closeout of the construction project. Not all requirements are listed herein and the Contractor shall provide all paperwork and closeout items required by the contract.

1.2 CLOSEOUT TIMETABLE

- a. The Contractor shall establish dates for equipment testing, acceptance periods, and on-site training sessions (as required under the contract). Such dates shall be established not less than 10 days prior to beginning any of the foregoing items, to allow the Owner, the Owner's Representative, and their authorized representatives sufficient time to schedule attendance at such activities. The timetable shall be presented to the Owner and the Owner's Representative in a written format.

1.3 SUBSTANTIAL COMPLETION

- a. When the Contractor considers that the Work is substantially complete (as defined herein or in the General Conditions, Article 1.01.A.51 & Article 14.04), the Contractor shall prepare for submission to the Owner's Representative a list of items to be completed or corrected, and a detailed schedule for completion of all outstanding items, and request a substantial completion inspection. The failure to include any items on such list or schedule does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents and within the specified contract time.
- b. When the Owner's Representative determines, on the basis of an inspection, that the Work is substantially complete, the Owner's Representative will then prepare a Certificate of Substantial completion which will establish the date of substantial completion; state the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the work and insurance; and fix the time within which the Contractor shall complete the items listed therein.
- c. Warranties required by the Contract Documents shall commence on the date of substantial completion of the work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such certificates.
- d. Upon substantial completion of the work and upon application by the Contractor and certification by the Owner's Representative, the Owner shall make payment, reflecting adjustment in retainage, if any, for such work or portion thereof, as provided in the contract documents.

1.4 WRITTEN RELEASES WHEN WORK IMPACTS PRIVATE PROPERTY

- a. Whenever any of the work is on, through or impacts property other than that owned by the Owner (ie. private property), the Contractor shall furnish the Owner with written confirmation (from the subject property owner or proper authority representing the

property owner) that the restoration of structures, utilities and/or surfaces has been satisfactorily completed.

- b. Such confirmation shall be submitted prior to final acceptance of the Work by the Owner or final payment.
- c. If, in the opinion of the Owner, the release is arbitrarily withheld, the Owner may at its sole discretion accept the portion of the Work involved and cause final payment therefore to be made.
- d. Failure by the Owner to verify that all such written confirmations have been submitted prior to final payment shall not relieve the Contractor of the responsibility of restoring all structures, utilities and/or surfaces to the satisfaction of the subject property owner, and of correcting any problems which come to light during the warranty period.

1.5 FINAL CLEANUP

- a. The Contractor shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily performed the final cleanup of the site.

1.6 FINAL SUBMITTALS

- a. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Owner's Representative for transmittal to the Owner:
 - 1) Written guarantees and/or warranties, as required.
 - 2) O&M information and instructions as specified in section 01705.
 - 3) Maintenance stock items; spare parts; special tools as specified.
 - 4) Completed record drawings.
 - 5) Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 6) Maintenance or warranty bonds (if applicable).
 - 7) Written releases from all parties (including private property owner's whose properties were used for yard or staging areas or were damaged) who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.
 - 8) Copies of final inspection certificates for all required building, electrical, mechanical or plumbing permits.
 - 9) Equipment manufacturer's startup test reports, installation certifications, and warranties.
 - 10) Letter from contractor listing any follow-up training, inspection or service visits required under the contract documents, and acknowledging that these training, inspection or service visits will be provided as required or requested by the Owner. The letter shall also acknowledge any final punchlist items that were deferred to a later time due to weather or other conditions.

- 11) Contractor's written warranty and certification letter as specified in this section.

1.7 CORRECTION OF DEFECTIVE WORK

- a. The Contractor shall comply with the defective Work correction requirements contained in the General Conditions, during the construction period or during the warranty period.
- b. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required corrective work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required corrective work unless the Contractor shall have obtained a statement in writing from the affected private property owner or public agency releasing the Owner from further responsibility in connection with such repair or resurfacing, including post construction settlement.
- c. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the right to do the Work and the Contractor and its surety shall be liable to the Owner for the cost thereof.

1.8 FINAL WALKTHROUGH INSPECTION

- a. After all preliminary punchlist items and/or non-compliance or uncompleted work items (identified in substantial completion or other inspections) have been completed, the Contractor shall submit a written request to the Owner's Representative stating that all work is complete and requesting a final inspection.
- b. The Contractor shall complete and sign off all preliminary punchlist items with the Owner's Representative. The Contractor shall participate in a final walkthrough inspection with the Owner and Owner's Representative, at which time the final punchlist will be prepared.

1.9 EXISTING SURVEY MONUMENT CERTIFICATION (prior to final payment)

- a. Prior to requesting final payment, the Contractor shall submit a letter certifying that existing survey monuments of record (*including but not limited to property and street monuments*) were located and marked prior to construction, and identify the licensed surveyor who performed this work.
 - 1) If no survey monuments were removed, disturbed or destroyed during construction, the letter shall state the date on which the surveyor verified that all existing monuments checked; OR
 - 2) If any survey monuments were removed, disturbed or destroyed during construction, the letter shall summarize the date(s) on which these survey monuments were replaced by a Registered Professional Surveyor (*retained by the Contractor*) licensed in the State of Oregon in accordance with ORS 209.150, and that required notice was provided to the County Surveyor. Photocopies of the survey documentation and/or maps submitted to the County Surveyor shall be submitted with the certification letter.

- b. This requirement shall apply whether there is a specific bid item for survey monument restoration, or whether it is considered to be incidental work for which no separate payment is made.

1.10 WRITTEN WARRANTY & CERTIFICATION FOR FINAL PAYMENT

- a. The Contractor shall provide a written warranty and certification letter, addressed to the Owner, but submitted to the Owner's Representative. The letter shall be substantially as follows (any changes to the wording below must be acceptable to the Owner's Representative:

The City of Yachats
P.O. Box 345
Yachats, OR 97498

RE: South Tank Seismic Valve and Water Treatment Plant Backwash Water Recycle Improvements

To Whom It May Concern:

We the undersigned do hereby certify and warrant that all materials and equipment supplied and installed, and all work performed under the terms of the Contract Documents, was in conformance with the construction drawings & specifications except as otherwise approved in writing by the Owner's Representative. The general project warranty begins at substantial completion (as determined by the Certificate of Substantial Completion) and is in effect for a period of two (2) year(s). This general project warranty period does not limit or reduce any manufacturer's warranty which may be longer than the general project warranty (for equipment or systems which were provided and installed under this contract).

Where a separate Certificate of Substantial Completion is issued for different phases of the project, the term of the general project warranty is based on the date of substantial completion granted for each phase. All other work constructed after substantial completion shall be warranted for not less than two (2) year(s) from date of installation, or the end of the general project warranty period, whichever is longer.

All materials & equipment installed were new and in good working condition at the time of substantial completion. All work is free from defects, and conforms to specifications provided in the Contract Documents. If, during the warranty period, any work is found to be defective or not in conformance with the requirements of the Contract Documents, we will promptly remedy, at our expense, any and all defects or deficiencies, and will pay for any damage to other work resulting from occurrence of said defects or the correction of same, upon written notice from the Owner.

This warranty excludes remedy for damage or defect caused by abuse, modifications not executed by us, improper or insufficient maintenance, improper operations and normal wear & tear under normal usage.

We also certify that:

- 1. Where required under ORS 279C.800-870, payment to laborers, workers, mechanics or other applicable personnel employed by the Contractor or subcontractor on this

Work was not less than the prevailing wage rates specified in the Contract Documents; and

2. All claims and indebtedness for material and labor and other services performed and/or completed in connection with these Specifications have been paid, except for work by subcontractor(s) for which a portion of such payment (or retainage) is withheld by Contractor pending final acceptance of said subcontractor's work and final payment/release of retainage by Owner; and
3. All moneys due the Industrial Accident Fund (ORS 279C.505), the State Unemployment Compensation Trust Fund (ORS Chapter 657), the State Department of Revenue (ORS 279C.505 and ORS 316.162 to 316.212) hospital associations and/or others (ORS 279C.530) have been paid; and
4. All permit final inspections and approvals are complete; and
5. Contractor has contacted all parties affected by the work (including agencies with jurisdiction, as well as public & private property owners whose property was utilized by the Contractor or on whose property work was conducted) and has verified that all restoration work has been completed to the approval of each of the affected parties, wherein each has jurisdiction; and
6. Contractor releases and discharges City of Yachats of and from all liabilities, claims, obligations and actions arising under the Contract, including any and all claims by third parties because of the performance of the Work; and
7. Contractor and the surety for this Contract shall defend, indemnify and save City of Yachats harmless from any liability or expense because of any claim on any Bond or any other claim related to the Contract or the Work; and
8. There have been no unauthorized substitutions or assignment of subcontractors; nor have any subcontracts been entered into without the names of the subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

Sincerely,

Contractor

cc: Westech Engineering, Inc.
Owner's Representative

- b. The Contractor's request for final payment shall be accompanied by an executed copy of the Contractor's Certification form included at the end of the Information For Bidders section herein.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

PART 4: SPECIAL PROVISIONS

None.

SECTION 01800
SURVEY WORK DURING CONSTRUCTION, BY CONTRACTOR

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing of all labor, materials, equipment and services necessary for the completion of Construction Survey Work in accordance with the Contract Documents and as required to complete the work.

1.2 RESPONSIBILITY OF CONTRACTOR TO RETAIN SURVEYOR

- a. The Contractor shall retain and pay for the services of a registered Land Surveyor (licensed in the State of Oregon) to locate and mark existing survey monuments of record (and replace disturbed survey monuments as required), as well as to establish construction control and perform construction surveys as required to establish the locations, lines and grades of curbs, grading, pipelines, structures, appurtenances and other improvements indicated on the drawings or specified.
- b. The Contractor and the Contractor's surveyor shall be responsible for reviewing the drawings and verifying that the grade & invert elevations (including existing invert elevations), stations and slopes listed on the drawings correspond (and match existing or new finish grades as applicable), as well as conforming with all requirements of this and related sections.
- c. The Contractor and the Contractor's surveyor shall be responsible for reporting any discrepancies to the Owner's Representative far enough ahead of construction to allow Owner's Representative to review and make necessary adjustments without delaying the work.
- d. The Contractor shall be responsible for layout of the work and transferring elevations from the construction control provided by the Surveyor as required to properly complete the construction of all improvements included in this project.
- e. Responsibility of Contractor's Surveyor Regarding Existing Survey Monuments.
 - 1) The Contractor's surveyor shall be responsible for determining the location of survey monuments that need to be located and marked for protection or replacement as specified herein. Existing survey monuments which are not at risk of being disturbed by the Contractor's construction activities are not required to be located and marked.
 - 2) Any failure by the Contractor's surveyor in fulfilling these responsibilities to locate, tie and/or mark existing survey monuments shall not entitle the Contractor to additional contract time or additional compensation.

1.3 MARKING & PROTECTION/REPLACEMENT OF PERMANENT SURVEY MONUMENTS

- a. Prior to construction, the Contractor's Surveyor shall be responsible for researching, locating and marking all existing survey monuments of record (including but not limited to property and street monuments) and permanent elevation benchmarks which may be at risk of being disturbed by the Contractor's construction activities. This shall include those which may be impacted by construction activities (whether or not the monuments are shown on the construction drawings).
- b. Contractor shall not disturb permanent survey monuments, lot stakes, or permanent elevation bench marks unless arrangements have been made to have his surveyor replace said survey markers after construction as noted herein. The Contractor's Surveyor shall be responsible for providing the County Surveyor with any required notice and/or maps as required under ORS 209.140-155. Contractor and Contractor's Surveyor shall bear the responsibility of replacing any survey monument disturbed by construction activities (whether removed with or without the consent or knowledge of the Owner's Representative).
- c. If any survey monuments of record are removed, disturbed or destroyed during construction of the project, the Contractor shall retain the services of a registered Professional Land Surveyor licensed in the State of Oregon to reference and replace all such monuments in accordance with ORS 209.150. The Contractor shall be responsible paying all costs related to the replacement of disturbed survey monuments of record.
- d. Each monument shall be replaced within a maximum of 90 days of its being removed, disturbed or destroyed as may be required by ORS 209.140-155. The surveyor shall notify the County Surveyor in writing of all such monuments replaced, and provide all documentation required by the County Surveyor, and pay any applicable recording fees. All monument replacement work shall be completed prior to final payment by the Owner. No separate or additional compensation will be provided for monument replacement work.
- e. When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument box is located, Contractor shall adjust the monument cover to the new grade at no expense to the Owner.

1.4 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following,
- b. Submittals for Record.
 - 1) During Construction. Copies of construction survey cut sheets shall be provided to the Owner's Representative for reference during construction (faxed or emailed copies are acceptable). Receipt and/or review of these survey cut sheets by the Owner's Representative does not relieve the Contractor of his responsibility to review and confirm all elevations, grades, slopes, etc., and to notify the Owner's Representative of any discrepancies or conflicts.
 - 2) Following Construction. Certification letter regarding the location and marking

of existing survey monuments of record (and replacement of any disturbed monuments) as required under Section 01750, as well as documentation regarding any required notice provided to the County Surveyor. A copy of survey documentation and/or maps submitted to the County Surveyor (pertaining to replacement or restoration of survey monuments, if any) shall be submitted with the certification letter.

1.5 RIGHT-OF-WAY, EASEMENT & PROPERTY LINE MARKING

- a. When the Contractor performs construction in a work zone that is within less than 8 feet of a right-of-way or easement boundary (or within less than 8 feet of a property line for work on private property), the Surveyor shall place tall stakes or lathe (properly identified & marked) on either end of such a work zone, as well as at points of change in width or direction of the right-of-way or easement line (or property line), and at points along the line so that at least two stakes can be seen distinctly from any point within the work area limits.
- b. If the work zone is longer than 50 feet, the boundary marker lathe shall be installed at 50 foot maximum intervals, or closer if required to meet the requirements noted above.

PART 2: PRODUCTS

2.1 SURVEY EQUIPMENT

- a. The surveying equipment used for construction staking, layout of the work and transferring elevations from the construction stakes shall be able to operate within the tolerance limits set by the technical specifications. The Contractor and Contractor's Surveyor shall be responsible for verifying that the equipment is in proper working order and adjustment during all phases of the work. The Owner's Representative may at any time during the project require the Contractor's or Contractor's Surveyor's equipment to be checked for accuracy.

2.2 DIGITAL INFORMATION AVAILABLE FOR USE BY CONTRACTOR'S SURVEYOR

- a. If requested by the Contractor's surveyor, the Engineer will make available the following digital survey & design data for use by the Contractor's surveyor.
 - 1) ASCII point file of the topographic survey and control points.
 - 2) XML file of the design to include surfaces, alignments, profiles, & pipe networks.
 - 3) pdf plots of the current construction drawings.
 - 4) AutoCAD drawing files
- b. No further digital data will be provided to the Contractor or Contractor's surveyor.
- c. The use of the electronic (digital) information transmitted herewith is intended for reference for this specific project, and is not to be used for other projects. The electronic media and/or electronic files shall remain the property of the Engineer and is subject to its copyright. Under no circumstances shall delivery of the electronic files for use by the Contractor or the Contractor's surveyor be deemed a sale by Engineer, and Engineer makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.

- d. Any electronic files provided are not construction documents. Differences may exist between these electronic files and corresponding hardcopy construction documents. Construction shall be based on the stamped hard-copy design drawings produced by Westech Engineering, Inc. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by Westech Engineering, and the electronic files, the signed or sealed hard-copy construction documents shall govern. Contractor is responsible for determining if any conflicts exist. Use of these electronic files does not relieve Contractor of Contractor's duty to fully comply with the contract documents including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other contractors for the project. No revisions shall be made to the design without the express written consent of the Design Engineer whose stamp is on the hard-copy design drawings.
- e. The electronic files are based on computer aided design (CAD) documents compatible with AutoCAD, based on Engineer's specific software configuration & settings. We make no representations regarding the accuracy or completeness of the electronic files received by Contractor or Contractor's surveyor, or compatibility with any computer or software you may use. By such request of and use of electronic files, Contractor and Contractor's Surveyor explicitly acknowledge that he understands that any translation of CAD data from one computer system, operating system or environment to another (or conversion from one CAD version or Civil 3D/XML data structure to another) can and often does result in the loss of important data. This loss can include but may not be limited to: portions of text and dimensions; the existence, location or scale of symbols or other elements of graphics; the internal structure of the data including layers and data attributes; the style or weight of lines; or the completeness, accuracy and/or functionality of Civil 3D data.
- f. By such request of and use of electronic files, Contractor and Contractor's Surveyor further acknowledge that, while all digital CAD data appears to be extremely accurate, this apparent accuracy is an artifact of the techniques used to generate it and is in no way intended to imply actual accuracy. All users of this data take full responsibility for verifying (against the stamped hard-copy design drawings) the correctness of all measurements, areas, inventories, etc. digitally extracted from this data. For example, where shown on the drawings, offset dimensions shall take precedence over the digitally scaled location of structures and utilities. Revisions to the design may be made subsequent to the transmission of this data. It is the responsibility of the user to identify and make all required revisions or corrections to this data required by subsequent design revisions by Westech Engineering.
- g. Any use or reuse by Contractor or by others will be at Contractor's sole risk and without liability or legal exposure to Westech Engineering, Inc. Contractor and Contractor's Surveyor agree to make no claim and hereby agree, to the fullest extent permitted by law, to indemnify, defend and hold harmless Westech Engineering, Inc. (including Westech's officers, directors, employees, agents, or sub consultants) against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs arising out of or resulting from Contractor's use of these electronic files. In no event shall Westech Engineering, Inc. be liable for any loss of profit or any consequential damages as a result of use or reuse of these electronic files by Contractor or any party to whom Contractor provides these files.

PART 3: EXECUTION

3.1 GENERAL

- a. The Contractor shall be responsible for coordinating and providing sufficient advance notice to allow Contractor's Surveyor adequate opportunity to complete field surveying prior to construction.
- b. The Contractor shall be responsible for layout of the Work shown on the drawings or as altered or modified by the Owner's Representative, and for transferring alignments, locations and elevations from the construction stakes set by the Surveyor. The Contractor shall use competent personnel and suitable equipment for the layout of the work required.
- c. The Contractor's Surveyor shall establish baselines and benchmarks that in his judgment will enable the Contractor to proceed with the work. This will include establishing construction control, layout lines, and performing initial construction surveys to establish the lines, locations and grades of pipelines and/or roads, structures and appurtenances at appropriate intervals, on offset lines as determined by the Contractor.
- d. Contractor's Surveyor shall provide survey cut sheets to the Contractor and the Owner's Representative. Marked lathe shall be provided by the Contractor's Surveyor for all construction hubs (offset hubs or elevation hubs) set by the Surveyor.
- e. Pavement and/or Curbs. Construction stakes for line and grade of pavement and/or curbs shall be set at a maximum of 50-foot intervals for curb grades of 0.5% or steeper and 25 feet intervals for curb grades less than 0.5% and at low and high points of vertical curves to assure conformance to plan line and grade.
- f. Pipelines, Utilities or Associated Improvements. Construction stakes for line and grade of pipelines, utilities or associated improvements shall be set at a maximum of 50-foot intervals (or closer if required to assure conformance to plan line and grade), as well as at all horizontal angle points, grade changes, manholes, catch basins, inlets, valves, meters, vaults or other structures.
- g. Buildings, Slabs, Vaults, Etc. Construction stakes for use as horizontal & vertical points shall be set for all buildings, slabs, vaults or other structures, sufficient to allow the contractor to establish stringlines or other means to accurately locate such improvements, as well as allowing the location of conduits, pipes, or other improvements installed prior to form installation to be accurately set.
- h. The Contractor shall preserve and protect the construction stakes or markers set by the Surveyor until their purpose has been served. Any survey construction stakes or markers that are destroyed or disturbed by the Contractor beyond use, and that are essential to the project or prosecution of the work, shall be replaced by the Surveyor at the expense of the Contractor.

3.2 VERIFICATION OF NEW CURB GRADES ALONG EXISTING STREETS

- a. Where new curbs (or curb & gutter) are installed along existing streets, the Contractor's surveyor shall be responsible to verify that the curb/gutter grades match the existing edge

of pavement (or sawcut edges as applicable), based on the design street cross slopes shown on the drawings and the specified curb exposure. Any discrepancies shall be reported to the Owner's Representative prior to installation of curb forms or final setting of string-line, and the curb grades adjusted as required to conform with direction from the Owner's Representative prior to concrete placement. Any such adjustment required shall be at no additional cost to the Owner.

- b. If the Contractor or his surveyor fails to verify grades as specified herein, curbs which are placed too high or too low shall be removed and replaced at no additional cost to the Owner, and such failure shall not entitle the Contractor to additional contract time.

3.3 VERIFICATION OF INVERT ELEVATIONS FOR EXISTING GRAVITY PIPELINES

- a. Where new gravity pipelines connect to existing manholes, catch basins or other junction structures, the Contractor's surveyor shall be responsible to verify that the existing invert elevations at such structures match the elevations shown on the drawings. Any discrepancies shall be reported to the Owner's Representative prior to installation of the new pipelines, to allow the grades to be adjusted if required to conform with direction from the Owner's Representative. Any such adjustment required shall be at no additional cost to the Owner.
- b. If the Contractor or his surveyor fails to verify invert elevations as specified herein, pipelines which are placed too high or too low shall be removed and replaced at no additional cost to the Owner, and such failure shall not entitle the Contractor to additional contract time.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 2

UNDERGROUND, PAVEMENT AND SITE WORK

SECTION 02260
GEOTEXTILE FABRIC

PART 1: GENERAL

1.1 SCOPE

- a. This section includes the furnishing and installing of geotextile fabric and incidentals on the project.

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of the Contract Documents and shall include:
 - 1) For the Owner's Representative's review - Geotextile certification shall conform with Level B requirements per OSSC (ODOT/APWA) 02320.10.c.2.

PART 2: PRODUCTS

2.1 GEOTEXTILE FABRIC

- a. Unless otherwise specified or noted on the drawings, geotextile fabric shall conform OSSC (ODOT/APWA) 02320, Geosynthetics, with minimum property values conforming to Table 02320-1 as noted below. Per OSSC (ODOT/APWA) 02320.10.c.2, if submittal information lists typical or average roll values instead of minimum average roll values, the specified table values under OSSC (ODOT/APWA) 02320 shall be increased by 25%.
- b. Filter Fabric. Unless heavier is specified or noted on the drawings, filter fabric shall be non-woven fabric (Propex Geotex 701, Mirafi 170N, Linq 160EX or approved equal), or woven fabric (Propex Geotex 200ST, Mirafi 500X, Linq GTF200, or approved equal). Slit film fabrics are not allowed.

2.2 PROTECTION

- a. The geotextile shall be furnished in a protective wrapping which shall protect the fabric from ultraviolet radiation and from abrasion due to shipping and handling.

PART 3: EXECUTION

3.1 SURFACE PREPARATION

- a. The surface to receive the geotextile shall be prepared to a smooth condition free of obstructions, depressions and debris.

3.2 PLACEMENT

- a. The fabric shall be placed loosely, not in a stretched condition.

- b. The fabric shall be covered immediately after placement to limit exposure to ultraviolet radiation.
- c. The crushed rock shall be placed so that the geotextile is not punctured.
- d. The maximum drop height for placing crushed rock on the geotextile shall be 3 feet. This specification shall be strictly adhered to so as to avoid damaging the geotextile fabric.
- e. The geotextile fabric shall be installed per plan details.
- f. Transverse joints between fabric panels shall be overlapped for a length in the direction of baserock placement sufficient to prevent movement of the fabric.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 3

CONCRETE

SECTION 03200
CONCRETE REINFORCEMENT

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing and installing concrete reinforcing steel of the quality, type and size as specified herein or shown on the drawings, including all tie wire, clips, supports, chairs, spacers and other appurtenances as required for the completion of the work.

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Number of Submittals.
 - a) Unless otherwise approved in writing by the Owner's Representative (for each structure), no more than one reinforcing steel submittal shall be prepared by the Contractor and submitted for each structure, including (as applicable) all rebar for concrete footings, foundations, slabs, beams, supports, and all CMU block walls.
 - b) Where a single submittal includes reinforcing steel for more than one structure, the submittal shall be divided into sections clearly labeled for each structure.
 - 2) Rebar Shop Drawing & Associated Documentation:
 - a) Shop Drawings, including bending lists and placing drawings, shall be submitted to Owner's Representative for review and approval prior to cutting or fabricating any reinforcing.
 - b) Bending lists and placing drawings shall indicate location for all bars, including straight bars, as well as the number of each bar provided.
 - c) Contractor shall allow sufficient lead time to permit detailing, submission, and review of placing drawings, fabrication, and delivery of bars to be accomplished within the framework of the established construction schedule.
 - d) Contractor shall thoroughly review and redline all shop drawings prior to submittal to the design team.
 - 3) Submittals for record:
 - a) The Owner's Representative shall be given a copy of the weigh bill and invoice for each shipment delivered.
 - b) Certified results of at least one representative tensile and bending test for each size bar and fabric reinforcement furnished for contracts requiring 10,000 lbs of reinforcing steel or more, unless otherwise required.

PART 2: PRODUCTS

2.1 GENERAL

- a. Reinforcing bars shall be fabricated in accordance with dimensions shown on plans and reviewed bending and detail sheets.
- b. Bends for bars other than hooks, stirrups, and ties shall be made around a pin having diameter not less than the following:
 - 1) #3-#8 bars: 6 times the minimum thickness of the bar.
 - 2) #9 & larger: 8 times the minimum thickness of the bar.
- c. Forming and cutting tolerances shall be in accordance with current edition of Manual of Standard Practice for Reinforced Concrete Construction, published by Concrete Reinforcing Steel Institute.
- d. All bars shall be bent cold.
- e. Contractor shall not deviate from bar sizes on plans without written approval from the Owner's Representative. In no case shall bar substitution be allowed which would result in a smaller steel cross section than shown on plans.

2.2 REINFORCING STEEL

- a. Structures & Slabs
 - 1) Bar reinforcement shall be Grade 60 deformed bars meeting the requirements of ASTM A-615 or ASTM A-706 for welded connections.
 - 2) Steel fabric shall conform to ASTM A-185 and shall be furnished in flat sheets.

2.3 ACCESSORIES

- a. Tie wire shall be 16 gauge, black, soft-annealed wire.
- b. Rebar Supports
 - 1) All supports for reinforcement shall be of adequate strength and of the proper depth and number to securely hold the reinforcement in position during concrete placement.
 - 2) Metal and plastic supports shall have a shape that is easily enveloped by the concrete.
 - 3) Metal supports in contact with form work shall have plastic tips.
 - 4) Where slabs are placed on forms, only metal or plastic supports will be permitted.
 - 5) Where slabs are to be poured on firm ground or concrete mud mats, reinforcement may be supported by precast concrete blocks (dobies)(as detailed in CRSI Manual of Standard Practice, Chapter 3 with a minimum strength of 4,000 psi), metal or

plastic supports.

- 6) Bar supports shall be of proper type for intended use and acceptable to the Owner's Representative.
- 7) Driving rebar or form stakes into the ground for support of rebar will not be acceptable.

c. Anchor Bolts and Inserts

- 1) Anchor bolts and inserts for anchor bolts shall be of types placed before the concrete is poured. All anchor bolts and nuts installed in underwater locations and for equipment exposed to the weather shall be Type 316 stainless steel. All others shall be zinc plated mild steel.
- 2) The diameter, length and any bend dimensions of anchors shall be as shown on the drawings or as recommended by the equipment or machinery manufacturer, whichever is more stringent. Unless otherwise required, use 3/4 inch minimum diameter and other geometry as shown on the drawings. In no case shall anchor bolts be more than 1/8-inch smaller than the anchor bolt holes provided by the manufacturer in the equipment or machinery.
- 3) Connections to existing concrete structures shall be made using approved dowels grouted in place with an approved epoxy grout specifically designed for the application. Grout shall be Five Star grout, or approved equal.
- 4) Self drilling anchors and powder activated fasteners will not be permitted except where specified or shown on the drawings.

PART 3: EXECUTION

3.1 GENERAL

- a. All detailing, fabrication accessories and erection of reinforcing steel, unless otherwise noted, shall conform to the "Manual of Standard Practice for Detailing Reinforce Concrete Structures" (ACI 315).
- b. Laps and splices shall conform to the requirements herein, drawing details, ACI 318 or the Oregon Structural Specialty Code, whichever is more stringent.

3.2 DELIVERY, HANDLING AND STORAGE

- a. Delivery, handling and storage shall be in accordance with the following:
 - 1) Reinforcing steel, as delivered to the job site, shall be bound in bundles of either bent or straight bars identified by a numbered weatherproof tag. The tag numbers shall identify the bars corresponding to those shown on the bar lists and placement drawings.
 - 2) Deliver bars with suitable hauling and handling equipment.
 - 3) Provide timbers or dunnage in storage area to keep bars off ground. No part of the

reinforcing bars shall lay in or allowed to be coated with dirt or mud.

3.3 CLEANING

- a. Before placing, reinforcing steel shall be thoroughly cleaned of any loose mill scale, oil, earth, and other contaminants.
- b. After positioning, reinforcement shall be kept free of any coatings which will destroy or reduce bond, including oil, dirt, ice, or old concrete.
- c. Where there is delay in depositing concrete, reinforcement shall be reinspected and cleaned as required prior to concrete placement.

3.4 STRAIGHTENING AND REBENDING

- a. The steel shall not be bent nor straightened in any injurious manner. Bars with kinks or bends not shown on the drawings shall be rejected.
- b. Heating of reinforcement shall not be permitted unless specifically approved by the Owner's Representative.
- c. Bars partially embedded in concrete shall NOT be field-bent, except as specifically authorized by the Owner's Representative. Under no condition shall bars be field bent more than once.

3.5 PLACEMENT OF REINFORCEMENT

- a. Reinforcement of the size and shape shown on the approved shop drawings or as may be directed by the Owner's Representative, shall be placed where indicated on the drawings or as necessary to carry out the intent of the drawings and specifications.
- b. Reinforcement shall be securely tied at intersections as often as necessary to maintain the bars in their proper position during placement of concrete. Tie reinforcing bars in conformance with CRSI recommended practice for placing reinforcing steel (current edition).
- c. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.
- d. No reinforcing bars shall be driven nor forced into concrete after it has obtained its initial set.
- e. **Welding** of reinforcing is prohibited unless specifically noted on the drawing. Where welding is required, method to be subject to approval of the Owner's Representative and in conformance with Oregon Structural Specialty Code.
- f. All bars shall be supported by concrete, metal or plastic supports, spacers, or metal hangers specifically designed to support reinforcing.
- g. Driving rebar or form stakes into the ground for support of rebar will not be acceptable.
- h. Bars in addition to those shown which may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the

Contractor at no additional cost to the Owner.

- i. Welded wire fabric placed over the ground shall be supported on wired concrete blocks (dobies) spaced not more than three (3) feet on centers in any direction. The practice of placing welded wire fabric on the ground and hooking into place in the freshly placed concrete shall not be used.

j. Cover Over Bars

- 1) The clear space between the outside face of reinforcing bars and the surface of concrete shall conform to the following dimensions, except as otherwise shown on the drawings:

LOCATION	MINIMUM COVER (inches)
Concrete in Contact with Earth.	
Formed Walls & Columns	3"
Slabs on Grade & Grade Beams	3"
Concrete in Contact With or Over Water.	
All Members	2"

k. Spacing of Bars

- 1) The clear distance between parallel bars (except in columns and between multiple layers of bars in beams) shall be not less than the nominal diameter of the bars nor less than 1-1/3 times the maximum size of the coarse aggregate, nor less than 1-inch.
- 2) Where reinforcement in beams or girders is placed in two (2) or more layers, the clear distance between layers shall be not less than 1-inch.
- 3) In columns, the clear distance between longitudinal bars shall not be less than 1½ times the bar diameter, nor less than 1½ times the maximum size of the coarse aggregate, nor less than 1½ inches.

l. Location Tolerances

- 1) Reinforcing bars may be moved within allowable tolerances shown below to avoid interference with other reinforcing steel, conduits, other embedded items or openings.

- 2) Placement of reinforcing steel to conform to the following tolerances:

LOCATION	TOLERANCE
Height of top and bottom bars (Beams and Slabs).	±1/4 inch
Lengthwise locations and spacing in slabs and walls.	±2 inches
Lateral spacing of bars in joints or beams.	-0" to +1/4"
Stirrup spacing.	±1 inch in any one stirrup and ±1 inch in end stirrups.

- 3) Bars may need to be moved to avoid interference with other reinforcement steel, conduits or embedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangement of bars shall be as acceptable to the Owner's Representative. Additional bars may be necessary to prevent cracking or provide additional reinforcement in this case and shall be provided by the Contractor at no additional cost to the Owner.

m. Minimum Reinforcing

- 1) Contractor shall provide all concrete walls with 0.25 percent reinforcing steel all ways unless otherwise noted. 24-inch by 24-inch corner bars shall be provided for all horizontal wall steel at all corners all ways unless otherwise noted.

n. Reinforcement Around Openings

- 1) When it is necessary to cut bars for pipe or openings and where not shown otherwise, an equivalent area of steel shall be placed around pipe or opening and extended on each side sufficiently to develop bond in each bar as approved by the Owner's Representative. When welded wire fabric is used, extra reinforcing shall be provided using deformed bars.
- 2) Unless otherwise specified or shown on the drawings, reinforcement shall be provided around all openings as follows:
- a) Place two (2) #6 bars over, two (2) #6 bars under, and two (2) additional #5 bars each side of all openings.
 - b) Two (2) vertical #5 bars at all discontinuous wall ends.
 - c) Vertical bars around openings and at wall ends shall be story height plus 24-inches.
 - d) Horizontal bars around openings shall be opening width plus 3'-6" each end, minimum.

3.6 SPLICING

- a. Splice Length. The ends of spliced reinforcing bars shall overlap at least 48 bar diameters (*unless longer splice lengths are shown or noted on the drawings*) and in no case less than 24 inches (including where All-Thread rebar is spliced to standard deformed rebar).

- b. Adjacent Splices To Be Offset. As a minimum, the splices in adjacent bars shall be staggered and offset by the full required splice length (*ie. legs of adjacent splices shall not overlap*).
- c. Full Contact Required at Splices. In all splices, bars shall be placed in contact and wired together.
- d. If it is necessary to splice reinforcement at points other than shown on plans, character of splice shall be subject to approval by the Owner's Representative.
- e. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each two (2) running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

3.7 STANDARD HOOK LENGTH

- a. Where standard hooks are noted on the drawings or specified, the hook length shall not be less than 12 bar diameters for 90° bends, or 4 bar diameters for 180° bends (*measured from the center of the bend radius*), or the length shown on the drawings, whichever is greater.
- b. Where stirrup/tie hooks are noted on the drawings or specified, the hook length shall not be less than 12 bar diameters for 90° bends, or 6 bar diameters for 135° bends (*measured from the center of the bend radius*), or the length shown on the drawings, whichever is greater.
- c. Where seismic stirrup/tie hooks (*135° seismic hook*) are noted on the drawings or specified, the hook length shall not be less than 6 bar diameters or 3" minimum (*measured from the center of the bend radius*), or the length shown on the drawings, whichever is greater.
- d. Bend diameters shall conform with CRSI standards.

3.8 SUPPORTS

- a. Metal or precast concrete spacer blocks of the required thickness shall be wired to wall and column steel to assure required concrete protection.

3.9 MUD MATS

- a. When the ground is too soft to support reinforcing steel supports, the Contractor shall construct concrete mud mats. Concrete for mud mats shall be 2000 psi concrete and shall not be less than 3-inches thick. Bottom of excavations shall be free of water when mud mats are placed.

3.10 INSPECTION & APPROVAL OF REINFORCING STEEL REQUIRED

- a. Reinforcing steel shall be in place and approved by the Owner's Representative prior to placing any concrete. It is the Contractors responsibility to see that the reinforcing steel is securely and properly supported in the correct position and that all embedment items including electrical conduit is correctly installed before calling for inspections
- b. Contractor shall notify the Owner's Representative a minimum of forty-eight (48) hours (*ie. two business days*) prior to inspections being needed.

- c. The Owner's Representative may at his option require the use of inspection or placement cards if deemed necessary.
- d. Any inspections (*or special inspections*) required under the building permits for the project are separate from the inspection by the Owner's Representative, and shall be arranged directly by the Contractor.

PART 4: SPECIAL PROVISIONS

None.

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing and placing concrete for site construction of foundation slabs, walls, floors, columns, beams, pavements, curbing, conduits and other structures as required.

1.2 ASTM STANDARDS

- a. The manufacture, delivery and installation of cast-in-place concrete shall be in accordance with requirements of ASTM C-94 and applicable documents of that standard, except as modified herein.

1.3 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Mix designs for each type and class of concrete, including required laboratory testing data, as well as historic compressive strength results for the mix design.
 - 2) Certified test reports from the manufacturer of the cement and any admixtures used.
 - 3) The location of all joints not shown on the drawings shall be submitted to the Owner's Representative for review and approval.
 - 4) Plant Certification - Laboratory testing certificates or plant certification as outlined herein.
 - 5) Batch Tickets - The manufacturer of the concrete shall furnish delivery tickets to the Owner's Representative at the unloading site in conformance with the certification required in ASTM C-94.
 - 6) Copies of all quality control field and laboratory testing required by this section, including break results.

1.4 PROJECT TESTING, LABORATORY SERVICES & QUALITY CONTROL

- a. Quality control/testing services shall be provided by an independent certified laboratory retained by the Contractor and shall be in accordance with the requirements of these Contract Documents. This requirement shall not limit or restrict the concrete supplier from performing his own quality control testing. The testing by the independent laboratory shall include:
 - 1) The laboratory shall make scheduled quality control tests consisting of the following:
 - a) Compressive strength
 - b) Slump

- c) Air entrainment
- d) Yield

b. Schedule of Tests:

- 1) Three Test Cylinders - Three test cylinders shall be made from the initial pour each day, and for each 100 C.Y. of concrete poured each day, or whenever there is a visible change in the slump or consistency of the concrete.
- 2) Slump & Air Tests in Conjunction with Cylinder Samples - When cylinder samples are made, the slump and air tests shall be made using concrete from the same batch.

c. Concrete Sampling Location:

- 1) Samples of concrete used for determining air content and slump, and for test cylinders and beams, shall be taken at the point of discharge into the structure unless otherwise directed by the Owner's Representative.
- 2) When concrete is pumped, concrete samples for slump, air content and test cylinders shall be taken at the discharge end of the pumping conduit.
 - a) If the pumping conduit is raised or lowered significantly from its placement position in order to facilitate the taking of such concrete samples, adequate concrete mix shall be discharged from the hose (*prior to taking to sample*) to ensure that a representative sample is obtained.

d. Portion of Load Concrete Sample Is To Be Taken From:

- 1) Samples of concrete used for determining air content and slump, and for test cylinders and beams, shall be taken by passing a receptacle completely through the discharge stream, or by completely diverting the discharge into a sample container.
- 2) Samples shall be taken from the middle portion of the batch to ensure a representative sample (*generally after approximately 25% of the load has been discharged*). In no case shall samples be taken before 10% or after 90 % of the batch has been discharged.

e. If the concrete slump or air content are not within the specified tolerances, or if the 28 day strength falls below that specified for the particular class of concrete, then stop production until concrete within the specified tolerances can be provided.

f. Contractor's Responsibility:

- 1) Any materials or products installed which do not meet the requirements as contained herein, including 28 day compressive strength, may be ordered removed and replaced at the discretion of the Owner's Representative, at no additional cost to the Owner.
- 2) Production of concrete to meet specified requirements shall be the Contractor's responsibility.
- 3) The Contractor shall not be required to furnish a certified Concrete Control

Technician. However, this shall not relieve the Contractor of the responsibility to assure that all concrete work conforms to the requirements contained herein.

g. Standard Testing Specifications:

- 1) Test specimens shall be made in accordance with "Standard Method of Making and Curing Concrete Test Specimens in the Field," ASTM C-31.
- 2) Tests for compression shall be performed in accordance with "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens," ASTM C-39.
- 3) Slump tests shall be made using "Standard Test Method for Slump of Hydraulic Cement Concrete," ASTM C-143.
- 4) Air content shall be determined for concrete mixes composed of sand, gravel and stone aggregates by use of "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method," ASTM C-231. Where slag aggregate is used, the air content shall be determined by use of "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method," ASTM C-173.

1.5 CONCRETE MIX DESIGN & SUPPLIER QUALITY CONTROL

- a. The Contractor or their supplier shall provide initial mix designs and cooperate with the laboratory in adjusting mixes to produce specified classes of concrete within the limiting requirements herein.
- b. Mix designs provided by the Contractor shall include the weight in pounds of fine aggregate, coarse aggregate, cement and water per cubic yard of concrete; the sacks of cement per cubic yard of concrete; the gallons of water per sack of cement; gross weight and yield per cubic yard of concrete; weight in ounces of admixture per sack of cement; slump; air content; and compressive strength of test cylinders at 7 days and 28 days. Weight of fine and coarse aggregate shall be determined in the saturated, surface dry condition.
- c. The mix designs shall be tested by an independent laboratory. The laboratory shall test and produce reports of mix designs for all concrete incorporated in the work.
 - 1) Test reports shall include all information required for the Contractor's design mix specified herein, and shall state "Specifications Are/Are Not Met."
 - 2) The laboratory shall adjust concrete mixes only as required to obtain a product in conformance with the specified limiting requirements.
 - 3) The mix design of all concrete must be approved by the laboratory prior to submittal to the Owner's Representative for his approval. The design mix must be approved by the Owner's Representative before starting concrete production.
- d. Concrete Mix - Quality control tests for concrete mix shall be performed on the first day of concrete production and for every following day when 20 cubic yards (C.Y.) or more of concrete is delivered to the site.
- e. Aggregate Analysis - Aggregate analysis shall be made for each source of aggregate and

for each month that concrete is placed. Make fine and coarse aggregate analysis as required in ASTM C-33.

- f. Production Inspection: When concrete is procured from a central batching plant or transit mixers are used, the Owner may, at his option, provide a representative at such plant to check the proportioning of aggregates, water and mixing time.

1.6 CONCRETE PLANT

- a. Plant equipment and facilities shall be in accordance with applicable requirements of ASTM C-94 and as specified herein.
- b. Equipment shall comply with the following requirements:
- 1) The accuracy of the weighing equipment shall conform with the requirements of the United States Bureau of Standards.
 - 2) Equipment shall be capable of compensating for the varying weight of moisture contained in the aggregates or for changing the proportionate batch weights.
 - 3) The equipment shall be capable for accurately controlling the weight of the cement and aggregate.
 - 4) The equipment shall be so arranged as to permit the convenient removal of overweight material.
 - 5) Standard testing weights and other necessary equipment for testing the accuracy of the weighing equipment shall be available at the plant at all times.
- c. Plant Inspection:
- 1) A qualified representative of the testing laboratory shall inspect the plant and determine if the necessary facilities and equipment are available and adequate for scheduled production of concrete as specified.
 - 2) If the plant does not meet requirements, the Contractor shall be informed of the deficiencies so that they may be corrected.
 - 3) When in the opinion of the laboratory representative, the plant meets the requirements for specified production, he shall so notify the Owner's Representative in writing. The notification shall include a list of all major facilities necessary for use in production of specified concrete for use in the project.
- d. Certification of Plant: In lieu of the requirements of a, b, and c above, the Contractor may submit a January 1, 1976 or later edition of the National Ready Mixed Concrete Association's "Check List for Certification of Ready Mixed Concrete Production Facilities," executed and certified for conformance by a Registered Professional Engineer.
- e. Production of concrete shall not be started until the Owner's Representative has approved the plant for use.

1.7 MIXING AND TRANSPORTING CONCRETE

- a. Types of Mixers: Concrete may be mixed in portable mixers located at the job site, in central plant mixers or in truck mixers. Mixers of any type shall conform to the requirements specified herein.
- 1) Portable and central plant mixed concrete shall be mixed in approved batch mixers of the rotary drum type having sufficient capacity to ensure continuous delivery at the required rate, except that relatively small quantities may be mixed by hand by special permission. The mixing drum shall be kept free of set concrete at all times. A water storage tank equipped with a gauge glass and an accurate measuring device shall be provided to determine the exact amount of water added to each batch. The measuring device shall be readily adjustable and so designed that it can be locked after setting and that the amount of added water cannot be altered after such setting. Mixing shall continue at least one minute at the manufacturer's rated speed of the drum after water, and all aggregate and cement have been added and until every particle of aggregate is coated with mortar and the whole mass uniform in color and homogeneous. The Contractor shall supply a discharge locking device so designed that concrete cannot be discharged in less than the required mixing time. The mixer shall also be equipped with a gong which sounds at the termination of the mixing time and with an approved batch meter which will accurately record each batch delivered.
 - 2) Truck mixed concrete shall be mixed completely in truck mixers equipped with specified water measuring control and locking devices. Each batch of concrete shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment as mixing speed. Additional mixing shall be at the speed designated by the manufacturer of the equipment as their rated capacity. Trucks shall be equipped with counters that register the number of revolutions of the drum or blades.
- b. Transporting Mixed Concrete
- 1) Concrete mixed in a central mixing plant shall be transported to the point of delivery in a truck agitator or in a truck mixer operating at agitating speed. Mixers and agitators shall be operated within the limits of the capacity and speed of rotation designated by the manufacturer of the equipment.
 - 2) Delivery and discharge of mixed concrete shall be completed within ninety (90) minutes after the introduction of the mixing water to the cement and aggregates. In hot weather or under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85°F or above, this time limitation shall be shortened to sixty (60) minutes.
- c. Cold Weather: Concrete delivered in outdoor temperatures lower than 40°F shall arrive at the work having a temperature not less than 60°F nor greater than 90°F, unless otherwise permitted by the Owner's Representative.

PART 2: PRODUCTS

2.1 GENERAL

- a. All materials or products specified under this section which will come in contact with or which will be used on material or products which will come in contact with potable water shall conform to the requirements of NSF 61, Drinking Water System Components - Health Effects, as well as OAR 333-61-0087, Product Acceptability Criteria.
- b. Whenever any material or product is indicated or specified by patent or proprietary name, name of manufacturer or model number, such specification is used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. Such specification of a particular product shall not be construed as acceptable under the above listed criteria. It shall be the Contractor's responsibility to provide certification as required above or provide an equal quality product for which certification can be provided.

2.2 MATERIALS

- a. Cement: Cement shall conform to the requirements of ASTM C-150, Type I, unless provided otherwise in the drawings or specifications.
- b. Concrete Aggregate
 - 1) Fine Aggregate: Fine aggregate shall consist of natural sand composed of clean, hard, strong, durable, uncoated grains. It shall be free from injurious amounts of shale, clay lumps, soft or flaky particles and other unsound or deleterious substances. It shall conform to specifications for concrete aggregate, ASTM C-33.
 - 2) Coarse Aggregate:
 - a) Coarse aggregate shall consist of gravel, slag or broken stone composed of strong, hard, clean, durable, uncoated pebbles or rock fragments free from injurious amounts of shale, coal, clay lumps and soft fragments, dirt, glass and organic or other deleterious substances. It shall conform to ASTM C-33, Size 57, Class 4S. Slag shall weigh at least 75 lbs/cf and shall meet all requirements of the governing State Highway Specifications for slag aggregate.
 - b) For thin sections a smaller maximum size stone shall be used when directed and for heavy sections a larger maximum size stone may be permitted, in which cases the gradation of other sizes shall be modified as directed. Crushed stone and gravel shall be washed, if necessary, to remove dust, dirt or loam. All unsatisfactory materials shall be excluded from the work.
- c. Water: Water used for concrete shall be clean, free from oil, acids, strong alkalis, vegetable matter or sewage contamination. All water shall be furnished at the Contractor's expense, preferably from City mains. Sources other than City water mains shall not be used unless approved by the Owner's Representative. Agricultural water with high total dissolved solids (over 1000 mg/1 TDS) shall not be used.

d. Admixtures:

- 1) Approved admixtures may be used to improve workability provided the cement content is not reduced. No admixture other than air entrainment admixture shall be used unless approved by the Owner's Representative.
- 2) All admixtures shall conform to the requirements of NSF 61, Drinking Water System Components - Health Effects, as well as OAR 333-61-0087, Product Acceptability Criteria
- 3) Air entrainment admixtures: Air entrainment admixtures conforming to ASTM C-260 shall be introduced into the mix in quantities to entrain an optimum air content as specified within $\pm 1\%$.
- 4) Neither calcium chloride nor admixtures containing more than 0.1% chloride ions shall be added to the mix. Written certification of the chloride ion content will be required for all admixtures which the Contractor proposes to use.

2.3 CONCRETE

- a. All concrete shall conform to the requirements of Oregon Structural Specialty Code except as modified herein.
- b. Classes of Concrete: The classes of concrete designate the specified minimum compressive strength in pounds per square inch of the concrete at 28 days. Unless otherwise approved in writing by the Owner's Representative, all concrete shall conform to the requirements listed below. Approval of an alternate mix design shall not relieve the Contractor of the responsibility for ensuring that the concrete meets all other specification requirements.

**TABLE 1
CONCRETE REQUIREMENTS**

Concrete Class	Maximum Water/Cement Ratio(*)	Minimum Cement Content Sacks/C.Y.	Slump (inch)		Air Content ($\pm 1.5\%$)	Intended Use
			Min.	Max.		
4000	0.45 (5.1)	6.5	1	4	4.5%	All Uses

* Also shown in water (U.S. gallons) per 94 lb sack of cement.

c. Water/Cement Ratio:

- 1) Except by special permission from the Owner's Representative, maximum amounts of water (U.S. gallons), including the surface water carried by the fine and coarse aggregates per sack (94 lbs net) of cement, shall be that listed in Table 1. Standard methods shall be used for determination of surface moisture in the aggregates.
- 2) Concrete of the maximum strength, density and durability possible with the specified water/cement ratio is required. No increase of these ratios will be permitted.
- 3) Water shall not be added at the job site without specific approval by the Owner's Representative.

- d. Minimum Cement Content: Each cubic yard of concrete shall contain the minimum number of sacks (94 lbs net) of cement listed in Table 1. The minimum amounts of cement listed shall be used, regardless of tests and design methods used.
- e. Slump:
 - 1) The proportions of aggregate to cement for concrete of the specified water/cement ratio shall be such as to produce concrete that can be puddled readily into the corners and angles of the forms and around reinforcement without excessive vibrating and without segregation of materials or collection of free water on the surface. In those portions of the structures where member dimensions and/or congestion, due to reinforcing steel, prevent the proper placement and consolidation of the concrete at the maximum slump specified, plasticizer shall be used by the Contractor in lieu of increasing the slump of nonplasticized concrete by the addition of water.
 - 2) If concrete containing a plasticizer is approved, it shall have a maximum slump of 8-inches. If the plasticizer is added at the batch plant, the contractor shall provide manufacturer's documentation that the plasticizer will not reduce the set time of the concrete.
- f. Adjustments to Mix Design
 - 1) Consistency of the concrete shall be closely regulated and the proportions of fine and coarse aggregate shall be such as to produce no harshness in placing nor honeycomb in the structures.
 - 2) If required, the mixture shall be changed whenever such change is necessary or desirable to secure the required strength, density, workability and surface finish and the Contractor shall be entitled to no additional compensation because of such changes. The Contractor shall cooperate in every way so that concrete of the desired quality will be obtained.

PART 3: EXECUTION

3.1 FORMS FOR CONCRETE

- a. Responsibility: It shall be the Contractor's responsibility to design, furnish, install and remove all form work and perform incidental work as required to produce concrete structures in conformance with the drawings.
- b. Design: Form work shall be designed to support all anticipated loads without movement or bending and to produce concrete structures conforming to the dimensions and contours shown on the drawings.
- c. Materials: Forms for exposed surfaces shall be made of approved material to produce a smooth surface with minimal joint marks.

3.2 PREPARATION OF SURFACES FOR CONCRETING

- a. Earth surfaces shall be thoroughly and uniformly wetted by sprinkling prior to the placing of any concrete. These surfaces shall be kept moist by frequent sprinkling up to the time concrete is placed thereon. The surface shall be free from standing water, mud and debris at the time of placing concrete.
- b. The surfaces of all horizontal construction joints shall be cleaned of all latence, loose or defective concrete and foreign material. Unless otherwise specified, such cleaning shall be accomplished by sandblasting followed by thorough washing. All pools of water shall be removed from the surface of construction joints before the new concrete is place.
- c. No concrete shall be placed until all formwork, installation of parts to be embedded, reinforcement steel and preparation of surfaces involved in the placing have been completed and accepted by the Owner's Representative. All reinforcement, anchor bolts, sleeves, inserts and similar items shall be set and secured in the forms where shown or by shop drawings and shall be acceptable to the Owner's Representative before any concrete is placed. Accuracy of placement is the responsibility of the Contractor. All surfaces of embedded items that have become encrusted with dried grout from concrete previously placed shall be cleaned of all such grout before the surrounding or adjacent concrete is placed.
- d. All form surfaces in contact with the concrete shall be thoroughly cleaned of all previous concrete, dirt and other surface contaminants prior to use. Damaged form surfaces shall not be used.
- e. Wood form surfaces in contact with the concrete shall be coated with an approved release agent prior to form installation. The release agent shall be non-staining and non-toxic after thirty (30) days. Mill scale and other ferrous deposits shall be sandblasted or otherwise removed from the contact surface of steel forms. All steel forms shall have the contact surfaces coated with an approved release agent. The release agent shall be effective in preventing discoloration of the concrete from rust and shall be non-toxic after thirty (30) days.
- f. Where concrete is to be cast against old existing concrete, the old concrete shall be thoroughly roughened to exposed, hard aggregate by sandblasting or chipping. Any additional surface preparation shall be as called for in the drawings.
- g. No concrete shall be placed in any structure until all water entering the space to be filled with concrete has been properly cut off or diverted out of the forms and clear of the work. No concrete shall be deposited under water or allowed to rise on any concrete until the concrete has attained its initial set. Pumping or other necessary dewatering operations for removing ground water, if required, shall be the responsibility of the Contractor and will be subject to review by the Owner's Representative.
- h. Pipe, conduit, dowels, sleeves and other ferrous items required to be embedded in concrete construction shall be adequately positioned and supported prior to placement of concrete. There shall be a minimum of 2 inches clearance between embedded items and any of the concrete reinforcement. Securing embedments in position by wiring or welding them to the reinforcement will not be permitted.

3.3 FORM & REBAR INSPECTION & APPROVAL REQUIRED, NOTICE

- a. No concrete shall be placed without prior inspection of the forms, reinforcing and embedded items and approval from an authorized representative of the Owner's Representative, as well as any inspections required under the building permit(s).
- 1) The Contractor shall contact the Owner's Representative and request form and rebar inspections a minimum of forty-eight (48) hours (*ie. two business days*) in advance, with such inspection scheduled far enough in advance of concrete placement to allow the Contractor to correct any deficiencies found (*one day minimum*). Any delays due to the need to correct deficiencies found shall be entirely the Contractor's responsibility.
 - 2) The Contractor shall notify the Owner's Representative a minimum of forty-eight (48) hours (*ie. two business days*) in advance of setting the second side of wall forms so that the construction joint preparation, water stop installation and reinforcing steel inspections can be conducted.
 - 3) It is the Contractor's responsibility to see that the forms are properly cleaned and oiled before being set, the construction joints properly prepared, reinforcing steel is securely and properly supported in the correct position and that all embedment items including electrical conduit is correctly installed before calling for inspections.
 - 4) The Contractor shall notify the Owner's Representative a minimum of twenty-four (24) hours in advance (*ie. one business day*) of any scheduled concrete placement.
 - 5) The Owner's Representative may at his option require the use of inspection and/or placement cards if deemed necessary.
 - 6) Any inspections (*or special inspections*) required under the building permits for the project are separate from the inspection by the Owner's Representative, and shall be arranged directly by the Contractor.

3.4 PLACING CONCRETE

- a. General
- 1) The temperature of concrete when it is being placed shall be not more than 90°F nor less than 50°F. Concrete ingredients shall not be heated to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. If concrete is placed when the weather is such that the temperature of the concrete would exceed 90°F, the Contractor shall employ effective means, such as precooling the aggregate and mixing water using ice or placing at night, as necessary to maintain the temperature of the concrete, as it is placed, below 90°F. The Contractor shall be entitled to no additional compensation on account of the foregoing requirements.
 - 2) Concrete which upon or before placing is found not to conform to the requirements specified herein shall be rejected and immediately removed from the work. Concrete which is not placed in accordance with these specifications, or which is of

inferior quality, shall be removed and replaced at the expense of the Contractor.

b. Placement Sequence:

- 1) Unless otherwise specified or authorized by the Owner's Representative, all multi-panel pours shall be poured such that panels are placed in an alternating sequence and allowed to cure before the adjoining panel is placed.
- 2) Unless otherwise shown on the drawing or approved by the Owner's Representative, concrete shall not be placed against the second side of the construction or expansion joints for at least seventy-two (72) hours after that on the first side has been placed.

c. Concrete Placement Scheduling & Sequencing:

- 1) Notice - The Contractor shall notify the Owner's Representative prior to placing concrete as required above, or as required in other specification sections. Where there is a conflict in notice requirements in this and other specification sections or on the drawings, the more stringent requirements shall apply.
- 2) Hours for Placing - Concrete shall be placed between the hours of 7 a.m. and 6 p.m., unless permission is given to extend that time.
- 3) Interruption of Pour - Each concrete pour shall be completed in a continuous operation with no interruption in excess of 45 minutes.
- 4) Initial Set - No concrete shall be placed after its initial set has occurred and no re-tempered concrete shall be used under any circumstances.
- 5) Supporting Members - When columns, brackets or walls are to support beams or slabs, the concrete in the vertical or supporting member shall be deposited up to 1/2-inch above the bottom of the supported member and a period of at least 12 hours shall elapse for settlement before placing concrete in the horizontal member.
- 6) The Contractor shall allow for the installation of conduit, piping, sleeves, inserts or other items which are to be located below or within the concrete.

d. Conveying Concrete to Forms:

- 1) The method or device used for conveying the concrete from the mixer to its place in the work shall be such as to ensure against separation of the materials.
- 2) Where placing operations would involve dropping the concrete more than 5 feet, it shall be deposited through sheet metal or other approved pipes. These pipes shall be made in sections not to exceed 5 feet in length.
- 3) Where a chute is used, its slope shall be such as to allow concrete of the proper consistency to flow readily without separation of the ingredients.

e. Placing Concrete in Forms:

- 1) Concrete shall be deposited at or near its final position and carried up evenly with

in the forms, in layers not exceeding 18-inches in depth. It shall be thoroughly consolidated around and into contact with forms, reinforcement, pipes or other shapes built into the work, by spading and vibrating. Voids or pockets of coarse aggregate shall be prevented and the completed work shall be a solid, watertight unit with smooth form surfaces. A sufficient number of employees shall be available at all times to perform the work properly. Control of methods and practices of placing shall be subject to the approval of the Owner's Representative.

- 2) Where pipe or other shapes are built into the work, the concrete shall be placed from one side only and shall flow under the pipe or shape to the other side until all air is displaced.
- 3) The Contractor shall furnish and have in use sufficient vibrating equipment of a type and size to properly compact each batch immediately after it is placed in the forms. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibration shall be of sufficient duration and intensity to remove all entrapped air and consolidate the concrete, but shall not continue so as to cause separation. "Dragging" of the concrete inside of forms or allowing it to flow by gravity to the ends of forms will not be permitted.
- 4) Spare Vibration Equipment Required On-Site. In addition to the concrete vibrators in actual use while concrete is being placed, the Contractor shall have available (on-site) a minimum of one (1) spare concrete vibrator in serviceable condition. No concrete shall be placed until it has been ascertained that all vibrating equipment, including spares, is in serviceable condition.

3.5 PUMPING OF CONCRETE

- a. Pumping of concrete will be permitted only with the Owner's Representative's approval. The pumping equipment must have two (2) cylinders and be designed to operate with one (1) cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor shall have a standby pump or crane and concrete bucket on site during pumping to provide assurance the concrete will be placed without cold joints in the event of pumping equipment breakdown.
- b. The minimum diameter of the hose (conduits) shall be 4 inches. Pumping equipment and hoses (conduits) that are not functioning properly shall be replaced. Aluminum conduits for conveying the concrete will not be permitted.

3.6 JOINTS AND BONDING

- a. Construction joints and control joints shall be placed as shown on the drawings. Waterstops shall be placed as specified in the applicable sections contained herein. Approval from the Owner's Representative must be secured for the placing of any construction joints not shown on the drawings.
- b. A minimum of 72 hours prior to concrete placement, Contractor shall provide to Owner's Representative with a drawing showing proposed location of all joints in large slabs.
- c. Keyways shall be provided in all construction joints. Unless shown wider or deeper on the drawings, all keyways shall be a minimum 1/3 of the wall width or slab thickness and 2-

inches deep but not less than 4-inches wide x 2-inches deep.

d. Horizontal Construction Joints:

1) Lower Joint Surface Construction:

- a) Proposed joint surfaces shall be finished straight by use of temporary straight edges tacked to the inside of the form with the lower edges on the line of the joint. Concrete shall be placed above the joint as required to allow for consolidation and settlement.
- b) Joint surfaces shall have free water and scum removed and the keyway formed before the concrete attains its initial set.

2) Completing Joints:

- a) Preparation - Within 12 hours after the keyway has been formed, the lower surface of the joint shall be thoroughly cleaned by the use of wire brushes and all laitance and loose material removed so as to expose clean, solid concrete. Care must be taken not to loosen any of the coarse aggregate in the concrete. If for any reason this laitance is not removed within 12 hours after the concrete is placed, it shall be removed using such tools and methods as may be necessary to secure the results specified above.
- b) Bonding
 - (1) After the lower surface has been prepared and immediately before placing concrete above the joint, the lower surface shall be thoroughly wetted and flushed and a bed of mortar composed of one part Portland cement and two parts sand spread over the entire surface (2-inches minimum depth in wall pours). The mortar shall be thoroughly worked into all openings and crevices.
 - (2) The contractor may, at his option, propose to use an enriched mix for the first lift in lieu of the mortar bed. Mix design shall be submitted and approved by the Owner's Representative prior to use.

3) Control Joints: All control joints shall be sawcut within 8 hours of concrete placement.

3.7 FINISHING CONCRETE SURFACES

a. General

- 1) Surfaces shall be free from fins, bulges, ridges, offsets, honeycombing or roughness of any kind, and shall present a finished, smooth, continuous hard surface.
- 2) Allowable deviations from plumb or level and from the alignment, profiles and dimensions shown are defined as tolerances and are specified herein. These tolerances are to be distinguished from irregularities in finish as described herein.

- 3) Aluminum finishing tools shall not be used.

b. UNFORMED SURFACES

- 1) The concrete for unformed surfaces shall be deposited between screeds to the finished floor or slab elevations making 1/8-inch allowance for shrinkage and any surplus water to the surface. Surfaces shall be sloped to drain as shown and care shall be taken not to leave hollows or pockets.
- 2) The finished surfaces shall be true and level so that a 10 foot straight edge will fit tight in all directions without permitting over 1/4-inch variance. Edges of concrete at expansion and pour joints shall be tooled to form a chamfer. No dusting or tempering will be permitted. Any concrete which takes its set before the required finish is obtained shall be cut out and replaced.
- 3) After placing and consolidating concrete, all unformed top surfaces of slabs, walls, curbs, gutter and steps, shall be brought to a uniform finished surface as follows:
 - a) Sufficient leveling and screeding to produce an even, uniform surface with surface irregularities not to exceed 3/8-inch.
 - b) After sufficient stiffening of the screeded concrete, surfaces shall be float finished with wood or metal floats or with a finishing machine using float blades.
 - c) After the floated surface has hardened sufficiently to prevent excess fine material from being drawn to the surface, steel troweling shall be performed with firm pressure such as will produce a dense, uniform surface free from blemishes, ripples and trowel marks. The finish shall be smooth and free of all irregularities.
 - d) Where specified or shown on the drawings, the surface shall be given a light hairbroom finish with brooming perpendicular to line of travel unless otherwise shown. The resulting surface shall be only rough enough to provide a non-skid finish.

c. FORMED SURFACES:

- 1) Immediately following the removal of forms, the concrete shall be inspected for defects such as rock pockets, grout loss, damage from stripping forms, surface defects such as fins, offsets, bulges, excessive bug-holes or stains. All defective concrete work shall be repaired or removed and replaced to the satisfaction of the Owner's Representative. Any work which has not been constructed in accordance with the plans and specifications will be considered defective.
- 2) Correction of defective work shall be as directed by the Owner's Representative and specified herein. No defective work shall be patched, repaired or covered without prior inspection and approval of the Owner's Representative.
- 3) Holes left by tie-rod cones or taper ties shall be reamed with suitable toothed reamers so as to leave the surfaces of the holes clean and rough. These holes then shall be repaired in an approved manner with non-metallic grout.

- 4) No special treatment is required after form removal except for curing, repair of defective concrete, treatment of surface defects or rock pockets, removal of fins, offsets, bulges and projections, filling of tie holes, depressions and bug-holes 3/8-inch or larger in width or depth with mortar.
 - a) All defective concrete shall be repaired, all fins, offsets, bulges and projections removed and ground smooth, filling of tie holes and filling of depressions and bug-holes 1/4-inch or larger in width or depth with mortar.

3.8 CURING OF CONCRETE

- a. Curing of concrete shall be in conformance with ACI 308 and as specified herein.
- b. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures and mechanical injury; and shall be maintained with minimal moisture loss and at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The Contractor shall provide thermometers as required by the Owner's Representative.

3.9 PLACING CONCRETE DURING COLD WEATHER

- a. Atmospheric Temperature: When concrete is placed at or below an atmospheric temperature of 40°F or whenever in the opinion of the Owner's Representative the temperature may fall below 40°F within the curing period, the water, aggregate or both shall be heated and suitable enclosures and heating devices shall be provided.
- b. Heating of Materials:
 - 1) Heating of mixing water shall be controlled to maintain uniform temperature from batch to batch. In no case shall the water be heated to a temperature greater than 140°F.
 - 2) Aggregate shall be uniformly heated to eliminate all frozen lumps, ice and snow; however, the aggregates shall not be heated to a temperature of more than 100°F.
- c. Placing and Curing:
 - 1) Temperature Control - The temperature of the concrete, when placed, shall be not less than 50°F and not more than 75°F. A satisfactory enclosure shall be provided and heated so that the temperature of the concrete will be maintained within this temperature range for a period of not less than 7 days. The enclosures and heating devices shall not be removed at the end of this period until the temperature of the concrete has been permitted to drop to atmospheric temperature at a rate of not to exceed 30°F per 24 hours. Thermometers shall be furnished by the Contractor so that the temperature within the enclosure may be determined.
 - 2) Concrete shall not be placed on frozen base material or in contact with forms, rebar or other materials having a temperature of less than 32°F or where any frost is present. If necessary, the forms, reinforcing steel and foundation materials shall be enclosed and heated before the concrete is placed. The temperature of all surfaces that the concrete will contact shall be raised above the freezing point for at least 12-

hours prior to placing new concrete.

- 3) The completion of suitable enclosures and the application of heat to bring the air surrounding the forms and deposited concrete to the specified temperature shall follow the placing of concrete as soon as possible.
- 4) Heaters shall be vented at all times. No products of combustion shall be permitted to come in contact with concrete surfaces before 24 hours after finishing.
- 5) If steam heat is used, curing compound shall not be applied until the use of steam is discontinued. If a heat source other than steam is used, a relative humidity of not less than 40% shall be maintained unless curing compound is used.

d. Form Insulation:

- 1) In lieu of heated enclosures, the Contractor may protect concrete in slabs more than 12-inches thick and in walls of structures by the use of insulation, if approved by the Owner's Representative.
- 2) Temperature Control - When form insulation is used, the concrete shall be placed at a temperature of not less than 50°F and not more than 75°F as directed by the Owner's Representative and maintained by the insulation at a surface temperature of the concrete of not less than 50°F and not more than 100°F. Sufficient thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. Whenever the surface temperature, as indicated by the thermometer readings, exceeds the specified maximum temperature, the forms or insulation shall be loosened or otherwise vented until the surface temperature is within the specified limits. If the thermometer readings indicate that the minimum required temperature is not being maintained, the structure shall be promptly enclosed and heat furnished as required.
- 3) The insulating material shall be wind and water resistant. Special precautions shall be taken at edges and corners to ensure that such points are adequately protected. The tops of pours shall be protected by a tarpaulin or other approved waterproof cover over the insulation.
- 4) At the close of the protection period, the temperature of the concrete within the form shall be gradually decreased, by loosening the forms of insulation to permit a rate of cooling not to exceed 30°F per 24 hours until the concrete attains atmospheric temperature.

3.10 PLACING CONCRETE UNDER WATER

- a. Concrete may be deposited under water only when provided on the drawings or by special permission from the Owner's Representative.
- b. Materials: Any concrete deposited under water shall contain at least 7.0 sacks of cement per cubic yard of concrete to compensate for losses due to water.
- c. Preparation:
 - 1) Care shall be exercised to prevent laitance and laitance on previously placed

concrete shall be removed before depositing additional concrete.

- 2) Pumping shall be discontinued while depositing foundation concrete and all flow of water inside of forms or sheeting shall be stopped.
- d. Placing: Concrete deposited under water shall be carefully placed in a compact mass in its final position by means of a tremie, a closed bottom dump bucket or other approved methods and shall not be disturbed after being deposited. The lower end of the tremie shall be submerged in the fresh concrete to maintain a seal.

3.11 PROTECTION

- a. All forms and reinforcing steel, located above the concrete being placed and all placing equipment shall be kept clean and free of hardened concrete.
- b. Free Water:
 - 1) Concrete for structures shall not be placed in water, nor shall water be allowed to come into contact with freshly poured concrete until it has attained a sufficient set (*except where special prior written permission may have been given to place concrete under water by tremie*).
 - 2) Water used for cleaning the placing equipment shall be discharged outside the forms.
- c. Aluminum Inserts: All aluminum materials inserted in concrete shall have the contact surface coated with bitumastic.

3.12 TIMING OF FORM REMOVAL

- a. No forms shall be removed in less than the time limits specified below or in other applicable sections contained herein, whichever is more stringent.
- b. If forms are loosened less than seven (7) days after the pour, they shall be removed completely, and any required curing procedures started within 1/2 hour after loosening.
- c. The Owner's Representative shall have the right to order the retention of any form until such time, in the Owner's Representative's opinion, they may be safely removed without injury to the structure.
- d. Suspended Slab Form Removal
 - 1) Forms for all suspended slabs and suspended beams shall remain in place until all of the following are satisfied.
 - a) Concrete has been in place for a minimum of seven (7) days.
 - b) Test cylinders attain a minimum compressive strength of seventy-five percent (75%) of the 28-day strength specified.
 - 2) For suspended slabs installed in segments, no forms shall be disturbed or removed from under an individual panel or unit until the concrete in the adjacent

panel or unit has attained seventy-five percent (75%) of the specified 28-day strength AND has been in place for a minimum of seven (7) days.

- 3) After form removal, suspended floor slabs, girders and beams shall be shored, in general, for a period of two weeks, under favorable curing conditions.

3.13 TIMING OF BACKFILL INSTALLATION, ETC.

- a. Unless otherwise approved in writing by the Owner's Representative, walls and structures shall not be backfilled until the concrete has reached a minimum of 75% of the specified design strength, but in no case sooner than 3 days after placement of concrete.
- b. If the Contractor proposes to begin backfill operations prior to the standard 7 day cylinder break, additional cylinders shall be cast at the Contractor's expense to allow for additional breaks prior to the standard 7 day time period.
- c. Use of Mechanical Vibration Equipment Adjacent to New Concrete: Unless otherwise approved in writing by the Owner's Representative, use of mechanical vibration equipment adjacent to new (*green*) concrete shall not occur for a minimum of 36 hours after the concrete is placed and finished (*ie. including but not limited to concrete vibrators for additional concrete adjacent to green concrete, vibratory roller compactors adjacent to green concrete, hoe packs or jumping jack compactors, or vibratory installation of pilings, caissons or similar components*).

3.14 REPAIRS

- a. If, for any reason, the finished concrete surfaces show voids, undue roughness or other defects, repairs shall be made or concrete cut out and replaced at the Contractor's expense and in accordance with ACI 301, Section 5.3.7.
- b. Through holes shall be completely filled by use of a pressure gun.
- c. Patching
 - 1) Unless otherwise specified, cavities produced by form ties, honeycombed spots, broken corners or edges and other defects shall be cleaned, saturated with water and completely filled, grouted and trued with a mortar of cement and fine aggregate of the same proportions used in the concrete being finished. Form tie holes shall be completely filled by use of a pressure gun or hand ramming method. Defective concrete shall be removed. Small shallow holes caused by air entrapment at the surface of the forms shall not be considered defects unless the amount is so great as to be considered not the standard of the industry and due primarily to poor workmanship.
 - 2) On exposed concrete surfaces or walls (*including interior walls of pump station wetwells*), all fins and irregular projections shall be removed with a stone or power grinder or with a bushing hammer, in such a way as to avoid contrasting surface textures and result in a smooth surface.
 - 3) If chipping is required to remove rock pockets or other void areas, the edges shall be perpendicular to the surface. Feathered edges for grouted repairs will not be permitted.

- 4) Except where the surface is to be painted or otherwise covered, sufficient white cement shall be substituted for the regular cement in the patching mortar to produce finished patches of the same color as the surrounding concrete (*for concrete which is exposed to view*).
- 5) All defective areas or form tie holes deeper than 2 inches shall be filled with a non-shrink, non-metallic grout. Use an approved bonding agent on horizontal patches prior to placing non-metallic, non-shrink grout. Since some bonding agents may not be compatible for some vertical surface patching techniques, submit all proposed methods for repair of vertical surfaces prior to ordering materials. The Contractor shall consult with representatives of the bonding agent manufacturer and the non-shrink grout manufacturer, and obtain a written recommendation for the patching of defective areas. Submit this information for review prior to performing the work.
- 6) Dress surface of patches that will remain exposed to view to match the color and texture of the adjacent surfaces.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 5

METALS

SECTION 05500
METAL FABRICATIONS

PART 1: GENERAL

1.1 DESCRIPTION OF WORK

- a. This Section includes the following:
 - 1) Miscellaneous steel and aluminum framing and supports and bearing plates.

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include, but not be limited to, the following:
 - 1) Submittals for Review. Submittals shall include but not limited to the following. Approval of submittals by the Owner's Representative shall be obtained prior to ordering materials and/or equipment associated with the bypass pump system.
 - a) Shop Drawings: Include plans, elevations, sections, details of installation, and attachments to other Work. Include drawings showing the waterline bridge crossing and the pipe joint alignment in relation to the pipe support bracket locations to confirm the absence of conflicts with pipe bells.
 - b) Templates: For anchor bolts
 - 2) Contractor shall allow sufficient lead time to permit detailing, submission, and review of placing drawings, fabrication, and delivery of bars to be accomplished within the framework of the established construction schedule.
 - 3) Contractor shall thoroughly review and redline all shop drawings prior to submittal to the design team.

PART 2: PRODUCTS

2.1 METALS

- a. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.
- b. Ferrous Metals:
 - 1) Steel Wide Flange: ASTM A-992, 50 KSI minimum yield strength.
 - 2) Other Shapes, Steel Plates, and Bars: ASTM A-36, 36 KSI minimum yield strength.
 - 3) Stainless-Steel Bars and Shapes: ASTM A-276, Type 316L, 25 KSI minimum yield strength.

- 4) Steel Tubing: Cold-formed steel tubing complying with ASTM A-500, 46 KSI minimum yield strength.
- 5) Steel Pipe: ASTM A-53, 35 KSI minimum yield strength, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

c. Aluminum:

- 1) Extrusions: ASTM B-221, alloy 6063-T6.
- 2) Alloy Rolled Tread Plate (Checkered Plate): ASTM B-632, alloy 6061-T6.
- 3) Shapes, Bars and Plates: ASTM B-221, alloy 6061-T6.

2.2 PAINT

- a. Shop Primer for Ferrous Metal: See Division 9, Section 09900 "Painting."
- b. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for re-galvanizing welds in steel.

2.3 MISCELLANEOUS MATERIALS

- a. Fasteners: Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B-633, Class Fe/Zn 5, where built into exterior walls, of type, grade, and class required by application indicated.
- b. Non-shrink, Nonmetallic Grout: ASTM C-1107, factory-packaged, non-staining, noncorrosive, nongaseous grout.

2.4 FABRICATION

- a. Connections, General: Use connections that maintain structural value of joined pieces.
 - 1) Shear and punch metals cleanly and accurately. Remove burrs.
 - 2) Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
 - 3) Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes.
 - 4) Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
- b. Miscellaneous Framing and Supports: Fabricate steel and aluminum framing and supports as necessary to complete the Work as shown on Drawings. Cut, drill, and tap units to receive hardware, hangers, and similar items.

- c. Miscellaneous Steel Trim: Fabricate units with continuously welded joints and smooth exposed edges. Miter corners and use concealed splices where possible. Fabricate cutouts, fittings, and anchorages; coordinate assembly and installation with other work.

2.5 FINISHES

- a. Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items not indicated to be galvanized.
 - 1) Hot-dip galvanize items indicated to be galvanized to comply with ASTM A-123 or ASTM A-153/A-153M as applicable.
 - 2) Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
 - 3) Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3: EXECUTION

3.1 INSTALLATION

- a. General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.
 - 1) Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
 - 2) Fit exposed connections accurately together. Weld connections, unless otherwise indicated. Do not weld, cut, or abrade galvanized surfaces.
 - 3) Deliver steel bearing plates and other items to be built into other work so as not to delay the other work.
- b. Touch up surfaces and finishes after erection.
 - 1) Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
 - 2) Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A-780.
- c. Aluminum fabrications shall be bolted with hot dipped galvanized or stainless steel bolts where bolts are required.
 - 1) Martensitic stainless steel (Type 410) shall not be used for aluminum connections.

- 2) Austenitic stainless steel (Type 302/304, 303, 305) shall be used for aluminum connections.

PART 4: SPECIAL PROVISIONS

None.

SECTION 05521
ALUMINUM PIPE AND TUBE RAILINGS

PART 1: GENERAL

1.1 DESCRIPTION OF WORK

- a. This Section includes the following:
 - 1) Aluminum pipe and tube railings.
- b. All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

1.2 PERFORMANCE REQUIREMENTS

- a. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1) Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.
- b. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1) Handrails:
 - a) Uniform load of 50 lbf/ ft. applied in any direction.
 - b) Concentrated load of 200 lbf applied in any direction.
 - c) Uniform and concentrated loads need not be assumed to act concurrently.
 - 2) Rails of Guards:
 - a) Uniform load of 50 lbf/ ft. applied in any direction.
 - b) Concentrated load of 200 lbf applied in any direction.
 - c) Uniform and concentrated loads need not be assumed to act concurrently.
- c. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1) Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- d. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

- a. Submittals shall conform to the requirements of these Contract Documents and shall include:
 - 1) Product Data: For the following:
 - a) Manufacturer's product lines of mechanically connected railings.
 - b) Grout, anchoring cement, and paint products.
 - 2) Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - a) For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - b) Contractor shall thoroughly review and redline all shop drawings prior to submittal to the design team.
 - 3) Samples for Verification: For each type of exposed finish required.
 - a) Sections of each distinctly different linear railing member, including handrails, guard rails and posts.
 - b) Fittings and brackets.
 - c) Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - d) Show method of connecting members at intersections.
 - 4) Mill Certificates: Signed by manufacturers of aluminum products certifying that products furnished comply with requirements.
 - 5) Welding certificates.
 - 6) Qualification Data: For professional engineer and testing agency.
 - 7) Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E-894 and ASTM E-935.

1.4 QUALITY ASSURANCE

- a. Source Limitations: Obtain each type of railing through one source from a single manufacturer.
- b. Welding: Qualify procedures and personnel according to the following:
 - 1) AWS D1.2, "Structural Welding Code--Aluminum."

1.5 PROJECT CONDITIONS

- a. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1) Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 - 2) Provide allowance for trimming and fitting at site.

1.6 COORDINATION AND SCHEDULING

- a. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- b. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2: PRODUCTS

2.1 MANUFACTURERS

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Aluminum Pipe and Tube Railings:
 - a) AlumaGuard Corp.
 - b) Golden Railings, Inc.
 - c) Superior Aluminum Products, Inc.

2.2 METALS, GENERAL

- a. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- b. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.3 ALUMINUM

- a. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
- b. Extruded Bars and Tubing: ASTM B-221, Alloy 6063-T5/T52.

- c. Extruded Structural Pipe and Round Tubing: ASTM B-429, Alloy 6063-T6.
 - 1) Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.
- d. Drawn Seamless Tubing: ASTM B-210, Alloy 6063-T832.
- e. Plate and Sheet: ASTM B-209, Alloy 6061-T6.
- f. Die and Hand Forgings: ASTM B-247, Alloy 6061-T6.
- g. Castings: ASTM B-26, Alloy A356.0-T6.

2.4 WELDING MATERIALS, FASTENERS, AND ANCHORS

- a. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- b. Fasteners for Anchoring Handrails and Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
 - 1) For aluminum handrails and railings, use fasteners fabricated from stainless steel Types 302/304, 303, 305 or hot dipped galvanized steel.
- c. Fasteners for Interconnecting Handrail and Railing Components: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
 - 1) Provide concealed fasteners for interconnecting handrail and railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for handrails and railings indicated.
 - 2) Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- d. Cast-in-Place and Postinstalled Anchors: Anchors of type indicated below, shall be per Section 03200, Part 2.3 c Anchor Bolts and Inserts.
 - 1) Cast-in-place anchors.
 - 2) Adhesive anchors.
 - 3) Expansion anchors.

2.5 GROUT AND ANCHORING CEMENT

- a. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

- a. General: Fabricate handrails and railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- b. Assemble handrails and railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- c. Form changes in direction of railing members as follows:
 - 1) By bending.
- d. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- e. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:
 - 1) Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2) Obtain fusion without undercut or overlap.
 - 3) Remove flux immediately.
 - 4) At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- f. Nonwelded Connections: Fabricate handrails and railings by connecting members with concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- g. Welded Connections for Aluminum Pipe: Fabricate pipe handrails and railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- h. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing members to other work, unless otherwise indicated.
- i. Provide inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.
- j. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.

- k. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.
- l. Cut, reinforce, drill, and tap components, as indicated, to receive finish hardware, screws, and similar items.
- m. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members that are exposed to exterior or to moisture from condensation or other sources.
- n. Fabricate joints that will be exposed to weather in a watertight manner.
- o. Close exposed ends of handrail and railing members with prefabricated end fittings.
- p. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of railing and wall is 1/4 inch or less.
- q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 FINISHES, GENERAL

- a. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- b. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.8 ALUMINUM FINISHES

- a. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- b. Mechanical Finish: AA-M12 (Mechanical Finish: nonspecular as fabricated).
- c. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3: EXECUTION

3.1 INSTALLATION, GENERAL

- a. Fit exposed connections together to form tight, hairline joints.
- b. Perform cutting, drilling, and fitting required to install handrails and railings. Set handrails and railings accurately in location, alignment, and elevation; measured from established lines and levels and free from rack.
 - 1) Do not weld, cut, or abrade surfaces of handrail and railing components that have

been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

- 2) Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3) Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- c. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
 - d. Adjust handrails and railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.
 - e. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing handrails and railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- a. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of handrails and railings.
- b. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- c. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

- a. Anchor posts to metal surfaces of metal supporting members as follows:
 - 1) For aluminum pipe railings, attach posts as indicated using fittings designed and engineered for this purpose.

3.4 ANCHORING RAILING ENDS

- a. Anchor railing ends into concrete and masonry with round flanges connected to railing ends and anchored into wall construction with postinstalled anchors and bolts.
- b. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces.
 - 1) Weld flanges to railing ends.

3.5 ATTACHING HANDRAILS TO WALLS

- a. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface.
- b. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- c. Secure wall brackets to building construction as follows:
 - 1) For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

3.6 CLEANING

- a. Clean aluminum by washing thoroughly with clean water and soap and rinsing with clean water.

3.7 PROTECTION

- a. Protect finishes of handrails and railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at the time of Substantial Completion.
- b. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 6

WOOD AND PLASTICS

SECTION 06650
FRP STOP LOGS

PART 1: GENERAL

1.1 SCOPE

- a. This section includes the fabrication and installation of FRP stop logs including the frames, anchors and other incidental work.

1.2 REFERENCES

- a. Design, fabricate, and test stop log systems and materials in accordance with manufacturer's recommended procedures and the following codes and standards:
 - 1) ASTM A276 - Stainless Steel Bars
 - 2) ASTM D256 - Izod Impact Strength
 - 3) ASTM D570 - Water Absorption Rate
 - 4) ASTM D638 - Tensile Strength
 - 5) ASTM D695 - Compressive Properties of Rigid Plastic
 - 6) ASTM D696 - Coefficient of Linear Expansion
 - 7) ASTM D790 - Flexural Properties
 - 8) ASTM D2583 - Indentation Hardness
 - 9) ASTM D2563-0 - Visual Defects
 - 10) ASTM D2584 - Resin, Glass & Filler Content

1.3 QUALIFICATIONS AND WARRANTY

- a. Manufacturer shall be experienced in the design and manufacture of fiberglass stop logs and accessories for a minimum of 25 years.
- b. Manufacturer must provide warranty for 25 years against failure due to corrosion of composite materials.

1.4 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of Section 01300 and shall include shop drawings showing all parts, dimensions, and materials for review.

PART 2: PRODUCTS

2.1 MATERIALS

- a. Stop log panels shall be:
 - 1) Engineered composite fiberglass reinforced plastic (FRP) completely encapsulating an internal steel reinforcing structure.
 - a) Infusion molded to create a seamless corrosion barrier impervious to moisture.
 - b) FRP resin shall be: polyester.
 - c) Internal Steel Reinforcing: Carbon Steel as needed for deflection requirements.
 - d) Foam core between steel reinforcing.

- e) Seal material shall be EPDM
- 2) Guide Frames
 - a) Guide Frame Rails shall be: T-304 stainless steel.
- 3) Lifting Pins
 - a) Lifting Pins shall be: T-304 stainless steel.
- 4) Anchor Bolts
 - a) Anchor Bolts shall be: T-304 stainless steel.
- 5) Lifting Beam
 - a) Lifting Beam shall be: T-304 stainless steel.

2.2 DESIGN CRITERIA

- a. Visual inspection for defects shall be made without the aid of magnification. Defects shall be classified as shown in Table 1 Level II of ANSI/ASTM D2563-0, approved 1977, (or any subsequent revision).
- b. Deflection
 - 1) Deflection across the stop log width shall be limited to: $L/360$ or $\frac{1}{4}$ " (6mm), whichever is less, at the maximum operating head.
- c. Head Pressure
 - 1) Stop log system shall be designed for a maximum head pressure of 6.5 feet.
- d. Stop log panel size as shown on the drawings.
- e. Surface Conditions
 - 1) All stop log panels shall be flat and level.
 - 2) Warpage throughout the entire stop log panel shall not produce a crown of more than $\frac{1}{16}$ " (1.6mm) in any direction.

2.3 CONSTRUCTION

- a. Stop Log Panels
 - 1) The stop logs shall be fabricated by means of vacuum infusion to encapsulate the internal structural matrix totally and protect it against corrosion from moisture or chemical deterioration with a minimum thickness of $\frac{1}{4}$ inch (6mm) FRP on the front and back facings, and $\frac{3}{4}$ inch (19mm) FRP on the remaining perimeter. Stop logs shall be designed so the maximum fiber stress (ultimate or yield, whichever applies) shall exceed 2.5 times the working stress. Stop logs shall be suitably reinforced to withstand the maximum seating head with a deflection less than $\ell/360$ of the stop log width or $\frac{1}{4}$ inch (6mm), whichever is less. Stop log covers that are fabricated from pressed or laminated sheet material and/or glued/bonded to a substructure shall not be acceptable. No seams or joints that may allow water intrusion will be acceptable. Each stop log shall be molded individually to the exact dimensions specified.

- 2) Stop log shall be manufactured of reinforced thermoset plastic in the form of FRP.
- 3) Stop log shall have UV Stabilizing pigment in the resin to provide long-term protection from UV.
- 4) The surface shall be resin-rich to a depth of 0.010 inches (2.5mm) to 0.020 inches (5mm) and reinforced with C-glass or polymeric fiber surfacing material.
- 5) The surface shall be free of exposed reinforcing fibers.
- 6) The composition of these surface shall be approximately 95% (by weight) resin. The remaining laminate shall be made up of copolymer composite and reinforcing fibers in a form, orientation, and position to meet the mechanical requirements.
- 7) Structural reinforcing shall be utilized to attain the necessary stiffness to meet deflection requirements and shall be well-encapsulated with a laminate not less than ¼" (6mm) thick on each side to ensure against any permeation by water to the core areas. Internal steel structure to be welded per AWS standards, sandblasted, and coated with epoxy vinyl ester resin immediately prior to vacuum infusion to ensure complete bonding with external corrosion barrier.
- 8) T-304 stainless steel lifting pins shall be attached to the Stop Log by passing completely through the log. Stainless steel lifting pin shall be fastened to the log with sufficient reinforcing to withstand the lifting force. Lifting pins attached to the surface of the log are not acceptable. The through holes shall not pass through or be in contact with the internal steel reinforcing.
- 9) Core material must be 100% resistant to decay and attack by fungus and bacteria and be resistant to hydrocarbons.
- 10) To assure maximum service life, the copolymer composite shall be ultraviolet stabilized and seamless to protect inner structural members from corrosion.
- 11) Metal, concrete, or wood stop logs subject to corrosion / bacterial breakdown / rot shall not be acceptable alternatives to composite FRP material.
- 12) Stop Log panels shall be manufactured using advanced technology vacuum infusion resin transfer processes. The closed mold vacuum process must completely evacuate all air from the mold prior to infusing the mold with premium quality resin as specified. The vacuum infusion process must eliminate the potential of air entrapment and/or voids in the matrix of the stop log panel (which cause defects and performance-detracting irregularities), producing a finished product that is one-piece, seamless, and uniformly impenetrable by fluids, eliminating the chance for interior corrosion. Stop Logs produced by techniques that employ adhesives or mechanical fasteners to attach individual panels to a pre-fabricated framework, resulting in seams along vertical and horizontal axes of the stop log, shall not be allowed, as they create stress-potential areas, portals for fluid infiltration, subsequent de-lamination, and product failure due to corrosion.

b. Seals

- 1) The stop logs shall be equipped with elastomeric bottom seals to seal between the logs. Vertical seals shall be mounted on the face at the ends of the stop logs positioned to contact the inside of the guide rails. Seals shall be made of molded EPDM, having a hardness of 55 – 65 Shore A durometer, with a maximum compression set of 25% and low temperature brittleness to meet suffix F-17 (-40°F/C).

- c. Guide Frames
 - 1) Guide frames shall be styled for surface mounting as shown on the drawings.
 - 2) Guide frames shall be fabricated from 304 stainless steel and shall have a slot suitable for mating with the stop log panels.

2.4 LIFTING BEAM/POLE

- a. Furnish a stainless-steel lifting beam/pole designed to latch onto the lifting pins for removal of each stop log. Beam/pole shall include an integral spring-loaded latching mechanism to connect to the lifting pins. Beam shall be designed to travel in the same channel as the stop logs.

2.5 PHYSICAL PROPERTIES

- a. Structural characteristics for FRP glass mat laminates shall meet the following minimum physical properties:

Tensile strength	15,000 psi (1034 ksc)
Flexural Modulus	900,000 psi (70307 ksc)
Flexural Strength	20,000 psi (1406 ksc)
Compressive Strength	20,000 psi (1547 ksc)
Impact Strength	9.0 ft-lbs/in. (1.24 kgf.m/25mm)
Water absorption	0.12% (in 24 hours)

- b. Seals: Extruded EPDM seals shall have the following physical characteristics:

Specific Gravity	1.25
Hardness	55 – 65 Shore A Durometer
Tensile Strength	1500 psi min. (0.07ksc)
Elongation	300% min.
Low temperature brittleness	- 40°

PART 3: EXECUTION

3.1 INSTALLATION

- a. All stop log guides shall be square, set plumb and securely anchored to the walls and floors as detailed. All guides that are twisted, buckled or prevent free movement of the stop logs shall be removed and replaced.
- b. All stop logs shall slide easily in guides and be watertight.
- c. Stop log gates and guides shall be installed in strict conformance with manufacturer's instructions.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 11

EQUIPMENT AND SYSTEMS

SECTION 11410
SEISMIC VALVE CONTROL SYSTEM

PART 1: GENERAL

1.1 SCOPE

- a. The section includes furnishing and installing the seismic valve control system at the South Tank including the seismic monitor, valve control system, and new pilot controls for the existing diaphragm control valve located in the valve vault at the South Tank.
- b. A single supplier shall provide the seismic monitor, seismic control system, and the pilot controls.
- c. A representative of the manufacturer shall provide start-up services and training in the operation and maintenance of the equipment.
- d. Operation and maintenance manuals shall be provided for all equipment furnished and/or installed.
- e. All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

1.2 MANUFACTURER'S REPRESENTATIVE

- a. The seismic monitor and valve control system manufacturer shall furnish the service of a qualified representative to supervise the installation, start-up and field testing of the equipment. A qualified manufacturer's representative shall be one who has had at least two years experience in the installation of the types of equipment specified for this project.
- b. At the completion of the installation, the following certifications shall be submitted as a minimum and included in the front of the O&M manuals.
 - 1) Certification letter signed by the manufacturer's representative stating the following as a minimum:
 - a) All required installation manuals were provided to the equipment installer with the equipment.
 - b) The installation is as specified and is acceptable to the manufacturer.
 - c) The warranty and/or guarantee will be in full effect during the warranty period with no qualifications or reservations.
 - 2) Certification letter signed by the equipment installer stating the following as a minimum:
 - a) The installation and operations manuals were received with the equipment and appurtenances.

- b) The installer has read the manufacturer's recommended installation procedures.
- c) The equipment and appurtenances were installed in strict conformance with the specification requirements and the manufacturer's recommended installation procedures. Any variances shall be noted.

1.3 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Submittals for Record
 - a) The Contractor shall submit an installation and operation certificate and a statement from the manufacturer as outlined above.
 - b) Complete operations and maintenance information for all equipment, and accessories, including manufacturer's warranties.
 - 2) Submittals for Review
 - a) Shop drawings including:
 - (1) Complete specifications, descriptive drawings, wiring schematics and literature of the equipment and appurtenances.
 - 3) Operations and Maintenance information, including parts lists for each piece of equipment, shall be submitted for all materials and equipment furnished under this and related sections, including printout of any programming and/or setpoints for controllers or other programmable equipment (after startup)..

1.4 ELECTRICAL AND CONTROLS COORDINATION

- a. If the current requirement of any motor or piece of equipment is increased to such an extent that the wiring or conduit for the equipment must be increased from that shown on the electrical drawings, the Contractor shall furnish and install the larger items. The increased wiring and conduit shall be provided at no additional cost to the Owner.
- b. All electrical, instrumentation, and control equipment and panels furnished under this section shall conform to appropriate sections of these Specifications. Equipment and panels shall be NEMA 4X or explosion proof unless otherwise specified or designated on the drawings.

1.5 WARRANTY

- a. All equipment shall be warranted for a period of two full years from the date of substantial completion.

PART 2: PRODUCTS

2.1 SEISMIC MONITOR, RESERVE POWER & VALVE CONTROL PANEL

- a. The following specifications describe systems manufactured by two different manufacturers. Either system is acceptable and the contractor may choose from one of the two systems, or an approved equal.
- b. The Seismic Monitor / Reserve Power and Valve Controller panel shall be housed in a single enclosure as a stand-alone system. Battery and charger capacities and control wiring shall be individually engineered to suit electrical demand characteristics the solenoid valve control system specified below. Batteries shall be sized to provide sufficient reserve to provide 5 open/close cycles for the valve over a 10-day period without main power supply.
- c. Monitor panel shall provide control switch and position indicator light (open/closed) to enable manual manipulation of the diaphragm valve. Control output shall be a constant 24 VDC. A fault indicator contact shall be provided to report on the following system status: Loss of AC power, Low AC power, Low battery, Battery fuse, AC fuse, Short fault protection.
- d. Following a seismic activation ("system trip"), control circuitry shall hold valve system in closed position until reset by operator or reset remotely by momentary contact closure. The sensor will record PGA (Peak Ground Acceleration) "g" values in non-volatile 'Flash' memory for future engineering evaluation.
- e. Terminal connectors shall be provided for SCADA or other means of remote monitoring or control as shown on the drawings or specified herein. Panel shall be capable to receive 4- 20 ma. feedback from exterior source such as flow or pressure indicators etc. to enable alternate logic schemes.
- f. Power Requirements: 120 VAC, 60 Hz. Control outputs 24 VDC, Dry Contact, user selectable N/O or N/C contacts. Control relays remain latched following seismic activation until operator reset.
- g. Physical: Enclosure NEMA 4X stainless steel with security locks. Operating temperature, minus 20C to plus 70C. Control relays -10amp capacity.
- h. Seismic Sensor: Solid state digital or mechanical sensors permitted. The unit shall react to ground motion in the x, y, and z axes. The sensor shall have an adjustable, factory-set sensitivity from 0.05g to 0.50g (initially set at 0.25g). The seismic sensor shall be factory tested and certified at the manufacturing plant prior to shipment. The owner shall receive three printouts showing that the sensor trips at the specified setpoint in all three axes.
- i. The seismic sensor shall have a manual trip button and a manual reset button to allow testing of the sensor.
- j. The Seismic Monitor, Reserve Power & Valve Controller Panel shall be model MSC-W as manufactured by Earthquake Safety Systems, Inc. (805-534-1582), Model SS1001 as manufactured by Flo Loc Products International (949) 429-1089, or approved equal.

2.2 DIAPHRAGM VALVE PILOT CONTROLS

- a. The existing diaphragm valve at the south tank is located in a valve vault as shown on the drawings. The pilot controls on the valve shall be modified to change the function of the valve to a solenoid valve that is open and closed by the seismic monitoring and control system specified above.
- b. The existing diaphragm valve is an 8 inch Cla-Val 100-01 Hytrol control valve. The pilot controls shall be modified by the factory authorized dealer.
- c. The conversion kit shall be an 8-inch kit to convert a Cla-Val 100-01 valve to a Cla-Val 136G-03BYKX solenoid valve. The seismic control system manufacture shall coordinate with the diaphragm valve dealer to determine the voltage and current requirements for the solenoid valve, and whether or not the valve shall have a latching function.

PART 3: EXECUTION

3.1 GENERAL

- a. All mechanical portions of the installation shall comply with drawing details, the requirements outlined below, the manufacturer's latest recommendations and the best practices of the industry.
- b. The diaphragm control valve pilot controls shall be modified by an authorized Cla-Val representative or dealer.

3.2 INSTALLATION

- a. Carefully handle and protect the equipment and appurtenances.
- b. Prior to installation, review all installation manuals provided with the equipment.

3.3 INSPECTION, START-UP AND FIELD TESTING

- a. The Contractor shall furnish a representative of the seismic monitor manufacturer to perform inspection, startup and training services. The manufacturer's representatives shall be experienced in the operation and maintenance of the equipment.
- b. The representatives shall check the installation and supervise initial startup of the equipment. They shall certify that the installation is correct and that the equipment has operated satisfactorily.
- c. After the installation and operation of the equipment has been certified, the manufacturer's representatives shall train the City's personnel for one 8 hour day in the proper operation and maintenance of the equipment.

3.4 FUNCTIONAL TEST OF SEISMIC OUTPUT

- a. Following installation of entire system, a manual test shall be performed by carefully unbolting sensor and applying shaking (below 15 Hz) to verify control relay closure. Actual trigger set points can be user verified by laptop via RS 232 port.

PART 4: SPECIAL PROVISIONS

None.

SECTION 11750
SUBMERSIBLE BACKWASH RECYCLE PUMP

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing and installing pumping equipment and appurtenances within and adjacent to the wetwell as shown on the drawings or as specified herein.
- b. The pumping equipment shall be furnished with all motors, power cables, pump bases, guide bars & brackets, discharge piping, fittings, anchors, anchor bolts, anchor bolt sleeves and other appurtenances as specified or required for a complete installation and for satisfactory operation, including all pump removal components specified herein.
- c. This section also includes the pump disconnect panel, the disconnect panel stand, and the level controls, as well as all appurtenances required to connect the pump power cables to the disconnect panel.
- d. In addition to the products specified herein, the pump supplier shall also furnish the following items to provide a completely integrated system.
 - 1) Wet well hatch. See drawings and specification 11751.
 - 2) Cable tray. See drawings and specification 11751.
- e. The scope of items which must be provided by the pump manufacturer under this section does NOT include the following items.
 - 1) Power conduits, control conduits and wiring beyond the disconnect panel. Reference the Electrical Drawings & Specifications for work by Contractor which is not under this section.
- f. A representative of the manufacturer of the pumps shall provide start-up services and training in the operation and maintenance of the equipment (ie. training of the Owner's personnel).
- g. All Work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

1.2 DEFINITIONS

- a. Total Head: Total head (*TDH*) in feet of liquid pumped shall be the discharge head minus the suction head (*or plus the suction lift*) both measured at the pump flanges and corrected to pump datum as defined by Hydraulic Institute Standards, plus the difference in velocity head at the same points.
- b. Pump Efficiency: Pump efficiency shall be the ratio of the useful power output at the discharge flange to the power input at the pump shaft.
- c. Overall Efficiency: Overall efficiency shall be the total efficiency for motor and pump from the motor terminals to pumped liquid.

1.3 MANUFACTURER'S REPRESENTATIVE

- a. The pump manufacturer shall furnish the service of a qualified representative to supervise the installation, start-up and field testing of the pump and motor. A qualified manufacturer's representative shall be one who has had at least two years experience in the installation of the types of pumps and controls specified for this Project.
- b. At the completion of the pump installation, the following certifications shall be submitted as a minimum and included in the front of the O&M manuals.
 - 1) Certification letter signed by the manufacturer's representative stating the following as a minimum:
 - a) All required installation manuals were provided to the pump installer with the pump(s) and control panels.
 - b) The installation is as specified and is acceptable to the manufacturer.
 - c) The warranty and/or guarantee will be in full effect during the warranty period with no qualifications or reservations.
 - 2) Certification letter signed by the pump installer stating the following as a minimum:
 - a) The installation and operations manuals were received with the pumps and appurtenances.
 - b) The installer has read the manufacturer's recommended installation procedures.
 - c) The pumps, equipment and appurtenances were installed in strict conformance with the specification requirements and the manufacturer's recommended installation procedures. Any variances shall be noted.
 - d) The bases and guide bars were leveled and plumbed as required before grouting.
 - e) The plumbness of the guide bars was checked after the anchor and mounting bolts were tightened and before the pumps were installed.

1.4 WARRANTY

- a. The pump manufacturer shall provide a 5 year warranty for the pumps and motors (*as summarized below*) and a 3 year 100% (*full parts & labor*) warranty for the pump disconnect panel, concurrent with and in addition to the general project warranty period.
- b. In addition to the general warranty required for the project, the pump manufacturer shall furnish the Owner with a written warranty to cover the pump(s) and motor(s) against defects in workmanship and material for a period of five (5) years or 10,000 hours of operation. Pumps repaired under warranty will be returned to the Owner freight prepaid. The pump manufacturer will pay the following portion of the cost of all replacement parts and labor based on the time elapsed from shipment of the pump unit.

Months	0-18	19-39	40-60
Hours	0-3,000	3,000-6,500	6,500-10,000
Warranty	100%	50%	25%

In addition to the general pump & motor warranty, all pump motors for which VFDs are provided shall include a 100% warranty (*full parts & labor*) against bearing damage or bearing failure due to VFD-induced shaft-to-bearing voltages and/or currents to ground via the bearings, for the life of the motor.

1.5 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following,
- b. Submittals for Review (Pumps).
 - 1) Pump and piping submittals & shop drawings including:
 - a) Cover letter summarizing the following information as a minimum.
 - (1) make & model of pumps and motors.
 - (2) weight of each pump/motor unit (*in pounds*).
 - (3) motor HP and speed.
 - (4) statement that pumps will meet or exceed the specified discharge/head requirements.
 - b) Pump performance curves and performance chart showing curves and data for flow, head, torque, current, power factor, input/output kW and efficiency for the pump motor (*demonstrating that each pump will meet or exceed the specified flow at the specified duty point(s). If average pump performance curves are used, the pump supplier shall account for potential bilateral test tolerances based on the type of HI factory test method proposed for use by the manufacturer*). These curves or charts shall also include data on starting and no-load characteristics.
 - c) Complete specifications, descriptive drawings, and literature of the pumps, pump drives, mounting systems, etc, including manufacturer's descriptive information as required to fully describe the pumps and overall performance and to state deviations, if any, from the specified requirements.
 - d) Technical data on seals, including descriptive drawings and pressure ratings.
 - e) Stainless Steel Basket Cable Grips. Technical data and/or literature on the required basket cable grips specified to support the upper ends of the pump power & signal cables (*minimum of 2 basket grips per cable required when Meltrics disconnect plugs are provided on the end of a cable*).

- f) Anchor Bolts for Pump Discharge Elbow.
- (1) Complete specifications, descriptive drawings, and literature for the anchor bolts recommended/required for the pumps being provided.
 - (2) Unless otherwise specified or shown on the drawings, epoxy anchor bolts may be proposed for wetwell pumps at the option of the Contractor & pump supplier, based on submittal of information subject to the supplier or Contractor providing calculations by an Oregon structural engineer showing that the proposed epoxy anchor bolt system is structurally equivalent to the standard manufacturer recommended J or plate anchor bolts (*including bolt size, material, embedment depth, drill hole size, and type of epoxy for use*).
 - (3) Epoxy anchors shall not be used for drypit pumps.
 - (4) Unless otherwise specified or shown on the drawings, epoxy anchor bolts may be proposed for wetwell pumps at the option of the Contractor & pump supplier, based on submittal of information regarding threaded rod material & diameter, embedment depth, drill hole size, and type of epoxy for use.
 - (5) Epoxy anchors shall not be used for drypit pumps, unless approved in writing by the Owner's Representative, based on the Contractor providing calculations by an Oregon structural engineer showing that the proposed epoxy anchor bolt system is structurally equivalent to the specified anchor bolts, with said calculations being approved by the Owner's engineer.
- g) Typical installation guides and technical manuals.
- h) Manufacturer's storage recommendations and recommended start-up report form.
- i) Copy of proposed manufacturer's warranty.
- j) Pump Removal Components. Drawings and literature covering the specified pump removal system(s) to be provided by the manufacturer, including the following.
- (1) Size & length of the stainless steel lifting chain sling and how it is to be connected to the pump lifting handle.
 - (2) Grip-eye for each size of pump, as specified.
 - (3) Any specified pump removal hook/eye assembly (*for use with jib crane or with pump removal boom truck*).
- k) Factory Pump Tests. A written quality assurance record confirming the following testing/inspections have been performed shall be provided for each pump.
- (1) Impeller, motor rating and electrical connections shall be checked for compliance with this specification.
 - (2) Prior to submergence, each pump shall be run dry to establish correct rotation. Each pump shall be run submerged in water (6

foot minimum) for a minimum of 15 minutes.

- (3) Motor and cable insulation shall be tested for moisture content or insulation defects before and after the pump testing.
- (4) Each pump shall be hydraulically shop tested in accordance with standards of the Hydraulic Institute, demonstrating that each pump meets or exceeds specified flow at the specified duty point(s), regardless of the HI test standard used for the factory tests.
 - (a) Four (4) copies of certified test curves indicating head versus capacity, efficiency, brake horsepower and speed shall be submitted to the Engineer for approval prior to shipping the pumps from the factory. Test data sheets shall be submitted with the test curves.
 - (b) Computer model printouts are not acceptable.
- (5) The equipment manufacturer shall also indicate separately the head, capacity horsepower demand, overall efficiency and minimum submergence required at the guarantee point(s). No point on the pump performance curve shall require more than the nameplate horsepower of the drive motor.

- l) No pump shall be shipped to the job site until the above submittals have been approved by the Owner's Representative.

- c. Submittals for Review (Disconnect Panel). Before any components are fabricated, and/or integrated into assemblies or shipped to the site, furnish to the Engineer, and receive his review full details, shop drawings catalog cuts, and such other descriptive matter and documentation as may be required to fully describe the equipment and to demonstrate its conformity to these specifications. The decision of the Engineer upon the acceptability of any submittal shall be final. Catalog information shall be submitted for all equipment, regardless of whether or not it is of the same manufacturer as that listed in the specifications.

All submittals shall be complete, neat, orderly and indexed, with all options and features marked. Partial submittals will not be accepted. All components shall be referenced by the instrument name tag designations shown. If, in the opinion of the Engineer, a submittal is not clear, it will be returned to the Contractor and it shall be revised and resubmitted within 15 days.

Specifically, the Contractor shall submit the following material:

- 1) Component Parts List (*bill of materials*) for the disconnect panel, description, manufacturer & model/part number, and designation as used on the schematics.
- 2) Catalog information, descriptive literature, wiring diagrams, and shop drawings on all panels, enclosures, controllers, switches, breakers, mini-CAS relays, power supplies if required, and all other components of the system.
- 3) Individual data (*or specification*) sheets shall be provided for all components provided under this section. The purpose of these data sheets is to supplement

the generalized catalog information provided by citing all specific features for each specific component (*ie., scale range, materials of construction, special options included, etc.*). Each component data sheet shall bear the component name and instrument tag number designation shown in the drawings and specifications.

- 4) Complete panel layout (*interior & exterior*), including applicable construction details.
- 5) Schematic and ladder diagrams of internal control wiring of each unit and connections and functioning of outside control devices required in the particular installation. Complete composite diagram showing wiring of power and control, interconnections between sections, terminal markings and wire size. List the role and requirements of all I/O points.
- 6) Record Drawings. Prior to pump station startup, the contractor shall provide copies of as-built record drawings and schematics for the pump control panel(s), disconnect panel(s) and control shelter. Reduced size copies of the as-built record schematics shall be included inside the control panels.
- 7) O&M Manuals - Operations and Maintenance information, including parts lists and complete manufacturer's literature for each piece of equipment, shall be submitted for all materials and equipment furnished under this and related sections, including printout of any programming and/or setpoints for controllers or other programmable equipment (*after startup*).

d. Submittals for Review (Disconnect/Junction Panel Stands).

- 1) Shop drawings & literature, information and materials of construction for all required disconnect/junction panel stand(s).

e. Submittals for Record (Pumps).

- 1) Installation certificate and statements from the manufacturer(s) as outlined herein for inclusion in the O&M manuals.
- 2) Copies of certified test curves indicating capacity, head, efficiency, brake horsepower and speed for inclusion in the O&M manuals.
- 3) Copies of all factory test reports, including pressure tests, vibration tests, etc. as applicable for inclusion in the O&M manuals.
- 4) Copies of field pump test results shall be provided for inclusion in the O&M Manuals, including results and certification of the following.
 - a) Impeller, motor rating and electrical connections were checked for compliance with this and related specifications.
 - b) A motor and cable insulation test for moisture content or insulation defects was made.
 - c) Prior to submergence, each pump shall be run dry to establish correct rotation.
 - d) Results of a drawdown test of the wetwell with each pump operated

- e) separately.
After the drawdown (*operational*) test (4), the insulation test (2) is to be performed again.
- 5) Electronic copy of programming and/or setpoints for controllers or other programmable equipment.
- 6) Complete information on all specified pump removal components, as well as certifications and/or test certificates.
 - a) Chain slings connected to pump handle
 - b) Grip-Eye
 - c) Pump removal hook/eye assembly

1.6 RESPONSIBILITY FOR INTEGRATED PUMP & CONTROL SYSTEM

- a. The Contractor shall coordinate his work with the pump manufacturer to ensure that all components provided under this section are properly installed, the proper type, size and number of control wires with their conduits are provided and installed, proper electric power circuits are provided for all components and systems, and that all pump & control system components are tested, calibrated and verified to be in communication with each other as specified or shown on the drawings, prior to requesting final inspection or startup of the control system.

1.7 UNDERWRITERS LABORATORY (UL) LABELING

- a. All panels provided under this section shall be UL-508A labeled by an entity that is currently registered with UL and authorized to provide such label.
- b. All panels provided under this section shall be acceptable to the State of Oregon and the authority having jurisdiction.
- c. All panels and components provided under this section shall conform to the more stringent of the technical specifications, or UL standard 508A. Provide documentation necessary to verify that all components, construction methods, and circuits conform to this standard.
- d. Where components specified or approved are not UL listed or recognized, provide isolation transformers, GFCIs (*Ground Fault Circuit Interrupters*), and fuses as required by UL standard 508A.
- e. Contractor shall provide additional design, components, and equipment necessary to meet the requirements of UL standard 508A.
- f. Contractor shall provide submittals for additional components that are required by UL standard 508A, but not specifically listed in this section.

1.8 ELECTRICAL AND CONTROLS COORDINATION

- a. If the current requirement of any motor or piece of equipment is increased to such an extent that the wiring, conduit and/or starter for that motor or equipment must be increased from that shown on the electrical drawings, the Contractor shall furnish and install the larger

items. The increased wiring, conduit, and/or starter cost shall be provided at no additional cost to the Owner.

- b. All electrical, instrumentation, and control equipment and panels furnished under this section shall conform to appropriate sections of these Specifications.
- c. In addition to requirements outlined herein, all electrical motors shall conform to the requirements of the applicable sections of these Contract Documents.
- d. The mini-CAS relay used to monitor the moisture and over-temp on the pump motor shall be provided by the pump supplier and installed within the Pump Disconnect panel (PDP) along with a power supply if necessary for the relay to operate on any voltage other than the 120-volt AC, 20 amp, dedicated circuit that the CONTRACTOR will be installing to the PDP. The CONTRACTOR will be utilizing a dry set of normally closed N/C contacts as a permissive for the VFD to operate the pump motor.

PART 2: PRODUCTS

2.1 ANCHOR BOLTS FOR PUMP DISCHARGE BASES

- a. All anchor bolts for pump discharge bases shall be 304 stainless steel.
- b. The diameter, length and any bend dimensions of anchors shall be as shown on the drawings or as recommended by the equipment or machinery manufacturer, whichever is more stringent. Sleeves shall be provided as required or as shown for location adjustment.
- c. A minimum of two nuts and one washer of the same material as the bolt shall be furnished with each bolt, with both nuts being fully engaged on the anchor bolt threads.

2.2 PUMP ACCESSORIES

a. Pump Discharge Connection

- 1) Each pump shall be provided with a mating cast iron discharge connection by the same manufacturer as the pump, and designed to be bolted to the wetwell floor. The pump shall be completely supported by the discharge head. No portion of the pump shall bear directly on the wet well or sump floor. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing off the discharge interface with a diaphragm, O-ring or profile gasket shall not be acceptable. No portion of the pump shall bear directly on the wet well floor.
- 2) Vibration Dampener. A vibration dampener shall be provided for each guide rail, for installation between the pump discharge connection elbow and the guide rails.

b. Pump Lifting Handle:

- 1) The pump shall be provided with a stainless steel lifting handle for connection of the pump removal system, or for direct removal by a lifting hook.

c. Guide Rail System

- 1) Each pump to be furnished with a guide rail system consisting of a dual rail system connected to the discharge head and to an upper guide bar holder mounted to the access frame. The guide rail system shall consist of stainless steel guide bar brackets and Schedule 40 Type 304 stainless steel pipe.
- 2) The guide rail system shall be designed and installed to locate the pumps in the proper alignment for automatic connection of the pumps to the discharge head. All brackets, braces, guides and fittings necessary for a complete working system shall be provided and installed by the Contractor.

d. Grip-Eye Pump Removal System

- 1) Each pump shall be equipped with complete attachments necessary for lifting the pump and motor from the wetwell by means of the Flygt Grip Eye system. The working load of the lifting system shall be a minimum of 50% greater than the pump unit weight.
- 2) The pump lifting handle and all accessories shall be constructed of stainless steel. The lifting system shall be as shown or noted on the drawings, and shall include a minimum 18-inch long stainless steel chain lifting sling, enough ¼-inch diameter woven nylon rope to reach from the installed position of the pump to an anchor point under the wet well access hatch, clevises, bolts and all other attachments necessary for a complete system.
- 3) Two Flygt Grip-Eye units shall be provided for each size of pump at the pump station.

e. Pump Removal Hook/Eye Assembly

- 1) Each pump station shall be provided with a pump retrieval hook/eye assembly, to allow connection directly to the pump lifting bail when the wetwell can be pumped down below the top of the pumps.
- 2) Contractor shall verify that the hook proposed is sized to fit through the lifting handle of all pumps at the pump station.
- 3) The hook/eye assembly shall consist of a wide-throat style “eye foundry hook”, a master link, and a closed ring sized for connection to the hook on the pump hoist *(the hook/eye assembly shall as short as feasible, with maximum length not to exceed 18”, unless a longer length is noted on the drawings)*.
- 4) The working load of the hook/chain/eye assembly shall be equal to or greater than 125% of the crane load rating, and shall be proof tested and certified by the supplier.
- 5) The pump retrieval hook/chain/eye assembly shall consist of the following, or approved equal.
 - a) The pump retrieval hook shall be Crosby A-1329 Eye Foundry Hook, Stock# 102697 or equal (3.5” min hook throat opening).
 - b) Suncor SS hammerlock link, Stock# S0655-0013.

- c) Suncor SS 1" master link, Stock# S0650-0025.
- 6) Field demonstration & testing.
 - a) The Contractor shall be responsible to demonstrate (*with the Owner's Representative and Owner's operations staff present*) that the hook can be used to remove all of the pumps at the pump station, without entering the wetwell.
 - b) The Contractor shall verify the length on the hook/eyes assembly to ensure that the pump will clear the wetwell hatch when lifted by the onsite lifting crane.

2.3 PUMP DISCHARGE PIPE & FITTINGS, PIPE BRACKET ANCHORS

- a. Discharge piping & fittings inside the wetwell shall be as noted on the drawings and/or as specified in Section 11752.
- b. All anchors, anchor bolts, harnesses & fasteners inside the wetwell shall be 304 stainless steel.
- c. Anchor bolts for pump discharge bases shall be as specified above.

2.4 SUBMERSIBLE PUMP

- a. The pump, mechanical seals and motor units provided shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, service and warranty.
- b. Pump shall be submersible sewage pumps as manufactured by Xylem Flygt Corporation, or approved equal. Pump models shall be as noted on the drawings or as specified in the Pump Schedule under Part 4 of this section.
- c. General Requirements
 - 1) Pumps shall be heavy duty, electric submersible, centrifugal non-clog units designed for handling raw, unscreened sewage and wastewater and shall be fully guaranteed for this use.
 - 2) Wet-Pit Pumps. The pump and motor unit shall be suitable for continuous operation at full nameplate load while the motor is completely submerged, partially submerged or totally non-submerged. The use of shower systems, secondary pumps or fans to cool the motor shall not be acceptable.
 - 3) The pumps provided shall be capable of operating in an ambient liquid temperature of 104°F. Since the high temperature of 104°F is specified by the National Electrical Manufacturers Association (NEMA) and Factory Mutual (FM), motors with a maximum ambient temperature rating below 104°F shall not be acceptable. No point on the pump performance curve shall require more than the nameplate horsepower of the drive motor.
 - 4) Each pump shall be designed with a permanently installed lifting system that

allows the pump to be retrieved from the exterior of the wet well. There shall be no need for personnel to enter the wet-well for pump removal.

- 5) The pump(s) shall automatically and firmly connect to the discharge connection, guided by no less than two guide bars extending from the top of the station to the discharge connection. Sealing of the pump discharge to the discharge connection elbow shall be accomplished by a simple linear downward motion of the pump. A sliding guide bracket shall be an integral part of the pump unit.
- 6) Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface by means of a diaphragm, O-ring or other devices will not be acceptable.
- 7) The pump shall be completely supported by the discharge head. No portion of the pump shall bear directly on the wet well or sump floor.
- 8) All mating surfaces between individual pump components shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.
- 9) All exposed nuts or bolts shall be 304 stainless steel construction.

d. Cooling System

- 1) Motors shall be designed to be sufficiently cooled by the surrounding environment or pump media. A water jacket shall not be required.

e. Power Cable Entry Seal

- 1) The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single or double cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable.
- 2) The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

f. Pump Power Cable

- 1) The power cable shall be sized according to the NEC and ICEA standards and

shall be of sufficient length to reach the pump disconnect panel or junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chloroprene rubber.

- 2) The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.
- 3) Cable supports shall be provided and shall be stainless steel wire braid sleeves with attachment tails for connection to the access hatch frame.
- 4) Each pump power cord shall be provided with a Meltrics disconnect rated plug to match the Meltrics receptacle on the Pump Disconnect Panel.

g. Stainless Steel Basket Cable Grips.

- 1) Each pump power cable and signal cable shall be provided with a minimum of two stainless steel basket cable grips designed to support the weight of the respective cables from the fasteners under the wetwell hatch.
- 2) A minimum of two basket cable grips shall be provided for each cable, one at the point required to support the cable in the wetwell (*ie. to support the cable above the pump without excessive slack*), and one installed within 18 inches below the Meltrics disconnect plug to allow a safety cord to be secured to the plug during pump removal (*to minimize risk of the plug end being dropped into the wetwell during pump removal*).

h. Motor

- 1) The motor and pump shall be designed and assembled by the same manufacturer. Unless otherwise specified or shown on the drawings, all motors shall be wired for 3 phase 240-volt, 3-phase, open delta power. For retrofit applications, the Contractor shall field confirm motor voltages prior to having the pump supplier prepare submittals or place orders.
- 2) The pump motor shall be an induction type with squirrel cage rotor, shell type design, housed in an air filled, watertight NEMA B type chamber, and shall be manufactured by the pump manufacturer. Unless otherwise specified, all motors shall be premium efficiency (PE) rated. The motor shall be rated to operate with a VFD motor starter.
- 3) The stator winding and stator leads shall be insulated with moisture resistant Class H insulation that will resist a temperature of 180°C (356°F). The stator shall be insulated by trickle impregnation method using Class H monomer-free polyester resin, resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable.
- 4) The motor shall be designed for continuous duty handling pumped media up to 40°C (104°F) and capable of sustaining a minimum of fifteen (15) evenly spaced

starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum.

- 5) Thermal switches shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel.
- 6) The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer O-ring seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. Wire nuts or crimping type connection devices are not acceptable.
- 7) Motors shall have a service factor rating of not less than 1.15. Motors shall be of sufficient horsepower to operate the pumps without overloading throughout the entire operating range of the pump without use of the service factor (*ie. from shut-off through run-out*).
- 8) The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C.
- 9) Motor Protection
 - a) Thermal switches set to open at 125°C (260°F) shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The thermal switches shall be set to stop the motor and activate an alarm at the mini-CAS relay located within the PDP.
 - b) A Float Leakage Sensor (FLS) shall be provided to detect water in the stator chamber. When activated, the FLS shall shut down the leaking pump motor and activate an alarm at the Mini-CAS located within the PDP. The use of voltage sensitive solid state sensors shall not be allowed.
 - e) The thermal switches and FLS shall be connected to a Mini-CAS (*Control and Status*) monitoring unit. The Mini CAS shall be located within the PDP with status and reset button located on the relay.
- i. Bearing: The integral pump/motor shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The upper motor bearing shall be a single ball type bearing to handle radial loads. The lower bearing shall be a two row angular contact ball bearing to handle the thrust and radial forces. The minimum L₁₀ bearing life shall be 50,000 hours at any usable portion of the pump curve.
- j. Mechanical Seals

- 1) Each pump shall be provided with a positively driven dual, tandem mechanical shaft seal system consisting of two seal sets, each having an independent spring. The lower primary seal, located between the pump and seal chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide ring. The upper secondary seal, located between the seal chamber and the seal inspection chamber shall be a leakage-free seal. The upper seal shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide seal ring. For 3153 & larger pumps, the rotating seal ring shall have small back-swept grooves laser inscribed upon its face to act as a pump as it rotates, returning any fluid that should enter the dry motor chamber back into the lubricant chamber. All seal rings shall be individual solid sintered rings. Each seal interface shall be held in place by its own spring system. The seals shall not depend upon direction of rotation for sealing. Mounting of the lower seal on the impeller hub is not acceptable. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces are not acceptable. The seal springs shall be isolated from the pumped media to prevent materials from packing around them, limiting their performance.
 - 2) Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and shall provide capacity for lubricant expansion. The seal lubricant chamber shall have one drain and one inspection plug that are accessible from the exterior of the motor unit. The seal system shall not rely upon the pumped media for lubrication.
 - 3) The area about the exterior of the lower mechanical seal in the cast iron housing shall have cast in an integral concentric spiral groove. This groove shall protect the seals by causing abrasive particulate entering the seal cavity to be forced out away from the seal due to centrifugal action.
 - 4) Seal lubricant shall be FDA Approved, nontoxic.
- k. Pump Shaft: The pump and motor shaft shall be a single unit (*ie. the pump shaft shall be an extension of the motor shaft*). Couplings shall not be acceptable. The shaft shall be AISI type 431 stainless steel. The use of stainless steel shaft sleeves will not be considered equal to stainless steel shafts.
- l. Volute/Suction Cover: The pump volute shall be single piece, gray cast iron, Class 35B, non-concentric design and shall have smooth fluid passages large enough at all points to pass any size solid that can pass through the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable suction cover insert ring or wear ring as summarized below.
- m. Impeller: The impeller shall be of ASTM A532 (Alloy IIIA) 25% chrome cast iron, dynamically balanced, non-clogging design having a long throughlet without acute turns. The impeller shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. A full vaned, not vortex, impeller shall be used for maximum hydraulic efficiency; thus, reducing operating costs.
- 1) N-type Impeller

- a) The impeller shall be of semi-open, multi-vane, back swept, screw-shaped, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute suction which shall keep them clear of debris, maintaining an unobstructed leading edge.
- b) On standard impellers, the impeller vanes shall be hardened to Rc 45. High chrome impellers shall be Rc 60. Impellers shall have screw-shaped leading edges and shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater.
- c) The impeller to volute clearance shall be readily adjustable by the means of a single trim screw. The impellers shall be locked to the shaft, held by an impeller bolt.
- d) Volute Bottom/Insert Ring
 - (1) The pump volute shall be a single piece gray cast iron, ASTM A-48, Class 35B, non-concentric design with smooth passages of sufficient size to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified. The volute shall have a replaceable volute insert ring containing spiral-shaped sharp-edged groove(s). The spiral groove(s) shall provide the relief path and sharp edge(s) across which each impeller vane leading edge shall cross during rotation so as to remain unobstructed.
 - (2) The sharp spiral grooves shall provide the shearing edges across which each impeller vane leading edge shall cross during its rotation in order to remain unobstructed. The clearance between the internal volute bottom and the impeller leading edges shall be adjustable.
 - (3) The insert ring shall be cast of ASTM A532 (Alloy IIIA) 25% chrome cast iron and provide effective sealing between the multi-vane semi-open impeller and the volute housing.

n. Protective Coatings

- 1) All pumps, motors and appurtenances shall be factory coated with a corrosion resistant coating at least equivalent to the following. All metal surfaces, other than stainless steel or brass, coming in contact with the pumped liquid shall be protected by a factory applied acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
- 2) All damage to exterior protective coating occurring during shipment or installation shall be repaired in the field using the same coating system as used in the factory.

2.5 PUMP DISCONNECT PANEL

- a. Pump supplier shall provide the pump disconnect panel and the level control floats as specified and as shown on the drawings. The system shall include disconnect plugs and receptacles to connect the pump power cable to the Pump Disconnect Panel. The panel manufacturer shall be listed as a certified National recognized testing laboratory to UL508A requirements for industrial control systems and shall provide evidence of such by attaching a serialized label on the cabinet door. The pump control system manufacturer shall be provided by Xylem or approved equal.
- b. The Pump Disconnect Panel shall be designed to connect two float switches in the wetwell. One float switch will be used to stop the pump at the desired low level set point, the other float shall be a low level alarm/redundant off.
- c. The level control floats shall be provided with cables long enough to be routed and secured around the hatch perimeter in a manner so as not to interfere with installation or removal of the pumps. Excess Cable. Provide all floats with adequate excess cable to allow the floats to be lowered to the bottom of the wetwell as required to test operation by manually lowering to the water level. Floats shall be provided with cable storage brackets allowing the excess cable to be coiled at the access hatch and the floats set at any level in the wet well.
- d. The Pump Disconnect Panel shall allow the pump to be disconnected and removed from the wetwell without opening the panel and without the need for an electrician to disconnect wiring, and without affecting the operation of the remaining pumps. The Pump Disconnect Panel shall be provided with a Meltrics disconnect rated receptacle for each pump to match the Meltrics plug on the pump cord. The Meltrics plugs and receptacles are fully rated as disconnect switches, and are sized and rated based on the horsepower of the pumps.
- e. The Pump Disconnect Panel shall be completely fabricated, components and instruments installed, and wired in the manufacturer's facility. All internal wiring shall be completed and tested prior to shipment. All external connections shall be by way of numbered terminal blocks. Enclosures shall be so sized as to adequately dissipate heat generated by equipment mounted in or on the panel.
 - 1) Enclosures shall conform with NEMA standards, as well as following requirements. Minimum metal thickness shall be 14-gauge. All welds shall be neatly formed and free of cracks, blow holes, and other irregularities.
 - 2) Enclosure Heaters.
 - a) The enclosure shall be provided with thermostatically controlled, 120-volt heater(s) for condensation control.
 - b) All heaters shall be appropriately located and/or adequately shielded to prevent heat damage to any components in the enclosure when the door is open during cool weather (*ie. when temperatures are colder than the thermostat setting, which will cause the heater to operate continuously*).
 - c) At the manufacturer's option, the heater may be provided with a door switch to deactivate it when the enclosure door is open.
 - 3) Enclosure Penetration Drawings.
 - a) The manufacturer shall prepare a drawing for the Pump Disconnect Panel

showing the recommended location for all penetrations into the enclosure (*including but not limited to conduits*). The drawing shall be based on the location of power and control wire terminal blocks and/or intrinsically safe areas in all panels to ensure that the conduits are installed in the proper location to allow wiring to be installed inside the panels to avoid interference between power and control/signal wiring, and to avoid interference between conduits and pump disconnect receptacles.

- b) In all cases, power conduits shall enter panels under or immediately adjacent to the power terminal blocks, and control conduits shall enter panels under or immediately adjacent to the power terminal blocks.
- c) These drawings must be provided to the contractor prior to installation of conduits and placement of concrete.

- 4) Nameplates, Name Tags and Service Legends. In addition to the labeling requirements for components within the panel, all components mounted on the face of the panel or which are related to the operation and monitoring of the pump station shall be provided with permanently mounted nametags bearing the name or designation of the component, affixed above or below the component.

- a) The panel drawings shall show and reference the nameplates and service legends (*wording acceptable to the owner's representative*): nameplates are defined as inscribed laminated plastic plates mounted under or near a panel face mounted instrument. Service legends are defined as inscribed laminated plastic integrally mounted on a panel face mounted instrument.
- b) Service legends and nameplates shall be engraved, rigid, laminated plastic type with adhesive back. Unless otherwise noted, color shall be black with white letters and letter height shall be 3/16-inch high characters.
- c) Field mounted tags (*on curved or irregular surfaces*) shall be 16-gauge, 304 stainless steel with 3/16-inch high characters.
- d) The contractor shall be responsible to verify the correct spelling of all labels and nameplates. Misspelled labels shall be replaced by the Contractor.

f. Pump Disconnect Panel (PDP) Enclosure.

- 1) The Pump Disconnect Panel enclosure shall be stainless steel construction, NEMA 4X blind front. All door openings shall be double flanged and gasketed on all four sides to prevent dirt and liquids from entering enclosure.
- 2) The Pump Disconnect Panel shall have provisions for a CONTRACTOR provided, 20-amp GFCI receptacle to be field mounted on the side of the PDP as shown on the Drawings. While this receptacle is not provided as part of the scope of the disconnect panel enclosure, enclosure layout must account for it to be field mounted after the disconnect panel enclosure is mounted on the disconnect panel stand.
- 3) The manufacturer shall ensure that that the pump disconnect plug/receptacles are located to allow adequate working clearance from the specified panel penetrations

for conduits, control cables and the GFCI receptacle.

g. Electrical Requirements.

- 1) Provide circuit protection with breakers as specified or required. Circuit breakers shall be used in place of fuses where possible.
- 2) Load wire to maximum of 80% of UL 508A allowable ampacities. Wiring for signal circuits shall be twisted shielded pairs no smaller than No.18 AWG, and be separated at least 6 inches from any power wiring.
- 3) Encase conductors on back panel in plastic wiring duct inside control enclosures. Bundle and tie any wires not in wiring duct with Nylon Ty-raps maximum 3-inch interval. Provide spiral nylon wrapping around flexible wiring harness to door mounted equipment. Bolt harness to enclosure. There shall be no grounded devices, screws, or rivets inside wiring duct.
- 4) Wire Numbering - Provide vinyl cloth or plastic machine numbered labels at each end of each control and power conductor termination. This shall be done at all terminations including at terminal blocks, I-O terminals (even if number is duplicated on the terminal) and the back panel termination at panel mounted devices.
- 5) Component Labeling. Label all components within the control panels with their tags or other identifying designations so that they can be easily identified. Miscellaneous components such as relays or breakers may be labeled using a "Dymo" type plastic tape label and may be affixed to an adjacent location when the component is removable.

- h. The pump disconnect panel shall include the components as specified herein, as noted on the drawings, as required to meet electric code provisions, and as required to ensure a complete system capable of operating and meeting all conditions as specified herein.
- i. In addition to features specified for the enclosures, the components shall include, but may not be limited to, Din rail mounted terminal blocks for connection of external power & control wiring, disconnect rated plug/receptacles for pump power cable, pump number labels, intrinsically safe barriers for control & alarm probes, primary & redundant level control sensors, wetwell alarm sensor(s) as specified, data pockets for as-built schematics.
- j. Mini-CAS Relay: The disconnect panel shall be fitted with a relay to monitor the temperature and leakage sensor for the pump. The relay shall be mounted in the disconnect panel. The relay shall be a solid state relay to monitor motor winding temperature and seal leakage. The relays shall be wired to prevent motor operation when an alarm condition is present. The relays shall have and 11 pin octal base and shall be flanged for mounting on the inner door. The relay shall be powered by 120VAC supply or the pump supplier shall provide an appropriate power supply for the relay. LED indicators shall be provided on the relay for power on, overtemp and seal fail conditions. An overtemp reset pushbutton shall be mounted on the relay. The sensor input circuitry shall contain both hardware and software filters to provide noise immunity, as well as sensor input short circuit protection. The relay shall be Mini-CAS 120, model 14-407129

by ITT Flygt or approved equal.

k. Level Sensors (Float Switches):

- 1) Pump off control and low level alarm sensing shall be accomplished using internally weighted float switches. Float switches shall have form-C contact and be provided with 3 conductor cable with sufficient length to reach the Pump Disconnect Panel without need for splices. Float switches shall be Flygt model ENM-10 or approved equal.

l. Pump Disconnect Plug/Receptacles:

- 1) Pump disconnect plug/receptacles shall be a combination of a plug/receptacle and a disconnect switch in the same device. These plug/receptacle units shall be horsepower rated and switch rated to UL Standards 1682, 98 (as a Branch Circuit Disconnect) and 508A (as a Manual Motor Controller).
- 2) The plug/receptacle units shall perform as true functioning disconnect switches for motors or other inductive loads, without the need for an electrical or mechanical interlock. As a switch, the unit shall be designed to make or break up to 600 VAC and up to one and a half times their rated current, and make or withstand up to 10,000 A short circuit, with a power factor as low as 0.45. The plug/receptacle units shall be rated to function as a "In Line of Sight" disconnect for both inductive and resistive applications per NEC 430.
- 3) The plug/receptacle unit shall have dead front construction to prevent user access to live parts, and contacts shall use silver-nickel 85/15 butt style spring loaded pressure contacts. Pilot contacts shall be provided as required for motor over-temperature sensors, moisture sensors, or other control features as required or as shown on the drawings. The pilot contacts shall make last and break first when the plug is engaged or disengaged from the receptacle.
- 4) The plug/receptacle unit shall be 3-pole, 4-wire configuration (female mounted on panel, plug connected to pump cable). Provide a minimum of two (2) pilot contacts in addition to the power and ground contacts (minimum number of pins/sleeves required is: 3-power, 1-ground, and 3-pilot for a total of 6-pins/sleeves). Where the plug/receptacle unit supports the option, provide three (3) pilot contacts. The connections to the plug receptacle shall be based on the following standard configuration.

Meltric Plug & Receptacle	Flygt Power/Signal Cable
Terminal 1 (Black)	Black Power Wire
Terminal 2 (Red)	Red Power Wire
Terminal 3 (Blue)	White Power Wire
Ground Terminal (Green)	Yellow/Green Ground Wire
Terminal A (P1/Brown)	Blue Sensor Wire
Terminal B (P2/Orange)	Orange Sensor Wire

- 5) The plug/receptacle unit shall have an IP67 watertight rating, and shall be Meltric DB series or approved equal, with protective cap on the plug, and watertight closed lid configuration on the receptacle.

m. Disconnect Panel Stand:

- 1) A lockable pump disconnect panel stand shall be provided below the disconnect panel mounted on the wet well as shown on the drawings. The disconnect panel stand shall be constructed of 304 stainless steel.
- 2) The disconnect panel stand shall be the same width and depth as the disconnect panel. The bottom of the disconnect panel shall be mounted a minimum of 36 inches above the top of the wetwell. The disconnect panel stand shall extend from the bottom of the top of the wet well. The entire front panel of the stand shall be a lockable, hinged door capable of opening 180 degrees, and shall not result in any gaps when the door is closed. The door shall include a padlock hasp.
- 3) The stand frame shall be constructed using stainless steel tube, angle, or bars. The sides of the stand and the door shall be enclosed with stainless steel expanded mesh or perforated sheets.
- 4) The stand shall extend over the cable tray and cover and be designed so that the door covers the cable tray cover in the closed position (see drawings and specification section 11751 for cable tray requirements) making it impossible to open the cable tray when the disconnect panel stand door is closed.

PART 3: EXECUTION

3.1 GENERAL

- a. All mechanical portions of the installation shall comply with drawing details, the requirements outlined below, the manufacturer's latest recommendations and the best practices of the industry.
- b. FACTORY TESTS PRIOR TO SHIPPING: Prior to shipment, all pumps, control panels and panel assemblies shall be tested for proper operation at the manufacturer's factory.

3.2 PUMP & ACCESSORY INSTALLATION

- a. Carefully handle and protect the pump and appurtenances. Pumps and appurtenances shall be supported on blocks during storage and delivery to prevent damage.
- b. Pump assemblies shall be installed such that the pumps, discharge piping and guide rails are properly aligned, plumb and level.
- c. Install internal piping, discharge piping and intermediate guide bar brackets as shown or required. Following installation of the upper guide bar bracket(s), discharge connection elbow and guide bars, check the guide bars and the discharge piping for plumbness in both planes and adjust as necessary.
- d. Prior to installation of pumps, the pump cable end shall be sealed with a high quality protective covering to make it impervious to moisture or water seepage prior to electrical installation.

- e. Lower pump units into place along guide rail system. Visually check the metal-to-metal contact between the volute flange and the discharge connection elbow.
- f. After the pumps have been set in position, and all components aligned and anchored, grout the discharge penetrations and pipe throulets with non-shrink grout.
- g. Install the pump so that connection may be made to the discharge header without springing or otherwise forcing either the pump or the header. All strain from attached piping shall be eliminated from the pumps. Any evidence of pump mis-alignment, noisy operation, leakage or other signs of improper setting shall be corrected by the Contractor.
- h. Coat all bolt threads with lubricant to facilitate future removal.

3.3 PUMP DISCONNECT PANEL INSTALLATION

- a. Panels, panel-mounted equipment and listed accessories shall be pre-assembled and wired at the factory. No work, other than correction of minor defects or minor transit damage, shall be done to the panel at the job site without written consent by the Owner's Representative.
- b. Prior to installation of panels that contain both power and control/signal wiring, verify that any installed conduits are properly located to allow wiring to be installed inside the panels to avoid interference between power and control/signal wiring.
- c. All conduits extended up into the Pump Disconnect Panels shall be PVC-RGS extended from below grade to the bottom of the disconnect panel without any breaks or joints.

3.4 LEVEL SENSOR INSTALLATION

- a. Level sensors shall be mounted on cable hangers at levels shown and demonstrate proper operation.
- b. Level sensors shall be mounted and secured around the perimeter of the wetwell hatch as required to avoid interference with installation or removal of the pumps (*ie. cables shall not cross over or hang behind the pump guide rails*). Provide stainless hardware as required to accomplish this.
- c. Excess Cable. Provide all probes (*including the overflow sensor probe*) with excess cable to allow the probes to be lowered to the bottom of the wetwell as required to test probe operation by manually lowering to the water level.

3.5 PUMP POWER CABLE & LEVEL SENSOR CABLE MANAGEMENT

- a. Excess cable shall be neatly coiled and hung in the wetwell in a manner so as not to interfere with pump removal or access to the pump removal lifting chain.
- b. Excess cable coils shall be secured with plastic ties, and hung as high in the wetwell as feasible. Excess cable shall not be stored or coiled inside the disconnect panel stand.

3.6 INITIAL LUBRICATION

- a. Initial lubrication required for start-up and field test operation shall be furnished and applied

in accordance with the manufacturer's recommendations.

3.7 PUMP INSPECTION, START-UP AND TESTING

- a. The Contractor shall furnish a representative of the manufacturer to perform inspection, start-up and training services. The manufacturer's representative shall be experienced in the operation and maintenance of the equipment.
- b. The representative shall check the installation and supervise initial start-up of the equipment. He shall certify that the installation is correct and that the equipment has operated satisfactorily. This service shall be provided for a minimum period of one trip and one day for each pump installation location. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following:
 - 1) Meg the stator and power cables.
 - 2) Check seal lubrication.
 - 3) Check for proper rotation.
 - 4) Check power supply voltage.
 - 5) Measure motor operating load and no load current.
 - 6) Check level control operation and sequence.

3.8 PUMP STATION INSPECTION, START-UP, TESTING & TRAINING

- a. The following is a general summary only, and does not supersede or replace inspection, startup, testing or training requirements contained on the electrical drawings on in the electrical specifications.
- b. Operational Acceptance Tests (Pump Control System).
 - 1) The objective of these tests are to demonstrate that the Pump Control System has been properly installed, calibrated and wired and is ready for startup and test operation of the complete system.
 - 2) The Pump Control System shall be checked for proper installation, adjusted, and calibrated on an element-by-element basis to verify that it is ready to function as specified.
 - 3) All system elements shall be checked to verify that they have been installed properly and that all terminations have been made correctly.
 - 4) All discrete elements and systems, shall have their set points adjusted and shall be checked for proper operation (*ie. interlock function, contact closure on rising/falling level, etc.*).
- c. Coordination of Startup and Test Operation of Complete System.
 - 1) The general contractor shall be responsible for the coordination with all trades, subcontractors and/or suppliers as necessary for the testing and test operation of all equipment, electrical and control systems to demonstrate that the total system operates as specified and shown, and that all system components operate correctly and communicate with all other system components as necessary for a complete and operable system.

- 2) After the Contractor has completed the initial start-up and testing and verified that all components and systems are operating correctly and as specified, the Contractor shall schedule a witness test by the Owner's representatives and staff, at a time acceptable to the Owner, with a minimum of 72 hours (*three business days minimum*) notice provided to allow all parties to be scheduled.
 - a) Witness testing shall be performed with the Owners Representative and the Owner's operators present, and after the startup and testing and certification (*by each respective manufacturer's representative*) of all equipment, control systems, , auxiliary power generator & ATS, telemetry and communications systems, and after all control system programming is completed and installed, whether such programming is by the contractor or by the Owner.
- 3) The contractor's personnel shall operate or arrange for the operation of all systems and equipment under normal and alarm conditions and simulate all operating modes of all of the equipment, including all alarm conditions, and verify proper alarm notification via telemetry or autodialer as applicable.
- 4) The representative for pump control manufacturer shall be on site during all start-up and testing activities including but not limited to the Owner's telemetry system start up and commissioning.
- 5) If there are incomplete or inoperable systems discovered during the startup, the Contractor shall schedule and provide a follow up system startup by qualified personnel after the deficiencies are corrected. The Owner's witness of start-up and testing shall be after all deficiencies have been corrected. Any and all trips by the respective trades, subcontractors and/or suppliers as required to accomplish this (*and associated costs*) shall be the sole responsibility of the Contractor.

d. Start-Up and Testing of Complete System.

- 1) The Contractor shall furnish a representative of each equipment manufacturer to perform inspection, start-up and training services on each equipment system. The manufacturer's representative shall be experienced in the operation and maintenance of the equipment.
- 2) The representative shall check the installation and supervise initial start-up of the equipment. He shall certify that the installation is correct and that the equipment has operated satisfactorily. This service shall be provided for a minimum period of two trips on two days for each equipment system. If additional trips and days are required to adequately test, program or troubleshoot the equipment or systems, this shall be provided at no cost to the Owner.

PART 4: SPECIAL PROVISIONS

4.1 PUMP SCHEDULE

PUMP SCHEDULE							
Pump No.	Location	Speed RPM	Motor Size HP	Motor Voltage	Capacity GPM @ TDH (ft)		Make & Model
					GPM	TDH.	
1	Recycle Pump Station Wet Well	VFD 1750 max	4	230V	50	68	Flygt NP 3085 (256)
					105	55	Shutoff Head = ±79 feet
					160	44	
Factory tests shall demonstrate that each pump meets or exceeds the specified duty points.							

4.2 LEVEL SENSOR SCHEDULE

LEVEL SENSOR & PROBE SCHEDULE		
Level Sensor No.	Location/Function	Sensor Type
1	Recycle Pump Station Wetwell/Pump Off	Float Switch
2	Recycle Pump Station/Redundant Pump Off/Low Level Alarm	Float Switch

4.3 PROCESS NARRATIVE

The recycle pump station shall be controlled as follows.

- The pump will be manually started from the new VFD.
- Pump speed will be adjusted by the operator by a potentiometer located on the VFD.
- The flow transmitter will be located next to the VFD inside the treatment plant building so the operator can use the potentiometer to select the desired flow rate.
- The operator can shut the pump off manually via the VFD stop button
- The low level float will shut the pump off and it will then need to be restarted manually.
- The low-low level float will also shut the pump off. Initially, no alarm conditions will be triggered, but the signal from the low-low level float may be used in the future for an alarm condition.

SECTION 11751
PUMP STATION WET WELL SYSTEM

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing and installing a concrete wetwell structure with precast or cast-in-place base slab, walls/riser section, & top slab assembly (as noted on the drawings or as specified), and other appurtenances as specified or required for a complete installation and for satisfactory operation.
- b. All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

1.2 RELATED SECTIONS

- a. Section 03200, Concrete Reinforcement
- b. Section 03300, Cast-in-Place Concrete
- c. Section 11750, Submersible Backwash Recycle Pump
- d. Section 11752, Pump Station Valve Vault, Pump Discharge Piping & Fittings

1.3 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Submittals for Review
 - a) Submittals & shop drawings including:
 - (1) Complete specifications, descriptive drawings, and literature of the wet well structure, including hatches, mounting systems, etc.
 - (2) Reinforcing (rebar) shop drawings for all rebar to be installed in cast-in-place or pre-cast base slabs and top slabs, including bending lists and placing drawings.
 - (3) Rebar shop drawings for top slabs shall also include fully dimensioned locations for hatches (hatch offsets to be labeled as being measured from hatch frame nutrails) and other embedded items, as well as indication showing the opening direction of the hatches for reference during hatch placement and top slab construction.
 - (4) Copy of OSHA certification and proposed warranty for access hatch.
 - (5) Certification letter signed by the manufacturer's representative specifically including the following as a minimum:
 - (a) The plant location where the wetwell barrel sections

- and/or any precast base slabs or top slabs will be cast.
 - (b) Confirmation that the manufacturer has read and understands the requirements in Part 3 of this section related to "Form & Reinforcing Inspection" and "Precast Scheduling", and will comply with these provisions.
- (6) Mix designs for each type and class of concrete, including required laboratory testing data, as well as historic compressive strength results for the mix design.
- (7) Complete reinforcing shop drawings for top slab and base slab.
- (8) Complete layout drawings & sections for base slab and/or top slabs showing (in addition to reinforcing steel) all inserts including (as applicable) waterstop at base-slab/1st-barrel joint, wetwell hatch, wetwell vent, cable tray, etc.
- (9) Bidco External Joint Wrap by Telleborg, or equal (*to be installed on the external surfaces of any below grade construction joints in the cast-in-place wetwell, and on the external surfaces of all joints as applicable*).
- (10) Sheeting/shoring/dewatering plan for deep excavations, to demonstrate conformance with the specification requirements and/or recommendations of the geotechnical report as applicable.

2) Submittals for Record

- a) Batch Tickets - The manufacturer of the concrete shall furnish copies of delivery tickets to the Owner's Representative.
- b) Concrete Test Results. Copies of all quality control field and laboratory testing, including the following as a minimum (*tests required for each structure constructed, whether precast or cast-in-place*), as well as requirements in Section 03300 if included.
 - (1) Slump
 - (2) Air entrainment
 - (3) Compressive strength
 - (a) For precast base & top slabs, shipping strength, 7 day & 28 day breaks.
 - (b) 7 day & 28 day breaks for all cast-in-place concrete.

1.4 WARRANTY

- a. Access Hatch. The hatch manufacturer shall guarantee proper operation and against defects in material and workmanship for a period of ten (10) years from date of shipment.
- b. The provisions of this warranty shall not be construed as relieving or reducing the obligations of the Contractor outlined under any other section of these specifications.

PART 2: PRODUCTS

2.1 WETWELL STRUCTURE

- a. Mastic Wrap, External Surfaces of All Joints and/or Pickholes. 9-inch wide external mastic wrap joint seal shall be installed on all below grade joints in the wetwell structure, as well as at any pickholes or other penetrations, prior to backfilling (Bidco External Joint Wrap BW-9T by Telleborg, or equal), including the joint between the base slab and barrel sections.
- b. Precast wetwell components shall be designed to resist all soil and hydraulic pressures, including both lateral pressure and hydraulic uplift. Precast wetwell base slabs, top slabs and barrel sections rings shall conform to the requirements of ASTM C478 except as modified herein.
 - 1) All precast concrete shall be a minimum of 4000 psi at 28 days.
 - 2) All bar reinforcing shall be grade 60 deformed bars conforming to ASTM A-615 or ASTM-616.
 - 3) **Welding on the specified reinforcing in base slabs and top slabs is prohibited.** Bars in addition to those shown that may be found necessary or desirable by the Contractor for the purpose of securing reinforcement in position shall be provided by the Contractor at no additional cost to the Owner.
- c. All cast-in-place concrete shall be a minimum of 4000 psi at 28 days, unless higher strength is shown on the drawings or specified. At his option, the Contractor may choose to utilize a higher strength mix design for the base slab to allow the wetwell walls or barrels to be placed or stacked earlier (*ie. to allow the base slab concrete to reach design strength more quickly*).
- d. Cast-in Place concrete wetwell base slabs, top slabs and/or walls/riser sections shall conform to the requirements of Sections 03200 & 03300, except as modified herein.
- e. All bars shall be supported by concrete or plastic supports, chairs, spacers, or plastic covered metal hangers specifically designed to support reinforcing. Driving rebar into the ground for support will not be acceptable.
- f. Wetwell Base Slab
 - 1) Wetwell base slab may be precast or cast-in-place, at the contractor's option.
 - a) Where precast riser sections are utilized, either cast-in-place and precast base slabs shall be manufactured such that the first riser section is cast into AND integral with the base slab. The bottom of the first precast riser section shall be embedded a minimum of 6-inches into the base slab concrete, or as shown on the drawings, whichever is greater.
 - b) Where precast riser sections are cast into the base slab, one strip of hydrophilic waterstop shall be installed on the underside of the inside lip on the bottom barrel joint which is cast into the base slab (*reinforced hydrophilic waterstop, Cetco RX-101T with CetSeal adhesive*).

- c) Where cast-in-place riser walls are installed, one strip of hydrophilic waterstop shall be installed in a keyway in all concrete joints (*reinforced hydrophilic waterstop, Cetco RX-101T with CetSeal adhesive*).
- 2) The base slab shall be provided with an extended base as shown on the drawings with an overhang sufficient to counteract worst case hydraulic uplift conditions.
- 3) The thickness of the base slab shall be as shown on the drawings, but in no case shall the base be less than 12 inches thick. Reinforcing shall be provided as shown on the drawings. The reinforcing for the portion of the base slab inside wetwell barrel sections shall be integral with the reinforcing for the extended base outside the barrel sections.

g. Wetwell Barrel Sections

- 1) Precast wetwell barrel sections and adjusting rings shall conform to the requirements of ASTM C478 except as modified herein.
- 2) 9-inch wide external mastic wrap joint seal shall be installed on all manhole barrel joints and over all pickholes after assembly and prior to backfilling (Bidco External Joint Wrap by Telleborg, or equal). Notify Owner's Representative for inspection prior to backfilling.
- 3) Wetwell Barrel Pipe Penetration Core Drilling.
 - a) All wetwell pipe penetrations shall be core drilled in the field, after installation of the wetwell barrel sections and verification of inverts as noted below.
 - b) The Contractor shall be responsible for verifying the wetwell base and top elevations prior to core drilling, as well as potholing existing pipelines (if any) to which influent or discharge piping will be connected or cross, which could affect the new pipe inverts. Report any discrepancies to Owner's Representative to allow resolution prior to core drilling.
 - c) All pipe penetrations shall be provided with flexible rubber boots to provide a watertight seal. Flexible boots at pipe penetrations shall be "Kor-n-Seal", "Res-Seal", or approved equal.
 - d) Gravity Pipe Penetrations: Core holes for the inlet pipe penetration (and overflow pipe if provided) shall be radial to the wetwell center.
 - e) Pump Discharge Pipe Penetrations: The penetrations for the pump discharge piping shall be core drilled axially to the pipe alignment rather than radial to the wet well center.

h. Wetwell Top Slab

- 1) Wetwell top slab may be precast or cast-in-place, at the contractor's option.

- 2) Top slab and hatches shall be designed to support traffic or non-traffic loads as indicated on the drawings, but in all cases shall be adequate to support pumps and maintenance personnel. The thickness of the precast top slab shall be as shown on the drawings, but in no case shall be the top slab be less than 12 inches thick. Reinforcing shall be provided as shown on the drawings. The reinforcing for the top slab shall include rebar under the support flanges of the hatches, and as required to interact with anchor bolt inserts for pump hoists. The top slab at the hatch shall be formed such that the concrete supporting the hatch frame extends to the inside face of the frame on all sides.

3) Access Hatch

- a) Hatch arrangement shall be hinged as shown on the drawings. Size and clear opening shall be as shown on the drawings. Unless otherwise specified, all hardware shall be stainless steel.
- b) Each hatch shall be designed to combine covering of the opening, fall through protection per OSHA standard 1910.23 and controlled confine space entry per OSHA standard 1910.146. Material shall be 6061-T6 aluminum for bars, angles and extrusions, and 1/4" diamond plate shall be 5086 aluminum.
- c) Hatch rating (traffic or non-traffic) shall be as noted on the drawings. Non-traffic hatches shall be pedestrian rated for 300 PSF loading. Traffic rated hatches shall be AASHTO H-20 load rated (not subject to high density traffic). Load calculations shall be submitted, with deflection not to exceed 1/150th of the span.
- d) The hatch cover leaf shall be 1/4-inch minimum aluminum diamond pattern plate with reinforcing as required to prevent distortion of the leaf when in any position.
- e) Hatch shall be provided with angle frame of extruded aluminum (1/4-inch minimum thickness), with anchor flanges to secure the hatch into the concrete.
- f) Hatch Skirt: The hatch frame shall be provided with a vertical full depth aluminum skirt (1/4-inch minimum thickness) which extends the full depth of the wetwell top slab. The aluminum plate shall act as a concrete form, with the skirt being integral with hatch frame, or welded around the full perimeter to be flush with the inside face of the hatch frame.
- g) The exterior of hatch frame and skirt (in contact with concrete) shall be supplied with a 2-mil thickness of bituminous coating. Application procedure shall be in accordance with manufacturer.
- h) Hinges shall be of heavy-duty design. Material shall be stainless steel with a 3/8" grade 316 stainless steel pin. Hinges shall be bolted to the channel frame and diamond plate, with grade 316 stainless steel bolts and ny-lock nuts.

- i) Hatch covers shall be equipped with a recessed cast aluminum handles. Lift handles must be placed at outer edges of cover. The lift handles shall be flush with the top of the 1/4" diamond plate.
- j) Hatch covers shall be supplied with a grade 316 stainless steel recessed Slamlock, with keyway protected by a threaded stainless steel plug. Plug shall be flush with the top of the 1/4" diamond plate. Slamlock shall be fastened with four grade 316 stainless steel bolts and washers.
- k) Hatch covers shall be supplied with a Recessed Padlock Clip (RPC). RPC shall be supplied with its own separate hinged cover for owner access to the owner supplied padlock.
- l) Hatch covers shall be equipped with a stainless steel hold-open arms. To highlight the hold-open arm feature, the entire hold open arm must be supplied with a red or orange powder coat finish. Any hold-open arm not supplied with red powder coat finish shall not be accepted as equal. Covers shall automatically lock open in the 90-degree position. Hold-open arms shall be fastened to the frame with a 1/2" grade 316 stainless steel bolt.
- m) Traffic-rated hatch covers shall be supplied with a heavy duty, stainless steel pneu-spring. Spring must consist of a minimum 1/2" stainless steel shaft which slides into a minimum 1" stainless steel tube. Spring must be charged with an inert gas (nitrogen). Mechanical, torsion, or coil type springs shall not be accepted as equal. Spring design must ensure ease of maintenance, including being able to removed/replaced by removing no more than three bolts.
- n) Nut-Rail.
 - (1) The hatch shall be provided with an aluminum nut-rail or unistrut welded to and flush with the inside face of the hatch skirt on ALL sides to allow for the connection of the upper guide bar brackets and other accessories as shown on the drawings or as may be required during the life of the pump station.
 - (2) Unless otherwise shown on the drawings, the nut-rail shall be attached at the bottom of the full depth hatch skirt (*ie. nut rail to be flush with the bottom of the top slab*), and shall be attached to the hatch skirt with a full length fillet weld.
- o) Safety Hatch Fall Protection
 - (1) Each hatch shall be provided with an integral safety grate that provides fall through protection per OSHA standard 1910.23 and controlled confine space entry per OSHA standard 1910.146. The design must assure that the fall through protection is in place before the doors can be closed, thereby protecting the next operator.
 - (2) Grating shall be 6061-T6 aluminum designed to withstand the same live load as specified for the hatch. Deflection shall not

exceed 1/150th of the span. The grate shall also be designed to support the specific pumps provided at this pump station. This allows the pumps to be pulled from the pit, the grating closed and the pump set back on the grating for pump wash down directly back into the pit.

- (3) Safety Grates must be supplied with hinge system, hold open arms and lift assist system as the hatch covers (see reference above), and shall be designed to be secured in the closed position with a padlock.
 - (4) Grate openings shall be 5" x 5", which will allow for visual inspection, limited maintenance and float adjustments while the safety grate fall through protection is left in place.
 - (5) Grate shall be coated with OSHA safety orange, Dupont Corlar Satin High Solids Epoxy paint, with a Dupont Corlar High Solids Epoxy Mastic Activator. Before coating of grates, grates must be shot blasted to assure a good bond with the Dupont two part epoxy.
- p) All hatches shall be Flygt hatches with the safety grating option, as manufactured by USF Fabrication, or approved equal.
- q) The cable tray system shall be provided that is integral with the access hatch, and by the same manufacturer. The access hatch frame shall be partitioned and reinforced as required to allow for seamless integration and connection of the cable tray to the hatch frame. Any cable tray system that is not integral with the hatch frame (*which does not connect to the hatch frame*) will NOT be approved as equal.
- r) The cable tray provided with angled "slide plate" for uninhibited cable entry into the wetwell. The cable tray shall be designed and configured to allow the aluminum nut-rail to be continuous below the bottom edge of the slide plate, to allow for connection of upper guide bar brackets and/or other accessories.
- s) The cable tray shall include provisions designed by the manufacturer to allow the hatch and cable tray to be shipped separately (*to minimize risk of damage or bending during shipping*), and then field connected together prior to top slab concrete placement.
- t) Unless otherwise shown on the drawing details, the cable tray shall be 9" wide (I.D.) with an internal cable partition, with a minimum depth of 3-inches clear from the bottom of the cable tray cover. Unless the cable tray cover is locked in a closed position by the disconnect stand door, a recessed slamlock and padlock hasp shall be provided for the cable tray.
- u) Non-traffic Loading. The cable tray shall be provided with an aluminum cover that is locked in place at both ends during normal operation, and cannot be removed without unlocking the access door on the pump

disconnect panel. The cover shall be rated for a minimum load of 700 lbs per square foot.

2.2 PUMP DISCONNECT PANEL STAND

- a. A lockable pump disconnect panel stand shall be provided as shown on the drawings. The disconnect panel stand shall be constructed of 304 stainless steel.
- b. The pump disconnect panel shall be connected to the side of the wetwell top slab with 304 stainless steel anchor bolts.
- c. The power/control conduits to the disconnect panel shall be continuous (RGS or PVC-RGS as applicable) from the underground vertical bend to the bottom of the disconnect panel to meet NEC and NFPA requirements (ie. for passing through the hazardous atmosphere envelope associated with the pump station wetwell hatch).

2.3 ANCHOR BOLTS

- a. Anchor bolts for pump discharge bases shall be as specified in Section 11750.
- b. Unless otherwise specified or noted on the drawings, all anchor bolts shall be 304 stainless steel.
- c. The diameter, length and any bend dimensions of anchors shall be as shown on the drawings or as recommended by the equipment or machinery manufacturer, whichever is more stringent. Sleeves shall be provided as required or as shown for location adjustment.
- d. Unless otherwise required or shown, use 3/4 inch minimum diameter and other geometry as shown on the drawings. In no case shall anchor bolts be more than 1/8-inch smaller than the anchor bolt holes provided by the manufacturer in the equipment or machinery.
- e. A minimum of two nuts and one washer of the same material as the bolt shall be furnished with each bolt, with both nuts being fully engaged on the anchor bolt threads.

PART 3: EXECUTION

3.1 GENERAL

- a. All portions of the installation shall comply with drawing details, the requirements outlined below, the manufacturer's latest recommendations and the best practices of the industry.
- b. Location of the wetwell shall be as shown on the drawings or directed by the Owner's Representative.
- c. All connections to wetwells shall be watertight. Any visible infiltration of water into wetwells shall be considered unacceptable.

3.2 FORM & REINFORCING INSPECTION SCHEDULING

a. Cast-in-Place Concrete.

- 1) No cast-in-place concrete shall be placed without prior inspection of the forms, reinforcing and embedded items and written approval from an authorized representative of the Owner's Representative.
- 2) The Contractor shall call for inspections at least twenty-four (24) hours in advance, and after inspections shall notify the Owner's Representative at least forty-eight (48) hours in advance (ie. two business days) of any scheduled concrete placement.

b. Pre-Cast Concrete Top Slab or Base Slab Scheduling.

- 1) All pre-cast top slabs or base slabs shall be formed and poured on a polished concrete surface, or other similar hard surface that will provide a comparable finish, and which will support (without deflection) the required chairs or other devices designed to hold up the rebar or barrel sections. Casting pre-cast concrete top slabs on a soil, gravel or sand foundation is specifically prohibited.
- 2) No concrete shall be placed for the wetwell top slab or base slab without prior inspection of the forms, reinforcing and embedded items and written approval from an authorized representative of the Owner's Representative.
- 3) The Contractor shall call for inspections at least seventy-two (72) hours in advance, and after inspections shall notify the Owner's Representative at least twenty-four (24) hours in advance of any scheduled concrete placement.
- 4) If the top slab or base slab is manufactured at a location more than 60 miles from Salem, Oregon, the Contractor shall be responsible for reimbursing the Engineer for additional travel time and mileage expenses, unless specifically waived in writing by the Owner.

c. It is the Contractor's responsibility to see that the forms are properly cleaned and oiled, reinforcing steel is securely and properly supported in the correct position, and that all embedment items are correctly installed and correctly oriented before calling for inspections. The Owner's Representative may at his option require the use of placement cards if deemed necessary.

d. Hatch & Embedment Item Orientation. The Contractor shall remain fully responsibility to ensure that hatches, cable trays and other embedded items are correctly located and correctly oriented prior to placing concrete. Failure by Contractor to ensure that hatches and other embedded items in the top slab fully conform with all drawing and specification requirements will not be grounds for an extension of the contract time or an increase in the contract price.

e. Spare Vibration Equipment Required On-Site. In addition to the concrete vibrators in actual use while concrete is being placed, the Contractor shall have available (on-site) a minimum of one (1) spare concrete vibrator in serviceable condition. No concrete shall

be placed until it has been demonstrated that all vibrating equipment, including spares, is in serviceable condition.

- f. Hours for Placing - Concrete shall be placed between the hours of 7 a.m. and 6 p.m., unless permission is given to extend that time. No slab shall be placed after 12:00 noon on any last working day of the week.
- g. Interruption of Pour - Each concrete pour shall be completed in a continuous operation with no interruption in excess of 45 minutes.
- h. Initial Set - No concrete shall be placed after its initial set has occurred and no re-tempered concrete shall be used under any circumstances.

3.3 EXCAVATION & WETWELL INSTALLATION

- a. Excavation for wetwell construction shall conform to the requirements contained herein, shown on the drawings or specified in other applicable sections.
 - 1) All excavation work and spoils piles shall remain within the work limits shown on the design drawings.
 - 2) Sheet piling and/or shoring shall be used where required, where specified or required by the Owner's Representative.
 - 3) All sheeting and/or shoring shall be of the Contractor's design, and shall be in accordance with all Federal, State and Local codes and requirements. While the Owner's Representative may review the shoring plan to verify conformance with the specification requirements and/or recommendations of the geotechnical report, the Contractor shall remain entirely responsible for the means & methods involved with the installation and use of any shoring system, including applicability for use under any particular conditions.
- b. Backfill & Compaction Under & Around Wetwell Structure
 - 1) Backfill Material. Except for the foundation stabilization rock noted below, backfill under the base slab and around the wetwell structure and other appurtenances shall be well graded granular baserock material (3/4"-0 granular baserock unless otherwise specified below or shown on the drawings).
 - 2) Foundation Stabilization Rock.
 - a) Unless otherwise shown on the drawings, a minimum of 18" of 4"-0 well graded quarry rock (*acceptable to the Owner's Representative*) shall be installed under the wetwell base slab for foundation stabilization.
 - b) If the quarry rock is not well graded, it shall be mixed with 3/4"-0 granular baserock prior to placement.
 - c) Woven reinforcement geotextile fabric shall be placed between the quarry rock and the subgrade soils.
 - 3) Backfill & Compaction under Base Slab.

- a) Unless greater depths are shown on the drawings, the graded quarry rock shall be topped with a 12-inch minimum thickness of $\frac{3}{4}$ "-0 compacted granular baserock (*thickness as required to allow for compaction testing as noted below*).
- b) Compaction of the granular baserock under the base slab shall be achieved by mechanical compaction to a minimum of ninety-two percent (92%) of the maximum dry density per AASHTO T-180 (Modified Proctor/ ASTM D1557) test method.
- c) The wetwell structure excavation shall be backfilled with compacted granular baserock for a minimum of 5 feet around the structure, unless otherwise noted on the drawings.
- d) The granular baserock shall be mechanically compacted in lifts not to exceed 4 feet.
- e) Compaction tests shall be taken on the granular backfill as each lift is placed and compacted.
- f) Compaction around the wetwell structure shall be ninety-two percent (92%) of the maximum dry density per AASHTO T-180 (Modified Proctor/ ASTM D1557) test method.

c. Base Section Installation

- 1) Excavations shall be dewatered prior to placement of base sections. Wellpoints or sumps shall be installed as required to adequately dewater the excavations.
- 2) Compaction tests shall be taken on the baserock prior to placement of the base slab section.
- 3) The precast base shall be fully and uniformly supported by the compacted baserock at the specified grade and alignment and shall be set such that the base section is level and plumb.
- 4) The use of spacers between riser sections to accommodate an out-of-plumb base section is specifically prohibited.

d. Precast Concrete Riser Sections

- 1) Other than the first riser section (cast into the base slab), the remaining riser sections shall not be installed for a minimum of 7 days, or until after the base slab concrete has reached 90% of its full design strength (as evidenced by test cylinder breaks), whichever is longer.
- 2) All riser sections shall be numbered by the manufacturer and installed in the order in which they are numbered. The shortest length of riser section to be incorporated into the wetwell shall be installed immediately below the top slab.
- 3) Care shall be exercised to ensure that the vertical reference marks on all riser

sections are aligned correctly as each piece is installed.

- 4) Riser section joints shall be grouted smooth inside and out, and lifting holes filled with non-metallic non-shrink grout.
- 5) Pipe connections shall be let into precast concrete walls smoothly. All connections shall be grouted back solid around the entire connection.

e. Precast Top Slab

- 1) If the wetwell top slab is precast, it shall not be placed until after the wetwell riser sections have been placed and backfilled with granular material to within 5 feet of final grade. The wetwell shall be checked for plumbness prior to placing the top slab.
- 2) Care shall be exercised to ensure that the vertical reference marks on the top slab are aligned correctly with the riser slab. The contractor shall also verify that the hatch and upper guidebar brackets are properly aligned with the pump discharge heads in the base section.

3.4 LEAKAGE TESTING, ETC.

- a. Wetwells that exhibit any visible water infiltration or leakage **OR** which do not pass leakage testing summarized below shall be repaired by the contractor in a manner acceptable to the Owner's Representative, at no additional cost to the Owner.
- b. Following completion of all pipe penetrations in the wetwell, the Contractor shall conduct hydrostatic leakage testing as outlined below unless otherwise approved in writing by the Owner's Representative:
 - 1) The test shall consist of plugging all inlets and outlets and filling the wetwell with water. The wetwell should be filled 24 hours prior to the time of testing to permit normal absorption into the wetwell walls. The wetwell shall be full at the start of the test.
 - 2) Leakage shall not exceed 0.2 gallons per hour per foot of head above the base over a four (4) hour period.
 - 3) Leakage shall be determined by refilling to the rim using a calibrated known-volume container, unless the volume can be accurately determined by measurement in a manner approved by the Owner's Representative and acceptable to the agency with jurisdiction.
- c. Fresh Water Testing Required. Contractor shall be responsible for obtaining sufficient water (non-sewage, fresh water) to fill the wetwell and to conduct the required wetwell and pumping tests. If adequate water cannot be obtained from hydrants or watercourses in the vicinity of the pump station, the Contractor shall provide water trucks or other means of transporting required water.

PART 4: SPECIAL PROVISIONS

None.

SECTION 11752
PUMP STATION VALVE VAULT, PUMP DISCHARGE PIPING & FITTINGS

PART 1: GENERAL

1.1 SCOPE

- a. This section includes furnishing and installing a precast concrete valve vault, as well as all pump station piping, forcemain piping and fittings, valves and appurtenances as shown on the drawings, as specified herein or as required for a complete installation and for satisfactory operation.
- b. All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Submittals for Review: Submittals & shop drawings including complete specifications, descriptive drawings, and literature for all vaults, equipment, piping and materials proposed for use, including but not limited to the following.
 - a) Complete specifications, descriptive drawings, and literature of the valve vault structure and all accessories, including hatches, piping, fittings, valves, pipe supports, pressure sensors, etc.
 - b) Valve Vault.
 - (1) Vault & top slab shop drawings.
 - (2) Mastic for use on vault joints.
 - (3) Hatch & Frame shop drawings.
 - (a) Hatch Frame Drain Coupling & Bend. Where channel frames are specified, the shop drawings shall show the frame channel drain pipe to the exterior edge, with notes for it to be cast into the top slab by the precaster.
 - (b) Unless another method is proposed (*acceptable to the Owner's Representative*), hatch shop drawings shall include a note requiring a 90° bend to be threaded into the bottom the channel drain outlet coupling prior to welding of the hatch skirt to the frame (*since the hatch skirt typically prevents the 90° bend from being screwed into place at the precast yard*).
 - (4) Safety grate shop drawings.
 - (5) Ladder & safety post assembly.
 - c) Valve Vault Sump & Sump Pump.
 - (1) Sump for installation inside the vault.
 - (2) Sump pump & appurtenances, or drain pipe & appurtenances, as shown on drawings.
 - (3) FRP grating or slotted MH cover for the top of sump, coped for the required sump pump discharge pipe.

- d) Each size and type of pipe used (*including each thickness class of pipe*) to be used.
- e) Each size and type of fitting, coupling or adapter to be used, including complete information on retainer glands or other pipe restraint.
- f) Each type and size of bolts, washers and nuts proposed for use.
- g) Each size and type of isolation or check valve to be used.
- h) Valve boxes and valve box bases.
- i) Underground warning tape.
- j) Toning wire & associated locator box/test stations.
- k) Zinc cap nuts as applicable.
- l) Thrust block concrete mix design (*where 3300 psi truck-mixed concrete is used*), or manufacturer's data (*where 4000 psi hand-mixed sack-krete concrete is used*).
- m) Valve wrenche as specified.
- n) Grooved piping products (*including couplings & fittings as applicable*).
 - (1) All grooved products as specified or shown on drawings shall be specifically identified with the applicable Victaulic series or style designation.
 - (2) Provide specific information on the factory coating system to be provided on the grooved fittings and/or couplings, as specified.
 - (3) Where substitute grooved fittings or couplings are proposed for use, the submittal shall include a certification that the proposed couplings, fittings and adapters are 100% compatible with and 100% interchangeable with the specified couplings & fittings, including a list with the model number of the proposed fitting or coupling which corresponds with the model number of the specified fitting or coupling.
- o) Access Hatch. The hatch manufacturer shall guarantee proper operation and against defects in material and workmanship for a period of ten (10) years from date of shipment.

2) O&M Information

- a) Operations and Maintenance information, including parts lists and complete manufacturer's literature for each piece of equipment, shall be submitted for all materials and equipment furnished under this and related sections.
- b) Manufacturer's warranties for components provided for inclusion in the O&M manuals.

PART 2: PRODUCTS

2.1 VAULT STRUCTURE

- a. The valve vault structure shall be designed to resist all soil and hydraulic pressures, including lateral and hydraulic uplift pressure.
- b. Precast vault base slab, top slabs and riser sections rings shall conform to the requirements of ASTM C857 except as modified herein.

- c. All precast concrete shall be 4500 psi at 28 days. All bar reinforcing shall be grade 60 deformed bars conforming to ASTM A-615 or ASTM-616.
- d. The base of the vault shall be a minimum of 4-inches thick, while the walls shall have a minimum thickness of 3-inches.
- e. Vault top slab shall be designed to support non-traffic loads as noted on the drawings.
- f. Vault Sump
 - 1) The vault shall be provided with a grated 12-inch diameter sump and sump pump with materials as specified on the drawings.
- g. Access Hatch
 - 1) Hatch arrangement shall be double or triple leaf, hinged as shown on the drawings. Size and clear opening shall be as shown on the drawings. Unless otherwise specified, all hardware shall be stainless steel.
 - 2) Each hatch shall be designed to combine covering of the opening, fall through protection per OSHA standard 1910.23 and controlled confine space entry per OSHA standard 1910.146. Material shall be 6061-T6 aluminum for bars, angles and extrusions, and 1/4" diamond plate shall be 5086 aluminum.
 - 3) Hatch shall be rated *non-traffic loads*. Non-traffic hatches shall be pedestrian rated for 300 PSF loading.
 - 4) The hatch cover leaf shall be 1/4-inch minimum aluminum diamond pattern plate with reinforcing as required to prevent distortion of the leaf when in any position.
 - 5) Hatch Channel Frame. The hatch shall have a channel frame with anchor flanges to secure the hatch into the concrete.
 - 6) Channel Frame Drains.
 - a) The hatch channel frame shall be provided with two (2) 1½-inch drain couplers (*one at each end, on opposite corners*), with bends & drain pipes routed to the exterior edge of the slab.
 - b) **The horizontal drain pipes shall be cast into the vault top slab** (*configured to allow the channel to be completely drained and debris washed down the channel drain*).
 - c) Unless another method is proposed (*acceptable to the Owner's Representative*), a 90° bend shall be threaded into the bottom the channel drain outlet coupling prior to welding of the hatch skirt to the frame (*since the hatch skirt typically prevents the 90° bend from being screwed into place at the precast yard*).
 - d) Failure to provide bends and horizontal drain pipe cast into the vault top slab will require replacement with the vault top slab with one meeting specification requirements, at the Owner's sole discretion (*at no additional cost to the Owner*).
 - 7) Hatch Skirt: The hatch frame shall be provided with a vertical full depth

aluminum skirt (*1/4-inch minimum thickness*) which extends the full depth of the vault top slab. The aluminum plate shall act as a concrete form, with the skirt being integral with hatch frame, or welded around the full perimeter to be flush with the inside face of the hatch frame.

- 8) The exterior of hatch frame and skirt (*in contact with concrete*) shall be supplied with a 2-mil thickness of bituminous coating. Application procedure shall be in accordance with manufacturer.
- 9) Hinges shall be of heavy-duty design. Material shall be stainless steel with a 3/8" grade 316 stainless steel pin. Hinges shall be bolted to the channel frame and diamond plate, with grade 316 stainless steel bolts and ny-lock nuts.
- 10) Hatch covers shall be equipped with a recessed cast aluminum handles. Lift handles must be placed at outer edges of cover. The lift handles shall be flush with the top of the 1/4" diamond plate.
- 11) Hatch covers shall be supplied with a grade 316 stainless steel recessed Slamlock, with keyway protected by a threaded stainless steel plug. Plug shall be flush with the top of the 1/4" diamond plate. Slamlock shall be fastened with four grade 316 stainless steel bolts and washers.
- 12) Hatch covers shall be supplied with a Recessed Padlock Clip (RPC). RPC shall be supplied with its own separate hinged cover for owner access to the owner supplied padlock.
- 13) Hatch covers shall be equipped with a stainless steel hold-open arms. Covers shall automatically lock open in the 90-degree position. Hold-open arms shall be fastened to the frame with a 1/2" grade 316 stainless steel bolt.
- 14) Safety Hatch Fall Protection
 - a) Each hatch shall be provided with an integral safety grate that provides fall through protection per OSHA standard 1910.23 and controlled confine space entry per OSHA standard 1910.146. The design must assure that the fall through protection is in place before the doors can be closed, thereby protecting the next operator.
 - b) Grating shall be 6061-T6 aluminum designed to withstand the same live load as specified for the hatch as a minimum. Deflection shall not exceed 1/150th of the span. In addition, the wetwell hatch safety grate shall be designed to support the specific pumps provided at this pump station. This allows the pumps to be pulled from the wetwell, the grating closed and the pump set back on the grating for pump wash down directly back into the wetwell.
 - c) Safety Grates must be supplied with hinge system, hold open arms and the same style of lift assist system required for the hatch covers (*see reference above*).
 - d) Safety grates shall be designed to be secured in the closed position with a

padlock, separately from the hatch.

- e) Grate openings shall be 5" x 5", which will allow for visual inspection, limited maintenance and float adjustments while the safety grate fall through protection is left in place.
 - f) Grate shall be coated with OSHA safety orange, High Solids Epoxy paint. Before coating of grates, grates must be shot blasted to assure a good bond with the epoxy.
- 15) All hatches shall be Flygt hatches with the safety grating option, as manufactured by USF Fabrication, or approved equal.
- h. Access Ladder & Safety Post. Unless otherwise noted on the drawings or specified, all vaults shall be provided with an OSHA approved chamber ladder with an aluminum pull-up safety post as shown on the drawing details.

2.2 BOLTS & NUTS

- a. All bolts & nuts shall conform to the size & thread requirements of AWWA C-111, material as summarized below for each category of joints and fittings.
- 1) Bolts & Nuts.
 - a) Flange bolts & nuts shall be high strength, low alloy steel, fluoropolymer coated (*Romac R-Blue, Tripac 2000 or equal*).
 - b) MJ T-bolts & nuts shall be high strength, low alloy steel, fluoropolymer coated (*Romac R-Blue, Tripac 2000 or equal*).

2.3 DUCTILE IRON PIPE & FITTINGS

- a. Ductile Iron (DI) Pipe
- 1) All ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151 unless otherwise specified.
 - 2) All ductile iron pipe within the wetwell or valve vault shall be minimum Class 53 thickness, unless otherwise shown or specified.
 - 3) The thickness class or pressure class of the pipe, as well as the material type, size and designation (ie. AWWA ____) shall be permanently stencilled on the exterior of each pipe at the factory.
 - 4) All ductile iron pipe shall be as manufactured by Pacific States, US Pipe, Tyler Pipe, or approved equal.
- b. Ductile Iron Coatings and Linings
- 1) All ductile iron pipe shall be cement mortar lined and seal coated in accordance with AWWA C-104.
 - 2) Pipe that have a damaged lining or no lining will be rejected at the job site.

Unless approved in writing by the engineer on a case-by-case basis, pipe linings shall not be repaired at the job site.

- 3) All cast pipe shall be coated on the outside with a standard coating of black bituminous paint a minimum of 1 mil thick unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

c. Pipe Joints

- 1) Gaskets and glands shall be provided by the manufacturer of the fitting on which they are to be used and shall be specifically designed for the pipe O.D. equivalent used.
- 2) Where required a non-toxic vegetable soap lubricant shall be supplied with the pipe or fittings in sufficient quantities for installing the pipe.
- 3) Mechanical Joints. All components of mechanical joints shall be in conformance with AWWA C-111 and C-153.
- 4) Retainer Glands. Retainer glands shall be used at locations shown on the drawings. Retainer glands shall be "Mega-Lug" as manufactured by EBAA Iron Inc., or approved equal, color coded based on the type of pipe it is designed for use on.
 - a) Retainer gland casting bodies shall have all surfaces fusion bond powder coated (*polyester or nylon based*) after pretreatment with a phosphate wash, rinse & sealer coating (*Mega-Bond or approved equal*).
 - b) Retainer gland set wedge bolts and set wedge assemblies shall have all surfaces coated with a minimum of two coats of fluoropolymer coating or approved equal coating (*to control thread friction torque during tightening of set wedges*).
- 5) Flanged Joints. Flanged joints for ductile iron pipe shall conform with the requirements of AWWA C-115. Unless otherwise shown or specified, flanged spools shall be minimum Class 53 thickness. SBR rubber gaskets shall be 1/8-inch thick rubber, full face, conforming to the pipe manufacturer's requirements and AWWA C-111.

d. Ductile Iron Fittings

- 1) The size, gasket manufacturer's mark, county where molded, year of manufacture shall be molded or permanently marked on non-sealing surfaces. In addition, the letters MJ shall be appear on all MJ fittings.
- 2) Unless otherwise shown or specified, all fittings shall be as manufactured by Mueller, Tyler, US Pipe or approved equal.
- 3) Mechanical Joint Fittings

- a) All MJ tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 24-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C-153. The minimum working pressure for all MJ ductile iron fittings 4-inches through 24-inch in diameter shall be 350 psi.
 - b) All follower glands shall be ductile iron. In addition to casting marks on the fittings, follower glands shall have cast or stamped on them the manufacturer's identification, country where cast, nominal size, and the letters DI or ductile.
- 4) Flanged Fittings
- a) All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48-inches in diameter shall be ductile iron fittings in conformance with AWWA C-110.
 - b) Unless otherwise specified, the minimum working pressure for all flanged ductile iron fittings shall be 250 psi.
 - c) All fitting shall have distinctly cast on the outside of the fitting the pressure rating, nominal diameter of openings, manufacturer's identification, country where cast, and number of degrees or fraction of the circle on all bends. Size of lettering shall conform to AWWA C-110.

2.4 COUPLINGS AND ADAPTERS

- a. Mechanical joint couplings and adapters shall be limited in their application to connection of new pipe work to existing waterlines, temporary installations, and where specifically called for in the Contract Documents or approved by Owner's Representative.
- b. Unless otherwise specified, all mechanical joint couplings shall be furnished with an epoxy coating inside and outside conforming to the requirements of AWWA C-550.
- c. Mechanical joint couplings and adapters shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.
- d. Unrestrained Couplings. Unrestrained mechanical joint couplings and adapters shall be Hymax Wide Range Couplings (*or Romac Macro HP as applicable*) two bolt couplings, or approved equal.
 - 1) If unrestrained MJ sleeve couplings are approved by the Owner on a case-by-case basis, they shall be long-style solid sleeve type couplings consisting of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts (*zinc plated*) (Tyler Pipe, UFCO, Star, Sigma or approved equal).
- e. Adaptor Flanges (*Exposed Locations*): Where shown on the drawings, adaptor flanges for use in making custom ductile iron spools in buried or exposed locations shall be Megaflange Adapters as Manufactured by Ebba Iron, or approved equal.

2.5 PVC PIPE

- a. 4-inch Through 24-inch (AWWA C-900)
 - 1) Unless otherwise shown on the drawings, PVC pressure pipe 4-inches through 12-inches in diameter shall conform to the requirements of AWWA C-900 (*design stress of 4000 psi*), NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions and conforming to the following:
 - a) Shall be PVC pipe with wall thickness equivalent to a standard dimension ratio (DR) of 18, Pressure Class 235 (per C900).
 - 2) All PVC pipe shall be as manufactured by JM Eagle, Royal Pipe or approved equal.

2.6 GROOVED PIPING SYSTEMS

- a. A manufacturer factory trained representative shall provide on-site training for Contractor's field personnel in the use of grooving tools, application of groove, and product installation.
- b. Ductile Iron Pipe. Grooved ductile iron pipe shall be Class 53 grooved in accordance with AWWA C606.
 - 1) Groove dimensions shall be for flexible cut (*to allow for minor deflections*) unless otherwise noted on the drawings.
- c. Grooved Couplings
 - 1) Factory Paint Coating. Unless otherwise specified or noted on the drawings, all ductile iron grooved couplings, adapters and fittings shall be provided with an alkyd-phenolic primer and factory orange enamel top coating.
 - 2) Coupling gaskets. Synthetic rubber FlushSeal configuration, manufactured of elastomers as designated in ASTM D-2000. Gaskets shall be pressure-responsive synthetic rubber, FlushSeal type. Reference shall always be made to the latest published Selection Guide for proper gasket selection for the intended service. Gaskets shall be rated for use in both pressure and vacuum applications.
 - 3) Ductile Iron Pipe Couplings. Manufactured in two or more segments of cast ductile iron, conforming to A-536, Grade 65-45-12. Mechanical coupling bolts shall be zinc plated (ASTM B-633) heat treated carbon steel track head conforming to the physical properties of ASTM A-183, minimum tensile strength 110,000 psi. Standard couplings shall be Victaulic Style 31.
 - 4) Transition Couplings. For transition between IPS steel and AWWA ductile iron sized pipe. Housings cast with offsetting, angle-pattern, bolt pads. Victaulic Style 307.

2.7 VALVES

- a. Gate Valves. Where shown on the drawings, isolation valves 8-inch and smaller shall be resilient seat wedge gate valves, factory fusion bond epoxy coated.

- 1) Except as modified herein, gate valves and appurtenances shall conform to the requirements of AWWA C-509 or AWWA C-515 covering iron-body, resilient seat non-rising stem gate valves 3-inches through 12-inches diameter.
- 2) All internal parts shall be accessible without removing the valve from the line. The top stem O-rings shall be field replaceable (*in the full open position*) without removing the valve from service.
- 3) Valves shall be tested and certified by the manufacturer for shut-off at a working pressure of 200 psi and shell tested to a minimum pressure of 300 psi.

a. Valve Operators

- 1) Exposed valves shall be provided with operators as indicated on the drawings (*ie. square nut or handwheel*).
- 2) Unless otherwise specified or shown on the drawings, all buried valves shall be supplied with a 2-inch square operating nut. Nuts shall have a flanged base on which shall be cast an arrow at least 2-inch long with the word "OPEN" cast on the nut to clearly indicate the direction of opening.
- 3) Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Length shall be such that the 2-inch square operating nut on top of the extension stem will be 12" minimum to 24' maximum below finish grade. The extension stem shall be provided with spacers which will center the stem in the valve box.

b. Valve Coating

- 1) Unless otherwise specified, all valves shall be furnished with a factory epoxy coating inside and outside (*8 mil minimum thickness*) conforming to the requirements of AWWA C-550.

2.8 VALVE BOXES (VB)

- a. All buried valves shall be provided with valve boxes. Valve boxes shall conform to drawing details. Lid to read "Sewer" or "S" for sewer system valves.
- b. All parts of valve boxes and covers shall be coated by dipping in bituminous varnish.

2.9 VALVE WRENCH (for square nut valves located in vaults, ARV manholes, etc.)

- a. A T-handle valve wrench specifically for the valve vault shall be delivered to the Owner by the Contractor prior to final acceptance of the pump station. The length of the valve wrench stem shall be such that the valves can be properly operated from a standing position outside the valve vault (*ie., handle at ± 3 feet above hatch or cover*).
- b. Articulated Knuckle Valve Wrench. The valve wrench shall be provided with an articulated knuckle joint within 6-inches of the socket end of the wrench. The knuckle shall allow all valves to be operated without opening the safety grate, even when the

valve nut is offset from the hatch.

The knuckle shall either consist of standard valve wrench with a ¾" drive knuckle for an impact wrench welded between the wrench stem and the valve nut socket, be a "Swivel Gate Valve Key" by Pollard Water, or approved equal.

2.10 PUMP DISCHARGE LINE CHECK VALVE

- a. Unless otherwise noted, the discharge line check valve shall be a rubber flapper swing check valve with a ductile iron body and cover. The body shall be long pattern design (*not wafer*), with integrally cast-on 125 pound, full faced end flanges, drilled per ANSI B16.1.
- b. The flapper shall be Buna-N having an O-ring seating edge and be internally reinforced with steel. The flapper shall be easily removed and replaced without the need to remove the valve from the line.
- c. The seating surface for the flapper shall be on a 45° angle requiring the flapper to travel only 35° from closed to full open position. The check valve shall have full pipe size flow area, except that 4-inch valves shall have a free flow area large enough to pass 3-inch solids ($\pm 185\%$ flow area) without clogging.
- d. The check valve shall be rated for a continuous working back pressure of 250 psi.
- e. All valves shall be furnished with a fusion-bonded epoxy coating inside and outside conforming to the requirements of AWWA C-550.
- f. All check valves shall be provided with a bronze backflow actuator with a T-handle operator as provided by Val-Matic, or approved equal.
- g. All swing check valves shall be provided with a Val-Matic Swing-Flex Mechanical Indicator or approved equal.
- h. Check valves shall be Val-matic Model 503A-MI or approved equal, as shown on the drawings. All check valves and associated components shall be provided by a single manufacturer.

2.11 PIPE SUPPORTS

- a. Except where saddle style supports are shown on the drawings, pipe supports for use with flanged piping, valves or fittings shall be positively attached to the flange. The support shall mount to the bottom two holes of the flange, utilizing standard diameter flange bolts.
- b. The pipe supports shall be supplied with an independent base and adjustment collar designed to accept standard Schedule 40 galvanized steel pipe for coarse height adjustment. Supports shall be fabricated from A36 mild steel and have an heavy duty galvanized finish unless otherwise specified. The pipe supports shall offer a minimum of 3-inches of final adjustment after installation.
- c. Unless otherwise shown on the drawings, pipe supports shall be Standon adjustable pipe supports as manufactured by Material Resources, or approved equal.

2.12 CONCRETE

- a. Concrete shall conform to OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 4000 psi.
- b. Reinforcing steel shall be deformed bars conforming to ASTM A-615, Grade 60.
- c. Cast-in-Place Thrust Collars.
 - 1) Cast-in-place concrete thrust collars shall be installed on outside of the valve vault, at each end where inlet or outlet piping penetrates the vault walls. The thrust collar shall encase inlet and outlet pipes as shown on the drawings or details.
 - 2) The concrete for the thrust collars shall be truck mixed concrete with a minimum strength of 4000 psi at 28 days, and shall have a minimum thickness of 12-inches. Other dimensions shall be as shown on the drawings.

2.13 VAULT SUMP PUMP

- a. A minimum 5 gpm sump pump shall be installed in the valve vault, unless a higher capacity is specified or noted on the drawings. The sump pump shall be automatically controlled by an integral float switch.
- b. Sump Pump Discharge Pipe & Fittings. Unless otherwise shown on the drawings, the pump discharge piping shall consist of the following shall be provided:
 - 1) 1½-inch rubber or braid reinforced PVC flex hose (*end as required for connection to the sump pump provided*) with a fitting on the opposite end to connect to Schedule 40 PVC discharge piping located on the vault wall above the sump hole (*if barbed fittings are used on either end of the flex hose, stainless steel hose clamps shall be used*).
 - 2) 1½-inch true union ball check valve (*Hayward TC or equal, suitable for dirty water applications*), to allow the check valve to be removed, cleaned or replaced without removing the discharge piping from the wall.
 - 3) 1½-inch true union ball valve (*Hayward TBH or equal, with integral lock-out plate, EPDM seals & reversible seats & embedded O-rings*), to allow the check valve to be removed, cleaned or replaced without removing the discharge piping from the wall
 - 4) Schedule 40 PVC pipe & bends as required on the interior of the valve vault, extending to the discharge location shown or noted on the drawings.
 - 5) Except for the vertical flex hose between the sump pump and the PVC pipe connection, all pipe shall be anchored to the vault wall.
- c. The pump provided shall be low enough profile so that the sump is deep enough to allow for operation of the sump pump without water rising above the top of the sump hole onto the vault floor.
- d. The sump pump shall be provided with a heavy duty SJO power cord long enough to plug into the specified receptacle with 10 feet of slack at the pump end (*neatly coiled and fastened with tie wraps, to allow the sump pump to be lifted from the vault without the need to disconnect the male cord plug*). If a factory power cable is not available, the cord

shall be field extended with a waterproof splice as follows.

- 1) Compression connectors shall be insulated type, and splice shall be sealed water tight with heavy-wall water-tight shrink wrap tubing placed over the cable (*not just the conductors*), overlapping the splice point by a minimum of 3-inches in each direction.
 - 2) The cord extension shall be the same minimum gauge and type as the one factory installed on the pump, in yellow or orange. For 1/3 HP pumps, the cord shall be heavy duty 16/3 SJTW.
 - 3) Unless otherwise shown on the electrical drawings, the male end of the pump power cord shall be NEMA 5-15 P (*Hubbell NEMA 5-15 P, male plug end sized for the cable diameter and a Hubbell rubber plug boot, or equal*).
- e. The sump pump shall be a Flygt SX series submersible drainage pump, or approved equal.

2.14 ANCHOR BOLTS

- a. Anchor bolts for pump discharge bases shall be as specified in Section 11750.
- b. Unless otherwise specified or noted on the drawings, all anchor bolts for shall be 304 stainless steel.
- c. The diameter, length and any bend dimensions of anchors shall be as shown on the drawings or as recommended by the equipment or machinery manufacturer, whichever is more stringent. Sleeves shall be provided as required or as shown for location adjustment.
- d. Unless otherwise required or shown, use 3/4 inch minimum diameter and other geometry as shown on the drawings. In no case shall anchor bolts be more than 1/8-inch smaller than the anchor bolt holes provided by the manufacturer in the equipment or machinery.
- e. A minimum of two nuts and one washer of the same material as the bolt shall be furnished with each bolt, with both nuts being fully engaged on the anchor bolt threads.

2.15 ZINC CAP NUTS (SACRIFICIAL ANODES)

- a. Both ends of each buried fitting and each bolted buried connection shall be provided with a minimum of six (6) zinc cap nuts as specified (*6 ounce anti-corrosion anodes*), evenly spaced. For fitting with less than 6 bolts on each end, zinc caps shall be provided on all bolts.
- b. The requirement for zinc cap nuts shall apply to all buried bolted joints (*including but not limited to MJ, flange, grooved and couplings*), regardless of pipe type or bolt material type. The zinc cap nuts shall be installed on the buried bolts after the bolt/nuts have joint has been completely tightened (*and retightened if required*) as specified.
- c. Zinc cap nuts shall be zinc anodes with composition conforming with MIL spec MIL-A-18001J, and shall be MARS 6 ounce zinc caps as provided by Farwest Corrosion Control Company, or approved equal.

2.16 UNDERGROUND WARNING TAPE

- a. Detectable or non-detectable acid and alkali resistant 6-inch wide safety warning tape shall be provided for all buried pipeline.
- b. The tape shall consist of a minimum 4.0 mil (0.004") thick, virgin low density polyethylene plastic film formulated for extended use underground. The tape shall be in accordance with the APWA national color code and shall be permanently imprinted in lead free black pigments suitable for direct burial.
- c. The tape shall be safety blue and shall be provided with the legend "CAUTION BURIED WATER LINE BELOW" or approved equivalent printed continuously down the length of the tape.

2.17 TONING WIRE

- a. A continuous insulated 12 gauge solid core copper toning wire shall be supplied with non-metallic pipe. Insulation shall be blue in color for potable water piping. All splices in toning/tracer wire shall be completed with watertight and corrosion resistance splices (*waterproof wire nuts*).
- b. Additional wire shall be supplied as necessary to allow the toning wire to be looped up at all valve boxes on all lines.

PART 3: EXECUTION

3.1 GENERAL

- a. All portions of the installation shall comply with drawing details, the requirements outlined below, the manufacturer's latest recommendations and the best practices of the industry.
- b. Location of the valve vault shall be as shown on the drawings or directed by the Owner's Representative.
- c. All connections to valve vaults shall be watertight. Any visible infiltration of water into valve vaults shall be considered unacceptable.

3.2 FORM & REINFORCING INSPECTION, PRECAST SCHEDULING

- a. Pre-Cast Concrete Top Slab. No concrete shall be placed for the valve vault top slab without prior inspection of the forms, reinforcing and embedded items and written approval from an authorized representative of the Owner's Representative. The Contractor shall call for inspections at least seventy-two (72) hours in advance, and after inspections shall notify the Owner's Representative at least twenty-four (24) hours in advance of any scheduled concrete placement. If the top slab is manufactured at a location more than 60 miles from Salem, Oregon, the Contractor shall be responsible for reimbursing the Engineer for additional travel time and mileage expenses.
- b. It is the Contractor's responsibility to see that the forms are properly cleaned and oiled,

reinforcing steel is securely and properly supported in the correct position and that all embedment items including electrical conduit is correctly installed before calling for inspections. The Owner's Representative may at his option require the use of placement cards if deemed necessary.

- c. Hours for Placing - Concrete shall be placed between the hours of 7 a.m. and 6 p.m., unless permission is given to extend that time. No slab shall be placed after 12:00 noon on any last working day of the week.
- d. Interruption of Pour - Each concrete pour shall be completed in a continuous operation with no interruption in excess of 45 minutes.
- e. Initial Set - No concrete shall be placed after its initial set has occurred and no re-tempered concrete shall be used under any circumstances.

3.3 EXCAVATION & VALVE VAULT INSTALLATION

- a. Excavation for valve vault construction shall conform to the requirements contained herein, shown on the drawings or specified in other applicable sections. All excavation work and spoils piles shall remain within the work limits shown on the design drawings. Shoring shall be used where required, where specified or required by the Owner's Representative.
- b. Backfill and compaction around manholes and other appurtenances shall be well graded granular material as specified.
- c. Vault shall be placed to lines, grades and dimensions shown on plans.
- d. Vault Base Section
 - 1) Excavations shall be dewatered prior to placement of base sections. Wellpoints or sumps shall be installed required to adequate dewater the excavations.
 - 2) Granular aggregate baserock shall be placed to a minimum compacted depth of twelve (12) inches prior to placement of precast base section. Additional thickness shall be installed as required to provide a adequately compacted base on which to set the base slab. Compaction tests shall be taken on the baserock prior to placement of the base section.
 - 3) Compaction under the base slab shall be achieved by mechanical compaction in horizontal lifts to a minimum of ninety-two percent (92%) of the maximum dry density per AASHTO T-180 (*Modified Proctor/ ASTM D1557*) test method.
 - 4) The precast base shall be fully and uniformly supported by the compacted baserock at the specified grade and alignment and shall be set such that the base section is level and plumb.
- e. Precast Concrete Riser Sections
 - 1) All riser sections shall be numbered by the manufacturer and installed in the order in which they are numbered. The shortest length of riser section to be

incorporated into the vault shall be installed immediately below the top slab.

- 2) Excess mastic shall be trimmed, and riser section joints shall be grouted smooth on the inside, and lifting holes filled with non-metallic non-shrink grout.

f. Precast Top Section

- 1) The vault top section shall be placed before backfilling with granular material. The base section shall be checked for level prior to placing the top slab.
- g. Prior to backfilling around the valve vault, the cast-in-place thrust collar shall be installed as shown on the drawings.
- h. Following installation of the thrust collars, the valve vault excavation shall be backfilled with granular aggregate baserock for a minimum of 3 feet around the structure. The granular baserock shall be compacted in lifts not to exceed 2 feet. Compaction tests shall be taken on the granular backfill as each lift is placed and compacted.
- i. Vault shall be watertight along all joints.
- 1) Prior to and at the final inspection, the Contractor shall spray water at the entire perimeter of all exposed joints (*including the joint between the vault walls and vault lid*) to demonstrate water-tightness, and proper installation of joint mastic. Contractor shall supply the water source and hose for such testing & demonstration.
- j. Leakage at any vault joint or penetration, including during the warranty period, shall be corrected to the satisfaction of the Owner's Representative, at no additional cost to the Owner.

3.4 PIPE ANCHORAGE, THRUST BLOCKS and/or STRADDLE BLOCKS

- a. Pipe anchorage systems shall be installed as shown on the drawings, as specified herein or as required by local jurisdiction standards or codes.
- b. All plugs, caps, tees, and bends of 11¼° or more on pipelines that are 3-inches in diameter or larger shall be securely anchored by concrete thrust blocking or straddle blocks.
- c. The use of threaded tie back rods to concrete deadman anchors shall NOT be used for permanent thrust restraint unless specifically shown on the drawings or directed by the Owner's Representative, although use as temporary thrust restraint is acceptable where approved by the Owner's Representative.
- d. Concrete thrust blocks and straddle blocks shall be installed where specified herein, shown on the drawings, or as directed by the Owner's Representative. Installation of concrete thrust blocks shall be in conformance with drawing details and the following:
 - 1) Concrete Mix. Unless higher strength is required on the drawings or by local jurisdiction standards or codes, concrete thrust blocks shall utilize a 3300 psi truck mixed concrete (*5" slump or stiffer*). If hand mixed sack-crete type concrete is proposed, it shall be a 4000 psi minimum mix (*approved by the Owner's Representative*), mixed with the minimum amount of water necessary for

workability (5" slump or stiffer).

- 2) In no case will dry sack-crete (*either in bags or as loose mix*) be considered as an acceptable substitute for an approved mixed concrete.
- 3) A plastic sheet or other similar protection shall be placed between the concrete and any portions of the valve, fitting, or nuts and bolts with which the concrete comes in contact. Do not encase pipe joints or cover bolt circles with concrete.
- 4) All concrete thrust blocks shall be placed using forms as necessary to allow access to the bolt circles after the placement of the thrust blocking concrete. The bearing surface shall be placed so that the pipe and fitting joints will be accessible for repair. Concrete shall in no case extend around more than one-half the circumference of the fitting at any point.
- 5) Concrete thrust blocking shall be placed between undisturbed earth and the fittings to be anchored. If, in the opinion of the Owner's Representative, the undisturbed earth against which the bearing surface will be established is compromised by adjacent trenches or excavations, the Contractor shall excavate additional material as required to establish a new bearing surface that is consistent with the size, configuration, and location of the piping.

e. Temporary Thrust Restraint.

- 1) Where approved by the Owner's Representative prior to construction, temporary thrust restraint may be used at mainline connections where it is not possible (prior to pressurization of the connection and placing the force main in service) to install permanent concrete thrust blocks, straddle blocks or other permanent thrust restraint as required or shown/noted on the drawings.
- 2) The adequacy of the temporary thrust restraint shall be the Contractor's sole responsibility, but shall be acceptable to the Owner's Representative and the agency with jurisdiction. Any movement of the pipe or fittings during pressurization of the pipeline or connection shall be considered evidence that the thrust restraint is not adequate, and the pipeline or connection shall be depressurized and the thrust restraint increased as necessary.
- 3) Trenches at the temporary thrust restraint location shall be left open and not backfilled (*but plated as necessary or required*) until the permanent thrust restraint is installed and approved by the Owner's Representative.
- 4) Unless otherwise approved in writing by the Owner's Representative and the agency with jurisdiction, permanent thrust restraint shall be installed by the end of the next working day after installation of the temporary thrust restraint, but in no case later than the third calendar day following installation of the temporary thrust restraint.

3.5 PRESSURE TESTING

- a. All pump discharge piping, valves, fittings, etc. shall be pressure tested at 150 psi, or 150% of the maximum working pressure (*ie. pump shutoff head*), whichever is greater. The

contractor shall provide and install all taps fittings pipe and temporary facilities as required to pressure test the piping.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 13

SPECIAL CONSTRUCTION AND PROCEDURES

As noted in the specification submittal requirements, Contractor shall provide all of the electrical / control / telemetry / SCADA product data in Division 13 & Division 16 at the same time, unless specifically allowed otherwise in writing by the Owner's project electrical engineer. Piecemeal submittals will be returned as incomplete.

SECTION 13410

BASIC MEASUREMENT AND CONTROL INSTRUMENTATION MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes.

1. This Section contains the basic materials and methods required to install the measurement and control instrumentation system.

1.2 SUBMITTALS

A. Contractor shall submit all the product data in Division 13 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete. In lieu of a hard copy submittal, and electronic version is allowed if it is tabbed and identified as required for the hard copy.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 13410.F30) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 01300 Submittal Procedures.
2. Provide product data on all components specified.

PART 2 PRODUCTS

2.1 MATERIALS

A. **Insulated Wire Ferrules (13410.F30).**

1. Ferrules shall be plastic sleeved and insulated.
2. Ferrules shall be color coded per the DIN Standard.
3. Provide Weidmuller ferrules, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. CONTRACTOR shall install and connect junction boxes, termination boxes, control panels, field devices, etc. as shown on the Drawings.
- B. Conductor Terminations.
 - 1. Provide ferrules on all conductors terminating on terminal strips.
 - 2. Ferrules shall be installed with a tool supplied by the ferrule manufacturer design specifically for that purpose.
 - 3. No more than one conductor shall be terminated on each side of a terminal block unless specifically shown otherwise on the Drawings.
- C. Terminal Block Jumpers.
 - 1. When connecting adjacent terminal blocks in a terminal strip to provide for common potentials, pre-manufactured bridge type jumpers supplied by the terminal manufacturer shall be used. These jumpers screw into and connect adjacent terminal blocks at the center of the terminal blocks.
 - 2. Comb type jumper shall not be used.
 - 3. Jumpers fabricated from short lengths of wire shall not be used.
- D. Twisted Shielded Pair (TSP) Cable Preparation.
 - 1. Strip cable insulation back only to the extent necessary to separate the individual conductors for termination. The shield shall be removed up to the point where the cable insulation has been removed.
 - 2. Provide green heat shrink tubing on the full length of exposed drain wire from the point of termination back to where the cable insulation has been removed. The tubing shall be properly sized for the conductor and shall be shrunk after installation. Reference Section 16150 Wiring Connections for specification requirements for heat shrink tubing.
 - 3. The drain wire shall be grounded as indicated on the Drawings.
 - 4. Provide black heat shrink tubing at the point where the cable insulation has been removed. The tubing shall be 3 inches long and shall extend 1.5 inches up the insulation and 1.5 inches down the individual conductors. The tubing shall be properly sized for the cable and shrunk after installation. No part of the shield and no un-insulated part of the drain wire shall extend beyond this tubing. Reference Section 16150 Wiring Connections for specification requirements for heat shrink tubing.
- E. Equipment Grounding.
 - 1. Each control panel, terminal box and junction box shall have a single grounding point consisting of a grounding bus bar. All grounding conductors terminating within the enclosure shall terminate on the ground bus. The ground bus bar shall be 100 percent copper with 10 percent spare opening for future use. Reference Section

16060 Grounding And Bonding for specification requirements for grounding bus bar.

F. Conductor Splicing.

1. Conductors shall be spliced on terminal blocks installed for this purpose.
2. Conductors shall only be spliced where identified on the Drawings.
3. No other splicing methods shall be approved without prior approval by the ENGINEER.

G. Instrument and Control Device Mounting Brackets.

1. The instrument/control device mounting bracket available from the manufacturer shall be provided and installed as directed unless a detail Drawing indicates a custom mounting bracket shall be provided.

H. Terminal Block and Terminal Strip Identification.

1. Terminal blocks shall be identified as shown on the Drawings. Identification shall be provided on both sides of the terminal block. The plastic identification inserts shall be machine printed and provided by the manufacturer of the terminal blocks.
2. Terminal strips shall be identified as shown on the drawings.

I. Identification

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.

3.2 FIELD QUALITY CONTROL

A. Site Tests.

1. Control and instrumentation related conductors shall be tested for resistance to ground through the use of an ohm meter and visual damage to the insulation. Grounded conductors (neutrals and negative conductors) shall be isolated from the grounding system before testing.
2. High voltage "meggers" shall not be used.
3. A conductor shall be replaced if the resistance reading is less than one meg-ohm.
4. CONTRACTOR shall record the results of these tests on the Continuity Test Certification forms and submit them to the ENGINEER as specified in Section 16080 Electrical Testing.

END OF SECTION

SECTION 13420

INSTRUMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. This section includes the requirements pertaining to the measurement and control instruments.

1.2 REFERENCES

A. American National Standards Institute (ANSI).

1. 51.1-1979 - (R1993) - Process Instrumentation Terminology.
2. 5.1-1984 - (R1992) - Instrumentation Symbols and Identification.

B. Instrumentation, Systems, and Automation Society (ISA).

1. 5.3-1983 - Graphic Symbols for Distributed Control/Shared Display Instrumentation, Logic, and Computer Systems.

C. National Fire Protection Association (NFPA) 70 - National Electrical Code.

D. National Electrical Manufacturer's Association (NEMA).

1. 1-2000 - Industrial Control and Systems General Requirements.

E. Underwriters Laboratory (UL).

1. 508 - Industrial Control Equipment.
2. 3121-1 - Standard for Safety for Process Control Equipment.

1.3 DEFINITIONS

A. Manufacturer's Representative - manufacturer's authorized employee of the service division.

1.4 SUBMITTALS

A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 13420.F21) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for

approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data

1. Pursuant to Section 01330 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS

C. Quality Assurance/Control Submittals

1. Manufacturers' instructions for each item specified in PART 2 PRODUCTS.
 - a. Complete user manual including installation, wiring schematic, programming, calibration, communication, diagnostics, troubleshooting, recommended spare parts, and maintenance recommendations or requirements.

1.5 SEQUENCING

- A. CONTRACTOR shall not energize instrumentation until the completion of the continuity test certification and certification of installation by manufacturer's representative.

1.6 SYSTEM START UP, COMMISSIONING, AND OWNER'S TRAINING

- A. Pursuant to Section 13490 Measurement and Control Commissioning.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. **Magnetic Flow Meter (13420.F51).**

1. Magnetic flow meter shall be provided as shown on the Drawings with a remote transmitter.
2. Provide a pair of ground rings for each meter installation. The ground rings shall be bonded to ground per the meter manufacturer's instructions.
3. The meter body shall be 2" diameter flanged style with Class 150, A105, carbon steel flanges in accordance with ANSI B16.5.
4. The meter shall be equipped with a remote transmitter rated NEMA 4X and 120 volt AC input power. The transmitter shall display instantaneous flow rate and totalized flow. The meter shall be configured to permit the transmission of instantaneous flow rate over a 4-20mA DC output.
5. Magnetic flow meters shall indicate, totalize, and transmit flow information.
6. Magnetic flow meters shall use pulsed AC measurement technology. Pulsed DC measurement technology is not acceptable.
7. Magnetic flow meters shall include an auto-zero feature.
8. Magnetic flow meters shall compensate for eddy currents.
9. The flow meter shall be equipped with "heartbeat technology" which allows the end user the ability to verify calibration with the equipment left in place with their staff.

10. All components of the flow meter, including meter tube, sensors and recorder/totalizer shall be products of a single manufacturer.
11. Magnetic flow meter flow tubes shall be factory assembled units comprised of a carbon steel spool piece and sensors.
 - a. Flow tube flanges shall be carbon steel, conforming to AWWA C110, and shall match the flange style of the piping to which they are connected.
 - b. Flow tubes shall be provided with stainless steel retention bolts.
 - c. Flow liner shall be hard rubber.
 - d. Transmitter power supply shall be 120 VAC.
 - e. Transmitters shall be shielded or filtered from common RF noise effects including: radio transmissions; variable frequency drives; etc.
 - f. Transmitters shall be housed in a corrosion-resistant epoxy painted, cast aluminum, NEMA 4X (IP67) enclosure, suitable for conduit connections, and shall include a clear polycarbonate window to allow viewing of the display without opening the enclosure.
 - g. Transmitter operation, configuration, and calibration shall be via the keypad with visual prompts and built-in help at the LCD display.
 - h. The flow meter shall have the capability of being programmed remotely using HART/analog protocol.
 - i. Transmitter display shall indicate flow rate and/or total flow in user-selectable units of measure.
 - j. Transmitters shall include:
 - 1) Isolated, independently configurable 4-20 mA analog output. Response time shall be adjustable between 0.05 and 100 seconds.
12. The magnetic flow meter shall be an Endress+Hauser Proline Promag W 400 Series model number, Promag 5W4C50-C6ELHP5DHA1KGA+AACBL4, or approved equal.
 - a. C6 Approval = CSA C/US NI Cl.1 Div.2 gr. ABCD
 - b. E Design: Fixed flange.
 - c. L Power Supply = 100-240VAC / 24 VAC/DC.
 - d. H Output; Input = 4-20mA HART, Pulse/freq. output switch output.
 - e. P Housing = Remote alum. coated.
 - f. 5 Cable, Remote Version = CONTRACTOR to determine lengths.
 - g. D Electrical Connection = Thread NPT ½ inch.
 - h. H Liner = Hard Rubber.
 - i. A12 Process Conn. = 150, carbon steel, lap joint, ASME B16.5
 - j. G Electrodes = 1.4435/316L Bullet Nose.
 - k. A Calibration = 0.5%
 - l. AA Operation Language Display = English
 - m. CB Sensor Option: IP68. Type 6P, fact-potted corrosion protection.
 - n. L4 Additional Approval: NSF 61 Drinking Water Approval

Ground Rings Model # DK5GD-50AHL. Provide 2.

B. Vault Float Switch (13420.F46).

1. Float switch shall be direct acting and rise on an integral stem.
2. Float switch contacts shall be Normally Closed (N/C) and rated for 0.40 A at 240 VAC and 1.0 A at 24 VDC.
3. Float switch shall a minimum of 24 inch wire leads, 22 AWG and Teflon insulated.
4. Float switch and all associated components shall be 316 stainless steel.
5. Shall be listed for use in the State of Oregon.
6. Shall have ¼" NPT.
7. Shall be provided with an 18" long ¼" stainless steel pipe which will be installed between the locate j-box and the float switch.
8. Float switch shall be 2-inch diameter minimum.
9. Provide Madison Model # M5600-PR, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Field wiring shall be installed according to the Drawings and manufacturer's instructions.
3. Wire and cable shall be connected from terminal to terminal without splices.
4. Wire and cable shall be arranged in a neat manner and securely supported in cable groups.
5. Wiring shall be protected from sharp edges and corners.
6. Transmitter connections shall be made using a terminal junction box, analog receptacles, and analog connectors as shown.
7. All equipment to be located as shown, and rigidly attached to walls or floor as shown or directed by Owner's Representative. Install all equipment in strict accordance with manufacturer's recommendations and in compliance with all rules and regulations of jurisdictions having authority. All work to be set plumb or level, as applicable, to be rigid and neat in appearance. Provide shop drawing of equipment and accessory layout and manufacturer's recommendations for installation and accessories before installing.
8. All piping shall be installed as shown on the plans or as directed by Owner's Representative.
9. All piping shall be supported as required to eliminate stresses on equipment including, but not limited to, the feed pump and chlorine tablet feeder.

3.2 ADJUSTING

- A.** The Contractor shall furnish a representative of the manufacturer to perform inspection, startup and training services. The manufacturer's representative shall be experienced in the operation and maintenance of the equipment.

- B. The representative shall check the installation and supervise initial startup of the equipment. He shall certify that the installation is correct and that the equipment has operated satisfactorily.
- C. After the installation and operation of the equipment has been certified, the manufacturer's representative shall train the City's personnel in the proper operation and maintenance of the equipment.

END OF SECTION

SECTION 13490

MEASUREMENT AND CONTROL COMMISSIONING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. The section includes the requirements pertaining to the checkout, calibration, and testing of the instrumentation provided as part of this project.

1.2 SYSTEM START UP, COMMISSIONING, AND OWNER'S TRAINING

A. General

1. CONTRACTOR shall provide the OWNER with a written notice a minimum of four calendar days prior to system start-up. The project schedule shall not be sufficient notice.
2. CONTRACTOR shall conduct System Start Up, Commissioning and OWNER's Training pursuant to the general instructions in Sections 01650 - Starting of Systems, 16001 - Commissioning, 16005 - Starting and Adjusting, and 16015 - Demonstration and Testing. CONTRACTOR shall follow the instructions given in each section which are specific to instrumentation and control of the station.

B. Checkout

1. After installation and connection work has been completed, CONTRACTOR shall verify the equipment is properly installed.
2. CONTRACTOR to verify the following
 - a. Polarity of electric power and signal connections.
 - b. Correct applied voltages to all equipment.
 - c. Required grounds are properly connected.
 - d. The integrity of all connections.
3. CONTRACTOR shall certify in writing each loop or system has been verified for proper installation.

C. Calibration

1. CONTRACTOR shall provide labor, tools, and equipment to calibrate each instrument in accordance with the manufacturer's specifications and instructions.
2. Analog instruments shall be calibrated and tested in place without removal.
3. Test equipment and instruments used to simulate inputs and read outputs shall be suitable for the purpose intended and shall be calibrated to accuracy greater than the required accuracy of the instrument being calibrated. Test equipment shall have accuracy traceable to the National Bureau of Standards.

D. Analog Loop Tests

1. CONTRACTOR shall provide labor, tools, and equipment to field test, inspect and adjust each instrument installed under this contract to its specified performance requirement in accordance with manufacturer's specifications and instructions.
2. Instruments provided by CONTRACTOR which fails to meet any contract requirement or any published manufacturer performance specification for functional and operational parameters not specified in the contract, shall be repaired or replaced, at no cost to OWNER.
3. Each element of the analog loop shall be tested and exercised by the CONTRACTOR to demonstrate proper operation, first individually and then as a complete loop.
4. Each analog loop shall be tested to verify proper performance within specified accuracy tolerances.

E. System Testing

1. The CONTRACTOR shall notify the ENGINEER a minimum of 14 days in advance of the scheduled system testing.
2. System testing shall not commence until after approved acceptance of all wire, calibration, and loop tests.
3. All systems shall be tested prior to the beginning of plant operational testing.
4. Completion of system testing activities shall be documented by a certified report, including all test forms, with test data entered, furnished to ENGINEER.
5. System testing shall at a minimum demonstrate the following:
 - a. Each component of the system operates properly with all other components of the system.
 - b. Analog control loops operate in a stable manner.
 - c. Interlocks perform properly.
 - d. Control sequences perform properly.
6. System testing activities shall include the use of water to establish service conditions simulating normal final control element operating conditions in terms of applied process loads, operating ranges and environmental conditions.
7. Final control elements, control panels and supplementary equipment shall be tested under start up and steady state operating conditions to verify proper and stable control is achieved using all control center and field mounted control circuits associated with each system.
8. Hardwired and software control circuit interlocks and alarms shall be operational.
9. Control of final control elements and supplementary equipment shall be tested using both manual and automatic control circuits.
10. Stable steady state operation of final control elements running under the control of field mounted automatic analog controllers or software based controllers shall be assured by adjusting the controllers, to eliminate oscillatory final control element operation.
11. CONTRACTOR shall submit to ENGINEER a copy of completed test reports specified in this Section and Section 16080 - Electrical Testing.

F. System Start Up

1. After system Calibration and Testing verification is complete, CONTRACTOR shall inform the ENGINEER in writing that the station controls are installed according to the Drawings and that the station is ready for Start Up.
2. When Start Up begins, the CONTRACTOR shall have his technicians available on site at all times during testing to aid the ENGINEER.
3. After ENGINEER has verified all installed control systems are operating properly, commissioning may commence.

G. Commissioning

1. CONTRACTOR shall then perform Commissioning as follows:
 - a. Operating the station for 14 consecutive days without a significant interruption with the exception of any interruption caused by training conducted during this time period.
 - b. The station shall be operated in every designed control mode including the operation of all equipment.
2. Should a significant interruption occur the fault causing the interruption shall be corrected by the CONTRACTOR and the Commissioning period of 14 consecutive days shall be restarted.

H. OWNER's Training

1. Coordinate with OWNER.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

DIVISION 14

CONVEYING SYSTEMS

SECTION 14301
PORTABLE DAVIT CRANE

PART 1: GENERAL

1.1 SCOPE

- a. This section includes the furnishing and installing portable davit cranes specified or shown on the drawings, complete with all appurtenances and accessories specified or required to provide an operational system.
- b. All installations shall be complete and comply with manufacturer's erection details and applicable OSHA regulations.
- c. All work performed under this section shall be in accordance with all approved trade practices and manufacturers' recommendations, including provisions for insulation between dissimilar metals where applicable.
- d. A representative of the manufacturer of the pumps shall provide start-up & testing services, and training in the operation and maintenance of the equipment (ie. training of the Owner's personnel).

1.2 SUBMITTALS

- a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:
 - 1) Submittals for Review
 - a) Descriptive literature, bulletins or other data describing the system equipment.
 - b) Complete list of equipment, appurtenances and all options included, complete, with manufacturer's name and model number.
 - c) General arrangement and dimension drawings.
 - d) Sectional assembly drawings.
 - e) Materials of construction.
 - f) Location of local service facility as specified.
 - 2) Submittals for Record (for inclusion in the O&M manuals).
 - a) Manufacturer's operations & maintenance instructions.
 - b) Manufacturer's and installer's installation certification letters.
 - c) Startup, calibration and full load field test report.

- d) Manufacturer's 2 year warranty

PART 2: PRODUCTS

2.1 GENERAL

- a. Each davit crane installation shall consist of a complete and operational davit crane system as specified or shown on the drawings, including mast, boom, crane base, winch and drive assembly, wire rope and hook assemblies as required for connection to the equipment for which the crane is to be used.
- b. The davit crane shall be provided with a telescoping boom capable of being adjusted vertically while under load. The mast and boom assembly shall be capable of rotating 360° while under load.

2.2 ANCHOR BOLTS

- a. Unless otherwise shown on the drawings, anchor bolts shall be cast-in-place with a minimum embed depth of 6 inches, and shall be 304 stainless steel.
- b. The diameter, length and any bend dimensions of anchors shall be as shown on the drawings or as recommended by the equipment or machinery manufacturer, whichever is more stringent. Unless otherwise required or shown, use ½-inch minimum diameter and with 2-inch J hook or other geometry as shown on the drawings. In no case shall anchor bolts be more than 1/8-inch smaller than the anchor bolt holes provided by the manufacturer in the equipment or machinery.
- c. A minimum of two nuts and one washer of the same material as the bolt shall be furnished with each bolt.

2.3 DAVIT CRANE

- a. Mounting Base
 - 1) The crane shall be provided with a pedestal base, a flush mount socket base, or a wall mount base as shown on the drawings. All bases, including the flush mount socket base, shall be provided with a drain hole to prevent water from collecting in the mounting socket. The flush mounted socket base shall consist of a ½-inch minimum size PVC pipe from the bottom of the socket, graded to drain.
 - 2) The crane base shall be welded steel construction with a factory applied galvanized finish.
 - 3) Wall mounted or pedestal bases shall be provided with an anchor slot for the quick disconnect end of the wire rope assembly.
 - 4) All quick release pins shall be 416 stainless steel, locking style, and shall be tied to the crane with cables to prevent accidental loss. All bolts shall be 18-8 stainless steel.

b. Mast and Boom Assembly

- 1) The mast and boom shall be welded steel construction with a factory applied galvanized finish.
- 2) The boom shall rotate through 360° on a pin and sleeve bearing in the mounting base. The boom shall be provided with a hinged handle below the winch assembly designed to provide leverage for rotating the boom from behind the mast.
- 3) The boom shall telescope to four different positions, and shall be secured in position with a quick release pin.
- 4) The boom shall be provided with a ratchet style screw jack for manual adjustment of the boom angle. The boom shall be adjustable from 5° to 45° of horizontal under load. The screw jack assembly shall be fastened to the mast with a quick release pin.
- 5) The hook reach and height shall conform to the following. The hook reach and height shall be adjustable within these ranges by a combination of the telescoping boom and the boom screw jack.
 - a) The hook reach (horizontal distance from the mast center to the hook throat center) shall be adjustable from 28 to 81 inches.
 - b) The hook height (vertical distance from the top of the mounting base to the hook throat center) shall be adjustable from 28 to 82 inches, except for installations with two part line assemblies, which shall be adjustable from 16 to 70 inches.

c. Hand Winch w/Supplemental Drill Motor

- 1) The winch shall have a hand operated worm drive with a cast aluminum gear case and drum, with a formed steel frame and a factory applied alkyd enamel finish. The worm drive gearing shall be enclosed in an oil bath, and the drive shall have self aligning bronze and ball bearings.
- 2) The winch handle shall be removable, and the winch shall be able to be power driven with a 1-1/8-inch hex socket in a 400 rpm drill motor.
- 3) The winch shall be provided with internal band type load brake. The band brake shall be externally adjustable.
- 4) The winch drum shall include an anchor slot for the swage end ball fitting on the quick disconnect wire rope assembly.

d. Wire Rope Assembly. The wire rope assembly shall be provided by the manufacturer of the davit crane, and shall consist of the following.

- 1) Wire rope shall be ¼-inch stainless steel cable with stainless steel thimble and Nicopress sleeve, with a latch type swivel hook. The hook eye shall be sized to accommodate the lift points on the equipment for which the crane is installed.
 - 2) The wire rope shall be provided with a factory installed stainless steel swagged ball fitting for quick disconnect to the anchor drum on the winch drum.
 - 3) The cable length shall be as required for the lift required for the locations and equipment shown on the drawings, but shall not be less than 20 feet.
- e. Portable davit cranes shall be Thern Commander 500 with a pedestal base and galvanized finish or approved equal.

PART 3: EXECUTION

3.1 INSTALLATION

- a. The hoisting equipment shall be erected in accordance with the manufacturer's recommendations and drawing details. Drilled in anchor bolts are not acceptable substitutes for the cast-in-place anchor bolts specified.

3.2 INITIAL LUBRICATION

- a. Initial lubrication required for startup and field test operation shall be furnished and applied in accordance with the manufacturer's recommendations.

3.3 INSPECTION, START-UP AND TESTING

- a. The Contractor shall furnish a representative of the manufacturer to perform inspection, start-up, field load testing and training services. The manufacturer's representative shall be experienced in the operation and maintenance of the equipment.
- b. The manufacturer's representative shall check the installation and supervise start-up and testing of the equipment as specified. He shall certify that the installation is correct and that the equipment has operated satisfactorily, and the specified certifications provided for inclusion in the O&M Manuals.
- c. After installation is completed, all equipment shall be tested in accordance with the provisions of the ANSI Safety Standards for Cranes and Hoists. Field testing shall include (but not be limited to) the following, and shall be witnessed by the Owner's Representative.
 - 1) Full load field testing to the full rated capacity of the crane (as measured at the full extension end of the boom). The Contractor shall arrange for a test weight to be provided equal to the full load capacity of the crane, (weight to be verified and certified in writing, acceptable to the manufacturer's representative), for use during the startup and load tests.
 - 2) The crane shall be rotated under full load to the extent allowed by any installed stops, and shall rotate freely and smoothly.

d. Training.

- 1) After the installation and operation of the equipment has been certified, the manufacturer's representative shall train the Owner's personnel in the proper operation and maintenance of the equipment, prior to placing the system in permanent operation and service.
- 2) This shall be in addition to the startup trip outlined above, and shall include a minimum of one trip on a day and time acceptable to the Owner.

PART 4: SPECIAL PROVISIONS

None.

DIVISION 16

ELECTRICAL

As noted in the specification submittal requirements, Contractor shall provide all of the electrical / control / telemetry / SCADA product data in Division 13 & Division 16 at the same time, unless specifically allowed otherwise in writing by the Owner's project electrical engineer. Piecemeal submittals will be returned as incomplete.

SECTION 16000
GENERAL PROVISIONS

PART 1 GENERAL

1.1 PERMITS, FEES AND SERVICE CHARGES

- A. The CONTRACTOR shall obtain all electrical permits required to complete the work and pay all associated fees.
- B. The CONTRACTOR shall be responsible for performing field verification of the existing conditions prior to Bidding. The nature of the work inherently requires field observation to understand the existing conditions and scope of work. Failure to observe the existing conditions or ignorance of the existing conditions shall not be the basis of a change order.
- C. The CONTRACTOR shall coordinate and provide for the installation and operation of franchise utility service (including any telephone and/or leased lines specified) as required during construction, startup, testing, and operation of the work until substantial completion.

1.2 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Riser and other diagrams are schematic and are intended to show the approximate location of equipment, and the general alignment of conduits and piping, and shall not be used for obtaining quantities. Dimensions given on the plans shall take precedence over scaled dimensions and all dimensions whether in figures or scaled, shall be verified in the field.
- B. The electrical drawings do not show complete details of the site conditions. The CONTRACTOR shall check actual conditions.
- C. The exact location of apparatus, fixtures, equipment, conduit and piping shall be ascertained by the CONTRACTOR in the field, and the work shall be laid out accordingly. Should the CONTRACTOR fail to ascertain such locations or coordinate with work performed by other trades, the work shall be changed at no additional cost to the OWNER when so ordered by the ENGINEER. The ENGINEER reserves the right to make minor changes in the location of conduit, piping and equipment up to the time of installation without additional cost to OWNER.
- D. CONTRACTOR shall provide all labor, materials, equipment, machinery, and tools necessary to provide all electrical equipment specified and shown on the Drawings. All items not specified in detail or shown on the Drawings but necessary for complete installation shall be provided by the CONTRACTOR.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
 - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16000.A01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:
 - 1. Submittals shall include information and literature as required for all equipment and materials provided under this and related sections.
 - 2. Shop Drawings: Shop drawings shall include the following along with any special requirements listed in the individual Specification Sections:
 - a. Installation instructions and drawings
 - b. Wiring schematics with termination point identification
 - c. Motor information
 - d. Materials of construction
 - e. Manufacturer's name and model
 - f. Manufacturer's catalog data
 - g. Supplementary structural framing for electrical equipment including design loads, member size and location. When supplementary framing is indicated, verify that dimensions are suitable for the equipment furnished. Provide additional strength when equipment furnished is heavier than that specified.
 - 3. Manufacturers' Literature: Literature indicating the compliance of the products with the Specifications shall be included with all submittals. This shall include catalogs and other descriptive bulletins. Relevant portions of the literature shall be clearly identified by highlighting or underlining.
 - 4. Test Logs: The CONTRACTOR shall submit test logs as outlined below and as specified in subsequent electrical sections and drawings.
 - a. A log of the complete results of tests for shorts and grounds for each circuit. All circuits and tests shall be clearly identified.
 - b. A log of complete results of insulation resistance measurements of each circuit. All circuits and tests shall be clearly identified.
 - 5. Operation and maintenance information for all equipment furnished and/or installed.

- 6. Programming instructions for any controllers or other programmable equipment. Copies of the any required software, including registration cards, shall be provided with the O&M manuals.
- C. The CONTRACTOR shall indicate on the submittals all variances from the Specifications.
- D. Record Drawings. After the completion of construction, the CONTRACTOR shall provide one set of “as-built” drawings to the ENGINEER as specified herein showing the location of buried conduits and all changes or deviations from the original drawings.
- E. After the completion of construction, a printout and electronic copy of any programming and/or set-points for controllers, PLCs, meters or other programmable equipment, including VFDs.
- F. Final inspection certificates shall be submitted prior to final payment.

1.4 COORDINATION OF WORK

- A. The CONTRACTOR shall plan his work in coordination with the other trades and with the power and telephone utility authorities.
- B. The CONTRACTOR shall field verify all dimensions of equipment to be installed or provided by others so that correct clearances and connections may be made between the work installed by the CONTRACTOR and equipment installed or provided by others.
- C. The CONTRACTOR shall arrange all conduit runs so that they do not interfere with piping, structural members, etc.
- D. All working measurements shall be taken from the sites, checked with those shown on the drawings, and if they conflict, reported to the ENGINEER at once, and before proceeding with the work. Should the CONTRACTOR fail to comply with this procedure, he shall alter his work at his own expense as directed by the ENGINEER.
- E. No additional payments will be allowed where obstructions in the work of other trades, or work under this contract requires offsets to conduit runs.
- F. The CONTRACTOR is responsible for all alterations in the work to accommodate equipment differing in dimensions or other characteristics from that shown or specified.
- G. The CONTRACTOR shall provide all temporary power necessary for existing site equipment and for all construction needs.

1.5 SUPERVISION

- A. The CONTRACTOR shall maintain adequate supervision of the work and shall have a responsible person in charge at the site during all times that work under this contract is in progress, or when necessary for coordination with other work.

1.6 CODES

- A. Work shall conform to the National Electrical Code (NEC), and State Codes and other applicable codes, even though not specifically mentioned for each item. These shall be regarded as the minimum standard of quality for materials and workmanship.

1.7 CONTRACTOR'S RECORD DRAWINGS & AS-BUILTS

- A. The CONTRACTOR shall maintain a neatly marked set of record drawings showing the locations of all buried conduits and other utilities encountered or installed during construction. The final locations of panels, field mounted instruments and panels, terminal boxes, junction boxes, receptacles, light switches and other materials included in the work shall be shown, as well as conduit routing between them to the extent it differs from the design drawings. Record drawings shall be kept current with the work as it progresses and shall be subject to inspection by the OWNER's Representative at any time. Failure to keep field record drawings current may result in the issuance of a stop work order or delay in the processing of pay requests until the record drawings are made current.
- B. The CONTRACTOR shall provide one complete set of as-built electrical schematics for all panels and equipment provided, including PLC I/O schematics as applicable, panel elementary diagrams, interconnecting wiring diagrams, wire numbers, termination strip locations and numbers. These shall be in the same format and style as those in the Contract Documents and submittal requirements.
- C. All information shown on the CONTRACTOR's field record drawings and as-built schematics shall be subject to verification by the OWNER's Representative. If significant errors or deviations are noted by the OWNER's Representative, new as-builts shall be completed at the CONTRACTOR's expense.

PART 2 PRODUCTS

2.1 PORTABLE OR DETACHABLE PARTS

- A. The CONTRACTOR shall retain in his possession and shall be responsible for all portable and detachable parts or portions of installations such as fuses, key locks, adapters, blocking chips and inserts until completion of his work.
- B. These parts shall be delivered to the ENGINEER and an itemized receipt obtained. This receipt, together with 2 copies of the final inspection certificate, shall be attached to the CONTRACTOR's request for final payment.
- C. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations.

2.2 NEW PRODUCTS

- A. All products shall be new without defects and covered by Manufacturer's warranty. Products shall be re-used only where indicated on the Drawings.
- B. All products shall be listed, labeled, and certified by a testing agency approved by the state of Oregon.
- C. All equipment of the same type and capacity shall be by the same manufacturer.

PART 3 EXECUTION

3.1 IDENTIFICATION

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.

3.2 WORKMANSHIP & COORDINATION

- A. All work shall be performed by personnel skilled in the particular trade in a workmanlike manner. Workmanship shall conform to the standards of the NEC and the National Electrical Installation Standards (NEIS).
- B. The ENGINEER shall be the sole judge as to whether or not the finished work is satisfactory; and if in his judgment any material or equipment has not been properly installed or finished, the CONTRACTOR shall replace the material or equipment whenever required, and reinstall it in a manner entirely satisfactory to the ENGINEER without any increase in cost to the OWNER.
- C. The CONTRACTOR shall coordinate and verify the installation of all equipment furnished by him to other trades, or equipment provided and installed by other trades that is connected to the electrical or control systems. Work shall include the furnishing of all labor, materials, and equipment required for the installation of a complete and operable system as hereinafter specified and as indicated on the drawings. The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. Unless otherwise specifically stipulated, the term "furnished and installed complete" shall be considered a part of this section.
- D. Controls and systems shall be complete with transformers, switches, relays, contactors, control valves, control devices, instrument piping, fittings, valves, control wiring, thermometers, pressure gauges, thermostats, damper operators, miscellaneous control cabinets to fill the intent of the Specifications and shall provide control for the various units and systems. All control valves and motorized dampers shall be provided with position indicators.
- E. Unless otherwise specified or shown on the drawings, switches or relays shall be installed in, or adjacent to the motor starter or other electrical device to which they are

to be connected. Control and interlock wiring shall be included as necessary from breakers specified herein or shown on the drawings.

- F. Each control schematic intended to control a series of motor operated louvers, fans, and thermostats shall contain a switch for maintenance to meet the NEC requirements regarding disconnect switches for motors. This switch shall be local if any unit controlled is out of sight of the switch. This switch shall disconnect all power to all motor operated devices within the circuit.

3.3 TEMPORARY HEATING, LIGHTING AND POWER

- A. The CONTRACTOR shall provide all heat, lighting and power required to construct and protect the work until the work is placed in service by the OWNER for beneficial use of the OWNER. Temporary heaters shall be provided as required to keep the work area and all new electrical components dry.
- B. The source for temporary power shall be from the electric utility or OWNER approved CONTRACTOR supplied auxiliary power units. The installation for electric power shall meet the requirements of local authorities and of OSHA.
- C. The CONTRACTOR shall obtain all permits and pay all costs for connecting temporary power service at no expense to the OWNER.

3.4 SUPPORT BACKING

- A. Provide any necessary backing required to properly support all fixtures and equipment installed under this contract.

3.5 CUTTING, PATCHING AND FRAMING

- A. The CONTRACTOR shall determine in advance the locations and sizes of all sleeves, chases, and openings necessary for the proper installation of his work.
- B. Whenever practical, inserts or sleeves shall be installed prior to covering work. Cutting and patching shall be held to a minimum. All required holes in concrete construction shall be made with a core drill and patched with non-metallic non-shrink grout.
- C. Cutting, fitting repairing and finishing of carpentry work, metal work, or concrete work, and the like, which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors; and holes required to be cut in floors must be drilled without breaking out around the holes.

3.6 TESTS

- A. The CONTRACTOR shall furnish all labor, material, instruments and tools to make all connections for testing of the electrical and instrumentation installation. All equipment shall be demonstrated as operating properly prior to the acceptance of the work. All

protective devices shall be operative during testing of equipment. The tests shall be made under the supervision of the ENGINEER. All deficiencies or unsatisfactory conditions as determined by the ENGINEER or inspecting authorities shall be corrected by the CONTRACTOR in a satisfactory manner at his own expense.

- B. After visual inspection of joints and connections and the application of tape and other insulating materials, all sections of the entire wiring system shall be thoroughly tested for shorts and grounds. A log of results for each circuit shall be kept by the CONTRACTOR and presented to the ENGINEER.
- C. A phase rotation check shall be made to demonstrate that all power receptacles, service feeders, main power feeders and auxiliary power generators have the same A - B - C phase rotation and ground relationships.
- D. Equipment shall be tested by operating all electric motors, relays, controls, switches, heaters, etc., sufficiently to demonstrate proper installation and electrical connections. Control and emergency conditions shall be artificially simulated where necessary for complete system or subsystem.

3.7 CLEANING AND TOUCH-UP PAINT

- A. Upon completion of work, all electrical equipment shall be cleaned.
 - 1. Vacuum all dirt, metal shavings, and foreign materials from all enclosures. The use of compressed air shall not be acceptable.
 - 2. All stains, dirt, and fingerprints shall be removed from switchboards, motor control centers, panelboards, light fixtures, enclosures, and all other electrical equipment covers.
- B. Provide touch-up paint on equipment that has been scraped, scratched, or chipped during construction. Paint color shall match color of equipment.

3.8 COORDINATION OF STARTUP AND ADJUSTING, COMMISSIONING, DEMONSTRATION AND TRAINING, AND OPERATION AND MAINTENANCE DATA.

- A. Reference Section 16001 - Commissioning, 16005 - Starting and Adjusting, 16010 - Operation and Maintenance Data, and 16015 - Demonstration and Training, for detailed requirements.

END OF SECTION

SECTION 16001
COMMISSIONING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. Definitions
 - 2. Requirements for commissioning.

1.2 DEFINITIONS

- A. Commissioning Verification Period.
 - 1. The commissioning period begins after the ENGINEER has approved the Functional Test Certification demonstration with the control software, the specified demonstration and training is complete, punch list deficiencies are corrected and the final operation and maintenance manuals are submitted and approved. The duration of the commissioning verification period is 14 days without significant interruption.
- B. Significant Interruption.
 - 1. Significant interruption may include any of the following events.
 - a. Failure of the CONTRACTOR to maintain qualified onsite start-up personnel as specified.
 - b. Failure of critical equipment unit, system, or sub-system that is not satisfactorily corrected within two (2) hours after the failure.
 - c. Failure of noncritical equipment unit, system, or sub-system that is not satisfactorily corrected within twenty-four (24) hours after the failure.
 - d. As may be determined by the ENGINEER.

1.3 REQUIREMENTS FOR COMMISSIONING

- A. Commissioning of the facility shall be completed prior to substantial completion.
- B. CONTRACTOR shall provide for realistic durations in the progress schedule for the commissioning activities.
- C. Provide the labor, medium, chemicals, tools, equipment, instruments and services required for, and incidental to, completing commissioning.
- D. Demonstrate satisfactory operation within the facility of the equipment and systems in actual operation as a functional unit.
- E. Conduct commissioning for a period of fourteen (14) continuous days without significant interruption.

- F. The commissioning verification period shall restart with the correction of each significant interruption.
- G. Correct defects in material and workmanship immediately following their discovery.
- H. Provide for maintenance until substantial completion. This includes the required maintenance activities during the commissioning verification period.
- I. Perform maintenance pursuant to the operation and maintenance data requirements for the new facility during and following the commissioning verification period and prior to issuance of a certificate of substantial completion.
- J. As of the date of substantial completion, OWNER's staff shall be responsible for operation and maintenance of the new facilities. This excludes any issues identified as warranty matters.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 16005

STARTING AND ADJUSTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. Definitions.
 - 2. Sequence of start-up activities.
 - 3. General requirements.
 - 4. Manufacturer's representative responsibilities.
 - 5. CONTRACTOR's independent process control test certification verification.
 - 6. CONTRACTOR's demonstration of the process control test certification to the ENGINEER.
 - 7. CONTRACTOR's independent functional test certification verification.
 - 8. CONTRACTOR's demonstration of the functional test certification to the ENGINEER.
 - 9. Record keeping.
 - 10. Supplements.

1.2 DEFINITIONS

- A. Manufacturer's Representative – Authorized service division employee of the manufacturer.

1.3 SEQUENCE OF START-UP ACTIVITIES

- A. Develop a specific plan for testing and start-up activities required for the project and submit to the ENGINEER for approval no less than 21 days before the initial start-up of equipment begins. The plan shall, as a minimum, incorporate the activities itemized below.
 - 1. Complete all work associated with the installations of the unit and related processes before start-up activities begin.
 - 2. Manufacturer's representative shall certify the installation meets manufacturer's recommendations and instructions.
 - 3. Manufacturer's representative shall certify equipment operates as specified and as shown in the Contract Documents.
 - 4. Calibrate instruments.
 - 5. CONTRACTOR's independent process control test certification verification.
 - 6. CONTRACTOR's demonstration of the process control test certification to the ENGINEER. Operation and maintenance manuals shall be available during this activity.
 - 7. CONTRACTOR's independent functional test certification verification.
 - 8. CONTRACTOR's demonstration of the functional test certification to the ENGINEER.

9. Submit records kept during start-up and adjusting activities.
10. Commissioning activities described in Section 16001 – Commissioning.
11. Demonstration and training described in Section 16015 – Demonstration and Training.
12. CONTRACTOR shall provide sufficient time in the progress schedule to accommodate the start-up sequences.

1.4 GENERAL REQUIREMENTS

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
- B. Demonstrate proper function of all equipment, systems and control devices.
- C. Furnish labor, process medium, chemicals, tools, equipment, instruments, and services required for, and incidental to, completing start-up and adjusting activities.
- D. Manufacturer's representative shall provide assistance for assembly and installation as well as testing guidance and troubleshooting during the start-up and adjusting activities.
- E. Complete Supplement 16005-A, "Process Control Test Certification" and submit the completed form to the ENGINEER for approval. The submission and approval of this form is required prior to commencing with the CONTRACTOR's demonstration to the ENGINEER that each process itemized in the Process Control Test Certification operates as specified and designed.
- F. Complete the following mechanical adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
 1. Remove rust preventatives and oils applied to protect equipment during construction.
 2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
 3. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
 4. Remove temporary supports, bracing and other foreign objects installed to prevent damage during shipment, storage and erection.
 5. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
 6. Perform cold alignment and hot alignment to manufacturer's tolerances.
 7. Adjust belt tension and variable pitch sheaves.
 8. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to insure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
 9. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
 10. Install gratings, safety chains, handrails, shaft guards and sidewalks prior to operational testing.

- G. Complete the following electrical and control adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
 - 1. Perform insulation resistance tests on all conductors operating at or above 200 volts.
 - 2. Perform continuity tests on all conductors.
 - 3. Test and set circuit breaker relays and circuit breaker trip settings for proper operation. Coordinate the trip settings for all circuit breakers.
 - 4. Check and record motors for actual full load amperage draw on each phase and compare to nameplate value. Submit results to ENGINEER.
- H. Complete the following instrumentation adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
 - 1. Field calibrate instruments and make required adjustments and control point settings.
 - 2. Leak test pneumatic controls and instrument air piping.
 - 3. Energize transmitting and control signal systems, verify proper operations, ranges and settings.

1.5 MANUFACTURER'S REPRESENTATIVE RESPONSIBILITIES

- A. Manufacturer's representative shall inspect the installation and certify with a written report that the installation meets the requirements of the Contract Documents as well as the Manufacturer's recommendations. This shall be done before the equipment is energized.
- B. At completion of a manufacturer's representatives' start-up and testing activities, they each shall furnish a written report certifying the equipment installation meets the following conditions.
 - 1. Has been properly installed to meet the IBC seismic requirements and has been adjusted, aligned and lubricated as required.
 - 2. Is free of any stresses imposed by connecting piping or anchor bolts.
 - 3. Is suitable for satisfactory full time operation under full load conditions.
 - 4. Operates within the allowable limits for vibration.
 - 5. Controls, protective devices, instrumentation and control panels furnished as part of the equipment package are properly installed, calibrated and functioning.
 - 6. Control logic for start-up, shutdown, sequencing, interlocks and emergency shutdowns have been tested and are functioning properly.

1.6 CONTRACTOR'S INDEPENDENT PROCESS CONTROL TEST CERTIFICATION VERIFICATION

- A. Verify the equipment provided is installed correctly and functions properly.
- B. Complete Supplement 16005-A, "Process Control Test Certification" pursuant to the following.

1. The supplement is not intended as a replacement for a systematic check of all the requirements specified.
 2. Complete the tests outlined in the Supplement, fill out the form and sign it certifying that the tests have been successfully performed and the results recorded.
 3. Where it is not possible to test a function without the software furnished, the CONTRACTOR shall verify the inputs/outputs (I/O's) are terminated correctly by simulating the process as closely and to the extent possible and checking the I/O terminations for voltage and continuity.
- C. Submission of the completed Supplement to the ENGINEER and approval of the submission are a prerequisite to the CONTRACTOR's demonstration of process control test certification to the ENGINEER.

1.7 CONTRACTOR'S DEMONSTRATION OF PROCESS CONTROL TEST CERTIFICATION TO THE ENGINEER

- A. The intent of the demonstration of the operation to the ENGINEER is to ascertain the installation, including the hardwired control, are in compliance with the Contract Documents. Successful completion of this step will facilitate efficient demonstration of the complete operations of the facilities when the configured control software is installed and tested as part of the Functional Test Certification.
- B. Demonstrate compliance with the items listed in Supplement 16005-A.
- C. ENGINEER may require the CONTRACTOR to demonstrate functions or processes in addition to those itemized in Supplement 16005-A.
- D. ENGINEER's approval of the demonstration of the process control test certification is required before the Functional Test Certification phase commences.

1.8 CONTRACTOR'S INDEPENDENT FUNCTIONAL TEST CERTIFICATION VERIFICATION

- A. Complete Supplement 16005-B, "Functional Test Certification" pursuant to the following.
1. Complete the tests outlined in the Supplement, fill out the form and sign it certifying that the tests have been successfully performed and the results recorded.
 2. This test will be conducted with the configured software installed and functional. Alarms, data logging, trending and control functions shall be verified
- B. Submission of the completed Supplement to the ENGINEER and approval of the submission are a prerequisite to the CONTRACTOR's demonstration of functional test certification to the ENGINEER.

1.9 CONTRACTOR'S DEMONSTRATION OF THE FUNCTIONAL TEST CERTIFICATION TO THE ENGINEER

- A. The intent of the demonstration of the Functional Test Certification to the ENGINEER is to ascertain the installation, including the configured software program, is in compliance with the Contract Documents.
- B. Demonstrate items listed in Supplement 16005-B, "Functional Test Certification" to the ENGINEER.
- C. ENGINEER may require the CONTRACTOR to demonstrate functions or processes in addition to those itemized in Supplement 16005-B.
- D. ENGINEER's approval of the demonstration of the Functional Test Certification is a prerequisite to beginning the commissioning phase.

1.10 RECORD KEEPING

- A. CONTRACTOR shall maintain, as a minimum, the following records generated during the start-up and adjusting activities.
 - 1. Daily logs of equipment and process testing, identifying all tests conducted and a summary of the results.
 - 2. Logs of time spent with manufacturer's representatives providing services for the project.
 - 3. Equipment lubrication records.
 - 4. Electrical phase voltage and amperage measurements for all equipment.
 - 5. Insulation resistance measurements.
 - 6. All completed test forms specified in Section 16080 Electrical Testing.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 SUPPLEMENTS

- A. Supplement 16005-A, "Yachats WTP Improvements Process Control Test Certification".
- B. Supplement 16005-B, "Yachats WTP Improvements Functional Test Certification".

END OF SECTION

SUPPLEMENT 16005-A

Yachats WTP Improvements

Process Control Test Certification

#	Description	Pass	Fail	Comments
1	Verify continuity on wires in the PLC enclosure and routed to the vault float switch in the flow meter vault.			
2	Verify continuity on wires at the VFD enclosure and routed to the Wet Well float switches via the pump disconnect panel.			
3	Verify continuity on wires at the VFD enclosure and routed to the mini-CAS relay located in the pump disconnect panel.			
4	Verify continuity on wires at the flow meter transmitter and routed to the PLC enclosure.			

END OF SUPPLEMENT

SUPPLEMENT 16005-B

Yachats WTP Improvements

Functional Test Certification

#	Description	Pass	Fail	Comments
1	These tests shall be performed with the OWNER's System Integrator on site.			
2	Manually activate the flood alarm float switch in the flow meter vault and verify the signal is received at the PLC			
3	With the backwash cycle initiated, start the VFD and ramp it up and down to make certain it is operating as design.			
4	With the pump running, manipulate the Mini-CAS relay to simulate a fault and verify the pump shuts down and will not restart without resetting the mini-CAS relay.			
5	With the pump running, simulate a low level in the wet well and verify the pump stops and will not restart without manually restating the VFD. Do the same simulation for the low-low level float and verify correct operation.			
6	While the pump is operational, verify the flow signal is displaying the GPM accurately at the transmitter and at the PLC.			

END OF SUPPLEMENT

SECTION 16010

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Definitions.
 - 2. General requirements.
 - 3. Submittal procedures.
 - 4. Content requirements for manuals.
 - 5. Supplements.

1.2 DEFINITIONS

- A. Maintenance Operation.
 - 1. Routine operation required to ensure satisfactory performance and longevity of the equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands and other routine adjustments.

1.3 GENERAL REQUIREMENTS

- A. Provide operation and maintenance data for items listed in Supplement 16010 – A, “Schedule of Equipment Requiring Operation and Maintenance Data”.
- B. In addition to the composite of manuals for individual equipment items or systems, provide a consolidated summary of required routine scheduled maintenance and scheduled preventative and predictive maintenance for the project, with reference to where detailed information may be found. Include safety information and emergency plans and procedures. The summary shall be in a separate binder from the other equipment and system binders.
- C. Comply with the following format relating to the Operation and Maintenance Manual:
 - 1. All binders shall be “D” ring type with one-touch ring locking mechanism.
 - 2. Overlay material shall be crystal clear poly.
 - 3. Binders shall be black poly.
 - 4. Binders shall be nominally sized for 75 percent fill per volume with a maximum binder depth of four (4) inches and a minimum depth of one (1) inch.
 - 5. Submit example binder cover sheet for approval by ENGINEER.
 - 6. Submit example spine insert for approval by ENGINEER.
 - 7. Paper: twenty (20) pound minimum, white for typed pages, 8.5 x 11 inches.
 - 8. Text: Manufacturer’s printed data, or neatly typewritten. Facsimiles transmitted via fax machine shall be unacceptable.
 - 9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.

10. Provide fly-leaf for each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment. Provide with heavy section dividers with numbered plastic index tabs.
11. Provide each manual with a title page, typed table of contents with consecutive page numbers. Plan contents of entire set, identified by volume number, in each binder.
12. Material shall be suitable for reproduction with quality equal to the original. Photocopying of material will be acceptable except for material containing photographs.
13. Table of contents shall be neatly typewritten, arranged in a systematic order, containing as a minimum the following data:
 - a. CONTRACTOR, name of responsible principle, address and telephone number.
 - b. List of each product required to be included and indexed to content of each volume.
 - c. List of each product, name, address and telephone number of subcontractor, supplier, installer and maintenance contractor as appropriate.
 - d. Provide local source and phone number of supply for parts and replacement.
 - e. Identify each product by product name, model number and other identifying numbers or symbols as set forth in the Contract Documents.
14. Product data:
 - a. Include only those sheets that are pertinent to the specific product provided.
 - b. Clearly annotate each sheet to identify specific product or part installed, data applicable to the installation and delete references to inapplicable information.
15. Drawings; supplement product data with drawings as necessary to clearly illustrate the following:
 - a. Relationship of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - c. Coordinate drawings with project record documents to assure correct illustration of completed installations.
 - d. CONTRACTOR shall not use project record documents as maintenance manual drawings.
 - e. Provide reinforced punched binder tabs.
 - f. Reduced 11 x 17 inch drawings shall be folded to 8.5 x 11 inch format.
 - g. Where reduction to 11 x 17 inch is impractical, fold and place the 8.5 x 11 inch envelopes that are bound in the binder.
 - h. Identify specification Section and product on drawings and envelopes.

1.4 SUBMITTAL PROCEDURE

- A. Compile the required data, arrange as specified herein and insert data in the number of volumes necessary. The volumes shall be submitted as a complete set. Partial or incomplete manuals shall be rejected by the ENGINEER.

B. Preliminary Manuals:

1. Submit three copies to ENGINEER for review and approval well before the starting and adjusting activities commence.
2. If accepted:
 - a. One copy will be returned to the CONTRACTOR.
 - b. One copy will be forwarded to the OWNER.
 - c. One copy will be retained in the ENGINEER's file.
3. If rejected:
 - a. Two copies will be returned to the CONTRACTOR with ENGINEER's comments for revision.
 - b. One copy will be retained in the ENGINEER's file.
 - c. CONTRACTOR shall be required to resubmit three revised preliminary manuals for ENGINEER's review.

C. Final Manuals:

1. Submit two copies to ENGINEER for review and approval before final completion.
2. If accepted:
 - a. CONTRACTOR will be so notified.
 - b. CONTRACTOR shall provide a complete set of the final manual on CD-ROM. Data written specifically for the manual will be presented in MS Word format. Manufacturer data (per-printed data) will be presented in Adobe PDF format.
3. If rejected:
 - a. At the ENGINEER's discretion either all but one copy of the manuals will be returned to the CONTRACTOR for revisions or all copies will be retained by the ENGINEER and the necessary revision data will be requested from the CONTRACTOR.

1.5 CONTENT REQUIREMENTS FOR MANUALS

A. The Operation and Maintenance Manuals shall normally consist of no less than four volumes outline below.

B. Volume 1 – Facility Overview.

1. All sheets in volume 1 shall have sheet protectors.
2. All materials in volume 1 shall be copied onto a CD and provided to the ENGINEER.
3. Include instructions and procedures for handling, storage, maintenance during storage, assembly, erection, installation, adjusting, testing, operating, shut down in emergency, troubleshooting, maintenance, interface with other equipment and as may otherwise be required.
4. Organize in a consistent format under separate heading for each different procedure.
5. Provide a logical sequence of instructions for each procedure.
6. Provide an information sheet for the OWNER's personnel which include the proper procedures in the event of a failure and instances that might affect the validity of warranties or bonds.

7. Content for each unit (or common units) and system:
 - a. Description of unit and component parts including controls, accessories and appurtenances. Detail their function, normal operating characteristics and limiting conditions. Provide performance curves, engineering data, nameplates data and test forms. Provide a complete commercial number and nomenclature for replaceable parts.
 8. Operating Procedures:
 - a. Start-up and break-in routine and normal operating instructions.
 - b. Test procedures and results of factory tests where required.
 - c. Regulation, control, stopping and emergency instructions.
 - d. Description of operation sequence by control manufacturer.
 - e. Shutdown instructions for both short and extended durations.
 - f. Summer and winter operating instructions as applicable.
 9. Maintenance and Overhaul Procedures:
 - a. Routine operations
 - b. Guide to troubleshooting.
 - c. Disassembly, removal, repair, reinstallation and reassembly.
 10. Installation Instructions including alignment, adjusting, calibrating and checking.
 11. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list and diagrams required for maintenance.
 12. Parts list by generic title and manufacturer's part number.
 13. Name, location and telephone number of nearest supplier and spare parts warehouse.
 14. Where applicable identify installed spares and other provisions for future work (e.g. reserved panel space, unused components, wiring and terminals).
 15. Manufacturer's printed operating and maintenance instructions.
 16. Charts of valve tag numbers along with the location and function of each valve.
 17. Manufacturer's certifications including calibration data sheets and specified calibration procedures or methods for installed equipment.
 18. Warranty forms and information for all installed equipment provided by the CONTRACTOR.
 19. Circuit directories for all panels including electrical, control and communication.
 20. List of adjustable electrical relay settings, control and alarm settings.
- C. Volume 2 – Equipment Manuals.
1. Table of contents shall have a sheet protector
 2. Table of contents and index sheets shall be of colored card stock.
 3. Manuals for individual equipment shall not be divided between separate binders.
 4. List function, normal operation, characteristics and limiting conditions.
 5. Complete commercial part number and nomenclature of replaceable parts.
 6. Maintenance procedures including routine operations, guide to troubleshooting and adjustments.
 7. Manufacturer's printed operation and maintenance instructions.
 8. List of manufacturer's spare parts and recommended quantities to be maintained in storage.
 9. Contents for Maintenance Summary Manual:

- a. Compile individual maintenance summaries for each applicable equipment item, respective unit or system and for components or subunits.
 - b. Format shall include use of the Supplement 16010 – B “Maintenance Summary” provided. Each Maintenance Summary may take as many pages as required. Supplement shall be typewritten and shall include detailed lubrication instructions and diagrams showing points to be greased or oiled, recommended type, grade and temperature range of lubricants and frequency of lubrication.
 - c. Include a list and quantity of manufacturer’s recommended consumable and spare parts that should be stored on site.
- D. Volume 3 – Drawings
1. As-built drawings associated with the project shall be provided. This includes, but is not limited to, manufacturers supplied drawings. All drawings shall be provided on 11 x 17 inch sheets folded to 8.5 x 11 inch size and bound in this volume. A complete and detailed index shall be provided that includes a list of all drawings in the volume and the drawings shall be tabbed in a fashion that provides clear and concise identification.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 SUPPLEMENTS

- A. Supplement 16010 – A, “Schedule of Equipment Requiring Operation and Maintenance Data”.
- B. Supplement 16010 – B, “Maintenance Summary Form”.

END OF SECTION

Supplement 16010 – A
Schedule of Equipment Requiring Operation and Maintenance Data

Item No.	Section	Manual (M) Data Sheet (D)	Description
1	13420.F51	M	Provide full operation manual for flow meter and transmitter
2	13420.F46	D	Provide product data sheet for the vault float switch.
3	16265.V06	M	Provide full operational manual and sheet listing all the programmable parameters.

END OF SUPPLEMENT

Supplement 16010 – B
Maintenance Summary Form

Project Name_____ Project Number_____

Equipment_____

Equipment ID Tag Number_____

Manufacturer_____

Name Plate Data_____

Manufacture’s Local Supplier Name_____

Phone_____

Address_____

Maintenance Requirements

Maintenance Requirements	Frequency Required	Lubricant if Required

END OF SUPPLEMENT

SECTION 16015

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. Definitions.
 - 2. General Requirements.
 - 3. Supplements.

1.2 DEFINITIONS

- A. Training Requirements.
 - 1. The following topics shall be covered at a minimum:
 - a. Equipment schematics.
 - b. Control strategy.
 - c. Troubleshooting procedures.
 - d. Recommended maintenance and periodic testing procedures.
 - e. Advanced start-up procedures.
 - f. Control Input/Output (I/O) and communications review.
 - g. Operator Interface Terminals (OIT) operating characteristics and navigation between various screens and functions.
 - h. Proper use and function of selector switches, reset buttons, speed controls, E-stops, etc.
 - 2. Training shall require one session for each type of process equipment.
- B. Manufacturer's Representative / Factory Trained Technician.
 - 1. Shall be an authorized service division employee of the manufacturer.

1.3 GENERAL REQUIREMENTS

- A. Provide training for OWNER's personnel for items listed in Supplement 16015 – A, "Schedule of Equipment Requiring Demonstration And Training".
- B. Utilize Manufacturer's Representative to conduct training sessions.
- C. CONTRACTOR shall have an employee familiar with the details of the installation attend the training sessions.
- D. The Manufacturer's Representative and CONTRACTOR shall provided the demonstration and training required to meet the performance specified herein. No costs in addition to the original Bid shall be incurred by the OWNER to meet this requirement.

- E. Schedule and coordinate training sessions to accommodate the following:
 - 1. Provide fourteen (14) day written notice to the ENGINEER for approval prior to proposed training sessions.
 - 2. Do not schedule training sessions for Monday, Friday, Saturday, Sunday or a Holiday.
 - 3. No more than two (2) different types of equipment training sessions shall be scheduled for any one (1) day.
 - 4. The Manufacturer's Representative shall utilize the operation and maintenance manuals as a basis for instruction. Should the need for additional data become apparent during instruction, CONTRACTOR shall prepare and insert the additional data into the operation and maintenance manual within seven (7) business days.
 - 5. OWNER reserves the right to video tape the training session. The OWNER agrees that the video tape shall only be used for training employees.
 - 6. Provide the material, data, and training aids including, but not limited to, the copying of any documents, screens, viewers, etc. required for training session.
 - 7. Provide an outline of the topics for discussion during the training session and copies of the operation and maintenance manuals for all training session participants.
 - 8. OWNER will provide the CONTRACTOR with the number of participants at each training session seven (7) days after receipt of the proposed training session schedule.
- F. ENGINEER shall not authorize the commencement of the demonstration and training sessions until after successful demonstration of the Functional Test Certification, approval of the test reports submitted from Section 16080 – Electrical Testing and the successful demonstration of the Process Test Certification in Section 16005 – Starting And Adjusting.
- G. Should the CONTRACTOR fail to meet the scheduled training session date, OWNER shall be entitled to notification of a new date complying with the requirements indicated herein.
- H. Training sessions shall be scheduled to allow for appropriate progression of the training material. If knowledge of certain equipment is necessary to adequately comprehend the operational and maintenance aspects of another piece of equipment, the training session shall be scheduled to provide for this requirement.
- I. Training sessions shall meet the following general requirements:
 - 1. Training sessions shall be completed before commissioning.
 - 2. CONTRACTOR shall provide the labor, process medium, chemical, tools, equipment and instruments necessary to accommodate demonstration of the equipment. CONTRACTOR may not rely on adequate water, wastewater, storm water or other normal process flows, etc. as they may not be available.
 - 3. The content of the training sessions shall be specific to the products installed.
 - 4. The training sessions shall be developed to allow for appropriate presentation of information and hands-on operation and maintenance opportunities for the OWNER's staff.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 SUPPLEMENTS

- A. Supplement 16015 - A, “Schedule of Equipment Requiring Demonstration And Training”.

END OF SECTION

Supplement 16015 – A

Schedule of Equipment Requiring Demonstration And Training

Item No.	Section No.	Description
1	13420.F51	Flow Meter
2	16265.V06	VFD
		Other items as may be specified in individual Sections.

SECTION 16060
GROUNDING AND BONDING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
1. The section includes requirements for grounding electrodes, equipment grounding and electrical bonding.

1.2 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16060.G01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 01300 Submittal Procedures.
 2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 MATERIALS

- A. **Ground Rods (16060.G01).**
1. Ground rods shall be provided as shown on the drawings.
 2. Ground rods shall be copper clad.
 3. Ground rods shall be a minimum of 5/8 inch diameter.
 4. Ground rods shall be a minimum of 8 feet long.

B. Compression Connectors (16060.C20).

1. Compression connections shall be provided as shown on the drawings and as required for bonding end-use equipment.
2. Compression connections shall be compress-deforming type, extruded copper material.
3. Compression connections shall be tin electroplated for corrosion resistance.
4. Compression connections shall be ring-type connectors. Forked connectors shall not be used on grounding conductors.
5. Provide Burndy products, or approved equal.

C. Welded Connections (16060.C10).

1. Welded connections shall be provided as shown on the drawings and as required for bonding ground rods, re-bar, building steel and like connections on the grounding electrode system.
2. Welded connections shall be exothermic welded type connection with materials and equipment manufactured by a single manufacturer for that purpose.
3. Provide Cadweld products, or approved equal.

D. Mechanical Connectors (16060.C21).

1. Mechanical connectors shall be provided as shown on the drawings and as required for bonding to pipes.
2. Mechanical connectors shall be UL 467 Listed, copper material.
3. Mechanical connectors shall be sized to match the pipe being bonded.
4. Mechanical connector clamps shall permit parallel or 90° cable connection.
5. Mechanical connectors installed below-grade shall include silicon bronze hardware.
6. Provide Burndy GAR3902 series for above-ground installations, or approved equal.
7. Provide Burndy GAR-BU series for below-grade installations, or approved equal.

E. Ground Bars (16060.B01).

1. Ground bars shall be provided as shown on the drawings.
2. Provide Cutler-Hammer model GBK21, GE model TKG42, Square D model PK27GTA, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Provide a ground rod routed through the side of the flow meter vault for bonding the flow meter ground rings. Coordinate with the ENGINEER on exact locate of this ground rod installation
3. Bond separately derived systems, including generators, to the grounding electrode system.

4. Maintain equipment ground continuity throughout the facility by means of a grounding conductor routed in all raceways.
 5. Provide grounding conductors pursuant to Section 16121. Conductors shall be copper and shall be sized per the Drawings or the NEC, whichever is greater.
 6. Provide ground bushings for all conduits that do not terminate in a hub type fitting and install at the source of power with a bonding conductor fastened to the ground bushing.
 7. Provide ground bar kits as shown on the Drawings and where two (2) or more grounding conductors are terminated in a box or enclosure.
 8. Install ground rods at the locations and in the number shown on the Drawings or per the NEC, whichever is greater.
 9. Bond the grounding electrode system to all metallic water and wastewater piping.
- B. Grounding Conductors.
1. Brush grounding conductors clean of debris before connections are made.
 2. Strip insulated conductor insulation in a neat, workman like manner where insulated conductors are used.
 3. Fasten all conductors securely.
- C. Connections.
1. Install connectors according to the manufacturer's directions, using the proper dies, tools, molds, shots, loads, etc. designed specifically for this purpose.
 2. Provide irreversible welded type connections to ground rods, re-bar, lightning protection box, building steel etc.
 3. Provide compression connector type connections to end use equipment and bolt to the equipment using washers and split lock washers for secure fastening. Bolts shall be grade 5 for grounding connections and shall be tightened to the manufacturer's recommend torque.
- D. Ground Test Wells.

END OF SECTION

SECTION 16070
HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. This section includes requirements pertaining to electrical equipment anchoring and electrical equipment hanging and support.

1.2 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16070.H01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 01300 Submittal Procedures.
 2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 MATERIALS

- A. **Stainless Steel Hardware (16070.H01).**
1. Bolts shall be 316 or 304 stainless steel and sized for the load served and have a hex head unless specifically specified otherwise elsewhere.
 2. Nuts shall be 316 or 304 stainless steel hex nut.
 3. Washers shall be 316 or 304 stainless steel, USS pattern flat washers.
 4. Split lock washers shall be 316 or 304 stainless steel.

5. Threaded rods and couplings shall be 316 or 304 stainless steel.
6. Eye-bolts, u-bolts, bent-bolts and similar connecting hardware shall be 316 or 304 stainless steel.

B. Galvanized Hardware (16070.H11).

1. Bolts shall be hot dipped galvanized steel and sized for the load served and have a hex head unless specifically specified otherwise elsewhere.
2. Nuts shall be hot dipped galvanized steel hex nut.
3. Washers shall be hot dipped galvanized steel, USS pattern flat washers.
4. Split lock washers shall be hot dipped galvanized steel.
5. Threaded rods and couplings shall be hot dipped galvanized steel.
6. Eye-bolts, u-bolts, bent-bolts and similar connecting hardware shall be hot dipped galvanized steel.

C. Stainless Steel Anchors (16070.A01).

1. Wedge or stud anchors installed in concrete or masonry shall be 316 or 304 stainless steel and sized for the load served.
2. Toggle type fasteners shall only be used in hollow sheetrock wall. The wing part of the fastener may be mild steel, but the bolt shall be stainless steel.

D. Galvanized Anchors (16070.A11).

1. Wedge or stud anchors installed in concrete or masonry shall be hot dipped galvanized steel and sized for the load served.
2. Toggle type fasteners shall only be used in hollow sheetrock wall. The wing part of the fastener may be mild steel, but the bolt shall be hot dipped galvanized steel.

E. Stainless Steel Beam Clamps (16070.B01).

1. Beam clamps shall be 316 or 304 stainless steel and sized for the load served.

F. Galvanized Beam Clamps (16070.B11).

1. Beam clamps shall be hot dipped galvanized steel and sized for the load served.

G. Galvanized Strut Channel (16070.S01).

1. Galvanized strut channel shall be hot dipped galvanized after fabrication and shall be a minimum of 12 gauge.
2. Galvanized strut channel shall have factory pre-drilled holes.

H. Stainless Steel Strut Channel (16070.S16).

1. Stainless steel strut channel shall be 316 or 304 stainless steel and shall be a minimum of 12 gauge.
2. Stainless steel strut channel shall have factory pre-drilled holes.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. Hardware shall be set to a torque as recommended by the manufacturer.
2. Washers and split lock washers shall be installed on all bolts, threaded rods and anchors.
3. Lead or plastic type anchors are prohibited from use on the project.
4. When threaded rods are installed in drop-in type anchors, a washer, split lock washer and a jamb nut shall be installed at the anchor to ensure stability.
5. When channel (strut) is installed as a hanger or support from threaded rod, washers, split lock washers and jamb nuts shall be installed on both sides of the strut to lock it in place.
6. Cut ends of channel, strut, threaded rods or other cut fittings shall be filed smooth before installation.
7. Cut ends of hot dipped galvanized channel and strut shall be coated with three coats of cold galvanizing compound after the channel has been filed to prohibit rust.
8. Galvanized channel and strut shall only be installed indoors in non-corrosive areas. Stainless steel channel and strut shall be installed everywhere else including outdoors and in corrosive areas.
9. Concrete anchors shall be installed as per the manufacturer's directions and set using the manufacturer's supplied tool.
10. Threaded rod shall not extend more than one (1) inch beyond the channel, strut or other material it is supporting.
11. Hangers and supports shall be installed level and plumb.
12. Hangers and supports shall be installed per the National Electrical Code, Building Code and Structural Code and shall be designed to safely support the load. The ENGINEER may request the CONTRACTOR provide a copy of their design calculations for the seismic requirements and the load served.

END OF SECTION

SECTION 16075

ELECTRICAL AND CONTROL IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Requirements for identification of electrical, measurement, monitoring, control and related components and equipment.

1.2 SUBMITTALS

A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16075.S21) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data

1. Pursuant to Section 01330 – Submittal Procedures.
2. The initial submittal shall contain all the products, samples and data base specified. An initial submittal that does not contain all the specified data shall be returned as incomplete.

C. Samples

1. Provide a sample of each type and size of nameplate, label, tag and means of attachment specified for approval by the OWNER.

D. Quality Assurance / Quality Control Submittals

1. The CONTRACTOR shall be responsible for submitting a data base of all identification nameplates, labels, panel schedules and tags required for the Work. The data base shall be developed in the most current edition of Microsoft Excel for the OWNER's future use.

PART 2 PRODUCTS

2.1 MATERIALS

A. Circuit Breaker Panel Schedules (16075.S21).

1. Shall be created in Microsoft Excel software. One copy of each schedule shall be included in the closeout submittals.
2. Shall be printed on 60 - 70 lb white card stock.

B. Heat Sealing Lamination Products (16075.L11).

1. Provide documents in laminate when specified. Laminate shall be clear, non-yellowing and sized for various sized documents.
2. Shall be 5 mil in thickness.

C. Velcro (16075.V15).

1. Provide white Velcro.

D. Plastic Nameplates (16075.P05).

1. Shall have a black background with white engraved letters. Nameplates for emergency functions shall be red background with white engraved letters. The nameplates shall have self adhesive rated for the environment which they are installed. The font type shall be consistent on all nameplates.
2. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

E. Stainless Steel Nameplates (16075.S15).

1. Shall be 316 or 304 stainless steel.
2. 1.5 inches high by 6.0 inches long minimum.
3. The nameplate shall be between .025 - .050 inches thick.
4. Text shall be as large as possible, shall be center justified and shall be stamped.
5. The stainless steel nameplate shall be attached with stainless steel rivets. No less than four (4) rivets shall be used to securely fasten the nameplate.
6. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

F. Stainless Steel Component and Device Tags (16075.S25).

1. Shall be stainless steel.
2. Two (2) inch round.
3. The tag shall be between .025 - .050 inches thick.
4. The text shall be center justified and shall be stamped.
5. Standard size for characters shall be 0.25 inches high.
6. The stainless steel tags shall be attached to devices with stainless steel beaded chain which shall be provided with two (2) to three (3) inches of slack when the tag is attached to the device. The hole in the tag for the beaded chain shall be at the top and centered on the tag. The hole shall be large enough that the chain will not bind in the hole.
7. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

G. Conduit Tags (16075.S35).

1. Shall be 316 or 304 stainless steel.

2. Nominally 0.75 inches high by 3.0 inches long.
3. Characters shall be 0.25 inches high. And shall be machine punched or durably embossed.
4. Conduit tags shall be products readily available and manufactured for this purpose.
5. The stainless steel conduit tags shall be attached with stainless steel cable ties.
6. Provide Panduit Permanent Identification System products, or approved equal.

H. Epoxy Gel (16075.E05).

1. Shall be a two component, 100 % solids, moisture tolerant, high modulus, high strength, structural epoxy paste adhesive.
2. Provide Sika type Sikadur 31, Hi-Mod Gel, or approved equal.

I. Conduit Trench Marker Tape (16075.T21).

1. Shall be a minimum of six (6) inches wide, polyethylene tape manufactured for this purpose.
2. Color code for tape shall be as listed below and the verbiage on the tape shall identify the type of system i.e. "Caution Buried Electric Line Below".
 - a. Electric Power – RED
3. Provide products manufactured by Seaton Identification Products, Harris Industries, or approved equal.

J. Conductor and Cable Identification Sleeves (16075.T31).

1. The identification sleeves shall be properly sized for the cable or conductor.
2. Sleeves shall be white with black machine generated characters.
3. Provide Brady wire and cable sleeves, or approved equal.

K. Flexible Identification Tape (16075.T56).

1. Shall be white, red, yellow, clear or as otherwise specified tape with black characters.
2. Standard tape size shall be 0.5 inch high unless specified otherwise and shall have extra strength adhesive rated for indoor and outdoor use.
3. Provide products manufactured by Brother, or approved equal.

L. Conductor Color Coding (16075.C89).

1. Conductors shall be colored as specified in the table below. The technical specification requirements for the conductors are specified elsewhere.

Conductor Color Coding

System	Conductor	Color
All Systems	Equipment Grounding	Green
IT / Data	Data Cable Sheath (outer cover)	Blue
24 Volt DC	Positive	Blue
	Negative	White w/Blue Stripe
	Discrete Input Line (hot leg) Side	Blue
	Discrete Input Switch Leg	Blue w/White Stripe
	Discrete Output Line (hot leg) Side	Blue
	Discrete Output Switch Leg	Blue w/Orange Stripe
24 Volt AC	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/Blue Stripe
120 Volt AC Control	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/White Stripe
	Discrete Output Line (hot leg) Side	Red
	Discrete Output Switch Leg	Red w/Orange Stripe
120/240 Volt Single Phase	Hot Leg # 1	Black
	Hot Leg # 2	Red
	Neutral	White
120/208 Volt Three Phase	Phase A	Black
	Phase B	Red
	Phase C	Blue
	Neutral	White
120, 208, 277 Volt	Switch Legs	Pink
480 Volt Three Phase	Phase A	Brown
Wye or Delta Corner Tap	Phase B	Purple
	Phase C	Yellow
	Neutral	Gray
120/240 Delta Three Phase	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow
	Neutral	Gray

PART 3 EXECUTION

3.1 INSTALLATION

A. Circuit Breaker Panel Schedules

1. CONTRACTOR shall request panel schedules in Microsoft Excel software and printing instructions from ENGINEER. CONTRACTOR shall update the panel schedules to reflect as-built conditions. Print schedules on 60 - 70 lb white card stock with black ink.
2. Schedules shall be neatly trimmed with 1/8" white space borders.
3. The finished schedules shall be laminated and neatly trimmed with 1/8" of laminate border.
4. A sample layout shall be submitted to OWNER for approval prior to installation.
5. Attach white Velcro to the panel door and the back of the panel schedule. Velcro shall, at a minimum, be attached to all four corners of the panel schedule.

B. Plastic Nameplates

1. Provide plastic nameplates for panelboards, motor control centers, motor starters, disconnects, variable frequency drives, control panels and similar equipment. The verbiage on the nameplate shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.
2. In addition to the nameplate identifying the equipment, a second nameplate shall be provided that identifies the source of power for the equipment i.e. "Fed From PNL208-1".
3. Typically the nameplates shall be centered and installed near the top of the equipment.
4. Nameplates shall be black with white characters unless specified otherwise.
5. Nameplates on emergency panels shall be red with white characters.

C. Stainless Steel Nameplates

1. Provide stainless steel nameplates for in-ground boxes, cast-in concrete boxes, electrical boxes larger than four (4) inches in any direction, boxes installed outdoors and vaults.
2. The nameplates shall be installed on the lid/cover and attached with 1/8 inch, stainless steel rivets in all four corners at a minimum.
3. The verbiage on the nameplate shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.

D. Stainless Steel Component and Device Tags

1. Provide stainless steel component and device tags for instruments, valves, pipes and similar equipment.
2. The tag shall be attached with a stainless steel beaded chain and attached in a manner and location which enables it to be read without interfering with the operation of the component or device. Whenever possible it shall not be attached to a removable part of the equipment.

3. The verbiage on the tag shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.

E. Conduit Tags

1. Provide stainless steel conduit tags at each point that a conduit terminates at or within an enclosure or box. The stainless steel tag shall be attached with stainless steel cable ties.
2. Where conduits enter a vault and are installed flush with the walls, the conduit tag shall be installed directly above the conduit entry and attached to the wall of the vault with epoxy gel.
3. The verbiage on the tag shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.
4. Where conduits terminate at a box in an inaccessible location such as behind a sheetrock wall, conduit labels are not required.

F. Conduit Trench Marker Tape

1. Provide conduit trench marker tape for single or multiple buried conduits. The color and verbiage shall match the type of system installed. If the trench contains several systems, one of which is electric power, the tape shall be for electric power.
2. The tape shall be installed 12 inches below finished grade and shall be laid flat and parallel to the conduits.
3. Provide # 14 AWG, red, THWN-2 tracer wire fastened to one of the conduits. Tracer wire shall be fastened to the conduit with nylon cable ties at five (5) foot spacing or less. The tracer wire shall be brought up with the conduit to points where it terminates or enters in-ground boxes and vaults. The tracer wire shall be fastened above ground with stainless steel cable ties. Label the wire "tracer wire" and seal the end so water cannot penetrate with a heat shrink tubing type cap.

G. Conductor and Cable Identification Sleeves

1. Provide heat shrink, machine generated, white labels with black characters for all cables and conductors. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provided on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.
2. The labels shall be installed between 6 to 8 inches from the end and shrunk. Conductors shall be labeled at all splices and points of termination.
3. Power conductors and cables, including the neutral and the ground conductors shall all be identified individually. The identification label will be developed as follows: The first set of characters will be the equipment code identifying the source of power "PNL208" followed by the circuit number "CKT 12" and a forward slash followed by the room number where the utilization is located and then the

utilization equipment. Using the first sequential unit heater in room 2334 as an example, the label would read "PNL208-CKT 12/ 2334-UH-1".

4. Control conductors, including grounds, shields, etc. shall be identified individually. The label shall identify the point of origin and the utilization equipment it serves. The identification label will be developed as follows: An sample label for a conductor fed from terminal strip 2, terminal block 33 in control panel # 1 (CP-1) to an terminal strip 1, terminal block 4 in automatic transfer switch # 1 (ATS-1) would read CP-1 TS2-TB33 / ATS-1 TS1-TB4.

H. Device and Faceplate Identification Labels

1. Devices, faceplates, security devices, fire alarm & life safety devices, small electrical boxes 4 inches or less located indoors and similar equipment shall be identified utilizing flexible identification tape. Typically the CONTRACTOR shall provide machine generated, white labels with black characters except as specified otherwise. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provide on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.

END OF SECTION

SECTION 16121

600 VOLT CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. The section includes the requirements for conductors and cables used to conduct potentials of 600 volts and less.
 - 2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

1.2 REFERENCES

- A. The following is a list of Standards which may be referenced in the Section.
 - 1. American Society for Testing and Materials (ASTM).
 - a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.
 - 2. National Electrical Contractors Association, Inc. (NECA): National Electrical Installation Standards (NEIS).
 - 3. National Electrical Manufacturers Association (NEMA).
 - a. WC 3, Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - b. WC 5, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - c. WC 7, Cross Linked-Thermosetting Polyethylene Wire and Cable for the Transmission and Distribution of Electrical Energy.
 - d. WC 55, Instrumentation Cables and Thermocouple Wire.
 - 4. National Fire Protection Association (NFPA). 70, National Electrical Code (NEC).
 - 5. Underwriters Laboratories, Inc. (UL).
 - a. 13, Standard for Power-Limited Circuit Cables.
 - b. 44, Standard for Safety Rubber-Insulated Wires and Cables.
 - c. 62, Standard for Safety Flexible Cord and Fixture Wire.
 - d. 510, Standard for Safety Insulating Tape.
 - e. 854, Standard for Safety Service-Entrance Cables.
 - f. 910, Standard for Safety Test Method for Fire and Smoke Characteristics of Electrical and Optical Fiber Cables Used in Air Handling Spaces.
 - g. 1277, Standard for Safety Electrical Power and Control Tray Cables.
 - h. 1581, Standard for Safety References for Electrical Wires, Cables and Flexible Cords.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16121.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 01300 Submittal Procedures.
2. Manufacturer's data including materials of construction, weight, and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 MATERIALS

A. Single Conductors (16121.C01).

1. Conductors shall be rated for 600 volts and conform to applicable requirements of NEMA.
2. Conductors shall be stranded copper.
3. Insulation type shall be THWN-2. XHHW-2 in #10 AWG or smaller.
4. Conductors shall be sized per the Drawings and the NEC, whichever is greater.
5. Rome Cable Corporation, Southwire Company, Okonite Company, or approved equal.

B. VFD Cable – Tray Type (16121.C22).

1. Provide VFD cable rated for use in cable tray.
2. Rated for up to 2,000-volt, with copper conductors in RHW-2 insulation and PVC sheath.
3. The cable shall have a 5-mil, minimum, copper shield
4. Cable shall be rated for direct bury.
5. Shall be rated for 90 degree C and wet or dry applications.
6. Shall be sized for the load or per the conduit schedule, whichever is greater.
7. Provide with a VFD termination kit for each termination.
8. Provide cable Service Wire Co. with termination kit cable # VFD2KTCP8/3, or approved equal.

C. Flexible Cords (16121.C05).

1. Conductors shall be rated for 600 volts and conform to applicable requirements of NEMA.
2. Conductors shall be stranded copper.
3. Flexible cord sheath shall be type SOOW, rated for 90 degree C and high-visibility yellow.
4. Southwire Company, General Cable, Electri-Cord Manufacturing Company, or approved equal.

D. Twisted Shielded Pair (TSP) Cables (16121.C25).

1. TSP cable shall be rated for 600 volts and conform to applicable requirements of NEMA.
2. Conductors shall be stranded copper. The gauge shall be 16 AWG unless specifically stated otherwise in the Drawings for a particular instance.
3. Overall jacket type shall be PVC.
4. Conductors shall be twisted and bonded along their length to maintain uniform twists. The number of pairs shall be as identified in the Drawings with a drain wire and overall aluminum foil shield.
5. Belden, General Cable, AFC Cable Systems, or approved equal.

2.2 ACCESSORIES

A. Colored Tape (16121.T01).

1. Colored tape shall be used to identify individual conductors larger than # 6 AWG.
2. 3M colored tape, or approved equal.

B. Cable Ties (16121.T05).

1. Cable ties shall be nylon, adjustable, self-locking, and properly sized for the bundle and force implied.
2. Thomas and Betts, Panduit, or approved equal.

C. Pulling Compound (16121.P01).

1. Pulling compound shall be non-corrosive, noncombustible, nonflammable waxed based lubricant listed for this use.
2. Ideal Company, Polywater, Inc., or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Conductor and cable installations shall meet or exceed the NECA National Electrical Installation Standards.
3. Twisted Shielded Pair (TSP) cable installation and termination methods are specified in Section 13410 Basic Measurement.
4. CONTRACTOR shall not exceed the manufacturer's recommendations for

maximum pulling tensions or minimum bending radii for respective conductors or cables.

5. Pulling compound is recommended for all conductor or cable installations and shall be used on all installations requiring a mechanical pulling device.
6. CONTRACTOR shall furnish and use a dynamometer on all conductor or cable installations requiring the use of a mechanical pulling device. The dynamometer shall be used to verify the maximum pulling tensions are not exceeded. Should the pulling tensions be exceeded, the conductor or cable shall be removed from the raceway and discarded. It shall not be reused under any circumstance on the project. The CONTRACTOR shall be responsible to make the alterations necessary before attempting to re-pull new conductors or cables.
7. Immediately after pulling in conductors or cables, the pulling compound shall be completely removed from the conductors or cables, from boxes, enclosures, floors, walls, etc.
8. Conductor and cable installations shall be continuous without splices or intermediate terminations unless specifically identified on the Drawings or prior written approval from the ENGINEER.
9. Where conductors or cables are routed in boxes enclosures or cable tray they shall be neatly bundled with cable ties at intervals not to exceed 12 inches on center. The tension for the cable ties shall be set with a tool specifically manufactured for that purpose and of the same manufacturer as the cable tie. Side cutters, linemen pliers and similar tools shall not be used to cut the tail end of the cable tie. The CONTRACTOR shall only use the tool specifically manufactured for this purpose and of the same manufacturer as the cable tie.
10. Conductors and cables shall not be installed until the raceway, boxes, enclosures, conduit bushings, etc. have all been installed. Where conductors or cables have been installed prior to meeting this requirement, the ENGINEER shall at their discretion elect to have the conductors or cables removed, disposed of and replaced with new product.
11. Should the outer jacket of any conductor or cable be damaged in any way, they shall be removed, disposed of and replaced with new product.
12. An equipment grounding conductor shall be installed in all raceways. Size shall be as identified on the Drawings or the NEC, whichever is greater, but in no case shall it be less than # 16 AWG for under 50 volts and no less than # 14 for 50 volts or above.

END OF SECTION

SECTION 16131
CONDUIT AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. The Section includes the requirements pertaining to conduits and fittings used to contain electrical conductors and cables.
 - 2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this Section.
 - 1. American National Standards Institute (ANSI).
 - a. C80.1, Rigid Steel Conduit-Zinc Coated.
 - 2. American Society for Testing Materials (ASTM).
 - a. A123 E1, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.
 - 3. National Electrical Contractors Association (NECA).
 - a. National Electrical Installation Standards (NEIS).
 - 4. National Electrical Manufacturers Association (NEMA).
 - a. RN 1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Coated and Intermediate Metal Conduit.
 - b. TC 3, PVC Fittings for use with Rigid PVC Conduit and Tubing.
 - c. TC 6, PVC and ABS plastic Utilities Duct for Underground Installation.
 - 5. Nation Fire Protection Association (NFPA).
 - a. 70, National Electrical Code (NEC).
 - 6. Underwriters Laboratories, Inc. (UL).
 - a. 6, Standard for Safety Rigid Metal Conduit.
 - b. 514B, Standards for Safety Fittings for Conduit and Outlet Boxes.
 - c. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.
 - d. 651A, Standard for Safety Type EB and Rigid PVC Conduit and HDPE Conduit.
 - e. 1660, Standard for Safety Liquid-Tight Flexible Nonmetallic Conduit.
 - f. 360, Standard for Safety Liquid-Tight Flexible Metallic Conduit.
 - g. 797, Standard for Safety Electrical Metallic Conduit.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16131.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product data

1. Pursuant to Section 01300 - Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

1.4 QUALITY ASSURANCE

A. PVC Coated Galvanized Rigid Steel Conduit Installation Training and Certification.

1. All installers of PVC Coated Galvanized Rigid Steel Conduit shall be factory trained and certified prior to the installation of any PVC Coated Galvanized Rigid Steel Conduit. CONTRACTOR shall provide written proof of current factory certification for all installers.

B. All PVC Coated Galvanized Rigid Steel Conduit shall be warranted for three (3) years, minimum.

PART 2 PRODUCTS

2.1 MATERIALS

A. **Galvanized Rigid Steel Conduit (GRC) (16131.C01).**

1. Shall be mild steel, hot dipped galvanized inside and out.
2. Shall be manufactured in accordance with ANSI C80.1 – Rigid Steel Conduit, Zinc Coated, and UL-6.
3. Conduit fittings shall be hot dipped galvanized malleable iron.
4. Condulets shall form 7 type.
5. The use of three-piece couplings shall be incorporated only when unavoidable and not simply due to poor planning and layout.
6. The use of compression, setscrew and split conduit fittings is unacceptable.
7. Gaskets shall be installed on all conduit covers regardless of the environment they are installed in.

8. Conduit straps shall be hot dipped galvanized malleable iron and incorporate matching conduit spacers when attached directly to walls, ceilings and floors.
9. LTV steel, Triangle PWC, or approved equal.

B. PVC Coated Galvanized Rigid Steel Conduit (PVC-GRC) (16131.C10).

1. Shall meet the manufacturing specification of GRC before PVC coating is applied.
2. Shall be manufactured in accordance with NEMA RN1 Standard for PVC coated GRC.
3. Exterior PVC coating shall not be less than 40 mils thick.
4. The exterior coating shall be sufficiently flexible to permit field bending the conduit without cracking or flaking the coating.
5. Chemically cured two-part urethane coating, at a nominal 2 mil thickness shall be applied to the interior of all conduit and fittings.
6. Female conduit or fitting opening shall have a PVC sleeve extending one-conduit diameter or 2 inches; whichever is less, beyond the opening.
7. The inside diameter of the sleeve shall be the same diameter as the outside diameter of the conduit before the coating is applied.
8. The wall thickness of the sleeve shall be 40 mil minimum.
9. Conduit fittings, condulets, mounting hardware and accessories shall be PVC coated to the same specifications as the conduit.
10. Condulets shall be form 7 type.
11. Gaskets shall be installed on all condulet covers regardless of the environment they are installed in.
12. The screw heads on condulets shall be encapsulated by the manufacturer with a corrosion resistant material, or shall be stainless steel. All condulets shall have the same type of type of screw heads, stainless steel or encapsulated.
13. The use of three-piece couplings shall be incorporated only when unavoidable and not simply due to poor planning and layout.
14. The use of compression, setscrew and split conduit fittings is unacceptable.
15. Ocal Inc., Perma-coat, or approved equal.

C. Liquid-Tight Flexible Aluminum Conduit (LFAC) (16131.C20).

1. Shall be constructed of a flexible aluminum core with a sunlight resistant thermoplastic outer jacket.
2. Conduit fittings shall be manufactured to the PVC-GRC fitting specifications. Galvanized or non-metallic conduit fittings are unacceptable unless written approval is obtained from the ENGINEER for specific locations before installation.
3. No couplings shall be installed.
4. Sealing rings shall be installed where conduit terminates at an enclosure.
5. Conduit shall be Anaconda, Electriflex, T & B, or approved equal.
6. Sealing ring shall be OZ Gedney 4Q-G, or approved equal.

D. Rigid Non-metallic Conduit (PVC) (16131.C30).

1. Shall be schedule 40 PVC unless specifically called out otherwise on the Drawings.
2. Shall be sunlight resistant.
3. Shall be manufactured in accordance with UL-651 Standard.
4. Conduit and fittings shall be securely glued.

5. Provide conduit bell ends at vaults unless specifically called out otherwise on the Drawings.
6. Provide PW Pipe, Carlon, or approved equal.

2.2 ACCESSORIES

A. **Conduit Thread Lubricant (16131.L01).**

1. Shall be an electrically conductive with copper particles suspended in the product.
2. Provide Kopr-Shield Catalog number CP8-TB, or approved equal.

B. **Glue (16131.G01).**

1. Glue shall be the wet/dry rated cement commonly referred to as “Blue Glue”.

C. **Conduit Duct Spacers (16131.A10).**

1. Shall be used in conduit duct banks to maintain uniform spacing of conduits.
2. Shall be non-metallic, interlocking type manufactured for this purpose. Shall be sized to maintain a minimum of 3 inches of separation between conduits.
3. Provide Underground Devices Wunpeece, IPEX Monoblock, or approved equal.

D. **Cord Connector (16131.C90).**

1. Provide stainless steel cord grip with integrated stainless steel mesh.
2. Provide Hubbell SCH1000 Series, or approved equal.
3. Provide cord grip with stainless steel integrated mesh for any unsupported cord longer than 59 inches to provide adequate support of the cord.

E. **Conduit System Drain (16131.D33).**

1. Provide a conduit system drain designed specifically for the purpose of draining accumulated condensate and to provide ventilation designed to minimize condensation.
2. The device shall UL Standard 514B certified.
3. The bodies and locknut shall be copper-free aluminum construction. The device shall be supplied with a stainless steel screen which may be removed and cleaned as required.
4. Provide a Cooper Crouse-Hinds 0.75 inch drain catalog number CD2-SA, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General Requirements

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification
2. Underground conduits routed to underground structures such as vaults, shall have a conduit drain installed as shown on the Drawings.
3. Install conduit runs in accordance with the schematic representation shown on the Drawings.

4. Provide conduit drains installed as shown on the Drawing details and in conduit systems as identified on the Drawings. Discuss the installation details with the ENGINEER before underground conduits are covered. Changes that may become necessary in the conduit system resulting from a lack of coordination with the ENGINEER prior to covering underground conduits shall be completed by the CONTRACTOR at no additional expense to the OWNER.
5. Minimum conduit size shall be .75 inch unless specifically called out otherwise on the drawings.
6. Where raceways are indicated, but the routing is not identified, the routing shall be the CONTRACTOR'S choice and in accordance with the rest of the Contract Documents and the National Electrical Code (NEC).
7. Raceways shall be electrically and mechanically complete before the conductors are installed.
8. Routing of conduits may be adjusted to avoid obstructions. Coordinate with other trades prior to installation of raceways. Lack of such coordination shall not be justification for extra compensation and removal and reinstallation to resolve conflicts shall be at the CONTRACTOR's expense.
9. Conduit joints shall be wrench tight, thoroughly grounded, secure and free of obstructions.
10. Conduits shall be reamed.
11. Strap wrenches and vises shall be used to install PVC-GRC conduit to prevent wrench marks and damage to the outer PVC coating. Conduits with damaged coating shall be replaced, repair is unacceptable.
12. Metallic threads shall all be coated with conduit thread lubricant before assembly. Failure to install the lubricant will result in removal of all conduit and reassembly with the conduit lubricant.
13. Exposed conduits shall be installed parallel or perpendicular to the structural members and surfaces and shall be level and or plumb.
14. When two or more conduits are routed in the same general direction their routing shall be parallel with symmetrical bends.
15. Conduits shall be bent with equipment specifically designed for this purpose and for the specific size and type of conduit.
16. Conduits that are creased or crushed shall be replaced.
17. Install conduits such that they do not interfere with the proper and safe operation of equipment and do not block or otherwise interfere with the ingress and egress and installation of removable hatches and covers.
18. Install expansion joints as needed across expansion joints in the structure and at other locations where necessary to compensate for thermal or mechanical expansion or contraction.
19. Conduits shall be routed at least six (6) inches from high temperature piping, ducts and flues.
20. Conduits installed in exposed areas indoors shall be GRC type unless the area contains potentially corrosive elements.
21. Conduits installed in all outdoor locations, corrosive areas and vaults shall be PVC-GRC. PVC-GRC conduit with damaged PVC coating shall be replaced. Repair is unacceptable.

22. Conduits that terminate at an enclosure that does not have a threaded hub shall be installed with a Myers type hub and ground ring. No exceptions shall be permitted without prior written approval for specific locations issued by the ENGINEER. Conduits that are permitted to terminate without a Myers type hub or a threaded hub shall have a ground bushing installed. A separate bonding conductor shall be routed to all ground bushings within an enclosure and be bonded to the enclosure and grounding conductor if present.
23. Final connections to dry type transformers, motors, instruments and other equipment requiring a flexible connection shall be made with LFAC conduit. Lengths shall not exceed three (3) feet.
24. All conduits shall be capped throughout construction to prevent entrance of dirt, trash, water, etc.
25. All power conduits routed to or from an adjustable frequency drive or a variable frequency drive shall be metallic conduit. Conduits installed underground shall meet the requirements listed below under part B; underground and concrete encased conduit installation.
26. Spare conduits shall be provided with a coupling and threaded male plug that matches the makeup of the conduit for the area they are installed in. The conduit shall terminate at an enclosure when one is called out and exists as part of the Work. Where the spare conduit is stubbed up in a concrete slab for future equipment, it shall be installed flush with the finished floor. Where spare conduits are routed to other areas such as outside a building envelope, in an attic, to a vault, etc., the conduit shall have a female conduit cap installed.
27. All conduits shall be individually identified at every point they terminate. The conduit identification shall be the same as that which is used on the conduit /conductor schedule in the Drawings. Should conduits be installed that are not listed on the conduit schedules, the CONTRACTOR shall add conduit callouts to the as-built conduit schedules and label the conduits accordingly.

B. Underground Conduit Installation.

1. Underground conduits shall be PVC except as specifically noted differently elsewhere.
2. Conduits routed under a concrete slab shall be routed under the vapor barrier. The conduits shall be routed deep enough so the radius of the conduit stubbed up through the slab is completely below grade. The vapor barrier shall be sealed at every point a conduit penetrates the barrier as per the requirements specified for the vapor barrier.
3. All power conduits routed to or from an adjustable frequency drive or a variable frequency drive shall be metallic conduit. Where routed underground these conduits shall be PVC-GRC type conduit.
4. Underground conduits shall be routed as shown on the Drawings.
5. Power conduits shall be separated from all other conduits by a minimum of 12 inches and when required to cross other conduits it shall be done at a 90 degree angles.
6. Conduit bends greater than 45 degrees shall utilize PVC-GRC conduit for the bend.
7. Conduit runs stubbed out of concrete shall make a transition to PVC-GRC at least six (6) inches before leaving the encasement.

8. Conduits routed in structural concrete shall be routed in such a manner as to not interfere with the structural integrity of the concrete. The ENGINEER shall approve CONTRACTOR's proposed conduit routing before installation. It is the CONTRACTOR's responsibility to coordinate conduit routing with the ENGINEER well before it is scheduled to be installed. Conduits shall be stubbed up directly under the enclosure or device they will serve. The CONTRACTOR is responsible to coordinate with the other trades prior to installation of raceways. Lack of coordination shall not be justification for extra compensation and removal and re-installation of conduits to resolve conflicts shall be done at the CONTRACTOR's expense.
9. Where conduits are stubbed up out of a concrete floor or slab, the PVC-GRC conduit shall extend two (2) inches above finished floor or grade including housekeeping pads before transitioning to any other type of conduit.
10. Underground conduit shall have a minimum of 24 inches of cover unless specifically called out differently on the Drawings.
11. Conduits routed from or to buildings or structures shall be concrete encased unless specifically called out differently on the Drawings.
12. Conduit duct spacers shall be installed for all underground conduits and the spacers shall be raised off the bottom of the trench with 1.5 inch minimum concrete dobies. The spacers shall be spaced no more than 60 inches linearly and joints in each horizontal layer of conduits shall be staggered a minimum of 12 inches from the layer above and below.

C. Miscellaneous

1. Provide cord grip for any unsupported cord.

END OF SECTION

SECTION 16135
BOXES AND ENCLOSURES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
1. This Section includes requirements for electrical device boxes, enclosures, in-ground boxes and vaults.

1.2 REFERENCES

- A. The following is a list of Standards that may be referenced in the Section.
1. American Society for Testing and Materials (ASTM).
 - a. A123 E1 Standard Specifications for Zinc-Coated Coatings on Iron and Steel Products.
 2. National Electrical Contractors Association, Inc. (NECA).
 - a. 5055 National Electrical Installation Standard.
 3. National Fire Protection Association (NFPA).
 - a. 70 National Electrical Code (NEC)
 4. Underwriters Laboratory, Inc. (UL).
 - a. 514C Standard for Safety Non-Metallic Outlet Boxes, Flush Device Boxes and Covers.
 - b. 50 Enclosures for Electrical Equipment.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16135.B01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.

1. Pursuant to Section 01300 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 DEVICE BOXES

A. **Cast Iron Boxes (16135.B01).**

1. Shall be cast iron galvanized boxes, have tapered threaded hubs and be the deep FD type in all cases.
2. Boxes shall have internal grounding screw.
3. Shall have external mounting tabs.
4. Whichever manufacturer is submitted and approved, all like boxes on Project shall be of the same manufacturer.
5. Provide OZ Gedney, Crouse-Hinds, or approved equal.

B. **PVC Coated Cast Iron Boxes (16135.B10).**

1. Shall comply with the specification for cast iron boxes.
2. Shall be coated to the same specifications as the PVC-GRC conduit.
3. Shall have external mounting tabs.
4. Whichever manufacturer is submitted and approved, all like boxes on Project shall be of the same manufacturer.
5. Provide Ocal, Perma-Coat, or approved equal.

C. **General Enclosures (16135.E01).**

1. Shall be NEMA 4X stainless steel.
2. Shall have an aluminum interior mounting panel (backpanel).
3. Shall be constructed of stainless steel with hinged and gasketed door.
4. Provide with necessary accessories and those shown on the Drawings.
5. Provide a grounding kit.
6. Whichever manufacturer is submitted and approved, all like boxes on Project shall be of the same manufacturer.

D. **Medium In-Ground Pull Box (16135.L01).**

1. Provide a 12 inch standard, green, specification grade, HDPE in-ground box with a T-Cover, optional bolt down loc-kit and optional penta-head bolts for the cover.
2. Provide Carson Industries model number 1419-12 body, 1419-4 cover, loc-kit, penta-head bolts in green, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Install boxes and enclosures in accordance with the schematic representation as indicated on the Drawings.
3. Boxes and enclosures shall be mounted level and plumb.
4. Boxes and enclosures shall not be altered, holes drilled, etc. in any way that may compromise the NEMA rating of the enclosure or box.
5. Boxes and enclosures shall be mounted with stainless steel hardware.
6. Boxes and enclosures shall be bonded to the equipment grounding conductor.
7. Surface mounted enclosures and boxes shall be spaced off the surface at least $\frac{1}{4}$ inch in damp or wet locations.
8. Boxes and enclosures with threaded hubs or punched holes shall have the opening match the conduit size. The use of reducing bushings or reducing washers is unacceptable.
9. Galvanized cast iron boxes are permitted only where GRC conduit is permitted.
10. PVC-coated boxes shall be used wherever PVC-GRC conduit is required.
11. Enclosures shall be provided whenever a junction or pull box larger than 4 inches square is required.
12. Provide a divider whenever a box contains conductors of different potentials that the code requires separation.
13. Install vaults and in-ground box tops (lids) such that they are $\frac{1}{2}$ inch above finished grade to prevent water ingress.

END OF SECTION

SECTION 16140
WIRING DEVICES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. This Section includes the requirements for wiring devices such as receptacles, toggle switches and devices plates.

1.2 REFERENCES

- A. The following is a list of Standards which may be references in the Section.
 - 1. National Electrical Contractors Association (NECA): National Electrical Installation Standards (NEIS).
 - 2. National Electrical Manufacturers Association (NEMA).
 - a. WD1 – General Requirements for Wiring Devices.
 - b. WD6 – Wiring Device Dimensional Requirements.
 - 3. National Fire Protection Association (NFPA): 70.
 - 4. Underwriters Laboratories, Inc. (UL): 1070.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
 - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16140.R01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
 - 1. Pursuant to Section 01300 Submittal Procedures.
 - 2. Manufacturer's data including materials of construction, equipment weight, and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 MATERIALS

A. **General Purpose Receptacles (16140.R01).**

1. Shall be heavy duty specification grade, two-pole, three wire grounding type with screw type terminals suitable for number 10 American Wire Gauge (AWG).
2. Shall be NEMA 5-20R, rated for 20 amperes, 125 volt configuration.
3. Provide duplex or single receptacles as shown on the Drawings.
4. Shall be gray in color unless fed from an emergency circuit and in that case the receptacle shall be red in color.
5. Provide Hubbell BR20 Commercial Specification Grade receptacles, or approved equal.

B. **Ground Fault Circuit Interrupter Receptacles (16140.R10).**

1. Shall be heavy duty hospital grade, two-pole, three wire grounding type with screw type terminals suitable for number 10 American Wire Gauge (AWG).
2. Shall be NEMA 5-20R, rated for 20 amperes, 125 volt configuration.
3. Provide duplex or single receptacles as shown on the Drawings.
4. Shall be gray in color unless fed from an emergency circuit and in that case the receptacle shall be red in color.
5. Provide Hubbell GFR8300SGGY, Hubbell GFR8300SGR for gray receptacles, or approved equal. Red receptacles shall be sample model number except for color designation.

C. **General Purpose Toggle Switches (16140.S01).**

1. Shall be heavy duty specification grade with grounding screw, 20 amperes, 120-277 volt rated with screw type terminals suitable for number 10 American Wire Gauge (AWG).
2. Single or double throw, single pole, three-way or four-way as shown on the Drawings.
3. Shall be gray in color.
4. Provide Hubbell CSB120 Specification Grade Commercial Series, or approved equal.

D. **Stainless Steel Device Plates (16140.P01).**

1. Install stainless steel device plates at all indoor locations unless called out otherwise on the drawings.
2. Provide Hubbell smooth metal 302/304 super stainless steel, or approved equal.

E. **Weatherproof Receptacle Device Plates (16140.P11).**

1. Weatherproof receptacle device plates shall be provided as shown on the drawings and in all locations that may be subjected to damp or wet conditions.
2. Weatherproof receptacle device plates shall be in-use type weatherproof receptacle device plates that allow for weatherproof protection even when a cord is plugged into the device.

3. Weatherproof receptacle device plates shall be metallic.
4. Weatherproof receptacle device plates shall be gasketed.
5. Weatherproof receptacle device plates shall be lockable.
6. Weatherproof receptacle device plates shall be UL Listed.
7. The device plate shall be PVC-coated and of a similar design when installed on PVC-coated boxes.
8. Provide Red Dot model CKMUV, or approved equal.

F. Weatherproof Switch Device Plates (16140.P20).

1. Provide a die cast vertical oriented weatherproof switch device plate that allow for an up/down action on a standard toggle switch installation.
2. The device plate shall allow for switching without lifting a device cover.
3. The device plate shall be PVC-coated and of a similar design when installed on PVC-coated boxes.
4. Provide Red Dot CCT type device plates, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Devices shall be bonded to their enclosure and the equipment grounding conductor with a separate grounding conductor attached to the device which will allow the device to be detached from the enclosure without disconnecting the equipment grounding conductor from the enclosure.
3. The use of the mounting yoke as the only method for bonding is unacceptable.
4. Devices that are not installed at the end of the line (circuit) shall be pig-tailed out and the pig-tails shall be connected to the line and load conductors.
5. After the pigtailed conductors are terminated on the device and before it is installed in the enclosure the exposed energized parts shall be wrapped with electrical insulating tape with a minimum of three wraps.
6. As the device is installed in the enclosure, care shall be taken to neatly fold the conductors inside the enclosure so as to not kink, bind or otherwise damage the sheath of the conductors.
7. Terminations on all devices shall be via pressure or compression type connectors. Wrapping conductors around a termination screw and tightening is unacceptable.
8. Mounting heights for receptacles shall be 18 inches to center from finished floor unless called out otherwise on the Drawings or specified at different height to meet minimum code requirements. Where countertops are present, receptacles shall be mounted horizontally and mounted 4 inches to center above the back-splash. The CONTRACTOR is responsible to coordinate with the approved casework submittals. Failure to do so will require the CONTRACTOR to relocate devices at their expense.

9. Mounting height for switches shall be 46 inches to center above finished grade unless called out otherwise on the Drawings or specified at different height to meet minimum code requirements. Where countertops are present, switches shall be mounted 5 inches to center above the back-splash. The CONTRACTOR is responsible to coordinate with the approved casework submittals. Failure to do so will require the CONTRACTOR to relocate devices at their expense.
10. Coordination is the responsibility of the CONTRACTOR. If a conflict exists for the mounting location of devices, the CONTRACTOR shall bring it to the ENGINEER's attention during the rough-in phase and the ENGINEER shall provide direction. Failure to coordinate conflicts during the rough-in phase will result in relocation of devices at the CONTRACTOR's expense.
11. All receptacles fed from emergency panels shall be red in color.
12. Devices shall be installed level and plumb. Devices shall be brought out plumb with the wall surface via UL listed spacers approved for this purpose if necessary.
13. Devices shall be tested for voltage, polarity, ground integrity and in the case of GFCI receptacles, that they operate as intended.
14. The position of devices, as shown on the Drawings, are general locations only unless dimensioned. The CONTRACTOR is responsible to coordinate with various trades to ensure no conflict exists.

END OF SECTION

SECTION 16150
WIRING CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. This Section includes requirements for conductor termination methods.
 - 2. Additional conductor termination means and methods are specified in Sections 13410.

1.2 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
 - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16150.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
 - 1. Pursuant to Section 01300 - Submittal Procedures.
 - 2. Manufacturer's data including materials of construction, applications and related information for each item specified in PART 2 PRODUCTS.

PART 2 PRODUCTS

2.1 MATERIALS

- A. **Small Compression Connectors (16150.C01).**
 - 1. Insulated fork, ring or splicing (butt) connectors shall be provided for # 10 AWG or smaller conductors that splice together or terminate with a screw other than in a terminal block.
 - 2. Connectors shall be properly sized for the conductor and for the stud used.

3. Burndy, Panduit, Thomas and Betts, or approved equal.

B. Insulated Wire Ferrules (16150.F10).

1. For all conductors terminating on terminal blocks, install crimp-on, insulated plastic sleeve ferrules on each conductor. Install ferrules with a crimping tool provided by the ferrule manufacturer for that purpose.
2. Wire ferrules shall be color coded to match the DIN color code.
3. Weidmuller, Panduit, American Electric, Inc., or approved equal.

C. Medium and Large Compression Connectors (16150.C10).

1. Non-insulated copper compression connectors shall be provided for # 8 AWG and larger conductors.
2. The connector shall have a voltage and current rating equal to or exceeding the conductor.
3. The barrel shall be long enough to accommodate a minimum of two (2) circumferential crimps.
4. The connectors shall be properly sized for the conductor.
5. Burndy, Panduit, Thomas and Betts, or approved equal.

D. Electrical Spring Connectors (Wire Nuts) (16150.W01).

1. Provide properly sized spring connectors for the size and number of conductors spliced.
2. Ideal, 3M, Thomas and Betts, or approved equal.

E. Insulated Mechanical Multi-Tap Connectors (16150.M01).

1. Provide properly sized, insulated, mechanical, multi-tapped connectors for splices.
2. Burndy, Panduit, Thomas and Betts, or approved equal.

2.2 ACCESSORIES

A. Varnished Cambric Tape (16150.T30).

1. Varnished cambric insulating tape shall be bias cotton cambric fabric tape, oil primed and coated with high-grade yellow electrical insulating varnish.
2. The tape shall not contain any adhesives.
3. 3M – Scotch # 2510, or approved equal.

B. Electrical Tape (16150.T40).

1. General electrical tape shall be premium grade, all weather vinyl electrical insulating tape.
2. 3M – Scotch 33+, or approved equal.

C. Thin Wall Heat Shrink Tubing (16150.T01).

1. Thin walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
3. Burndy, Panduit, or approved equal.

D. Heavy Wall Heat Shrink Tubing (16150.T10).

1. Thin walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The inside diameter shall be coated with an adhesive sealant to protect against moisture and corrosion.
3. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
4. Burndy, Panduit, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Care shall be taken when terminating conductors to avoid kinking, cutting or puncturing the jacket or allowing contamination by grease, oil or water.
3. Care shall be taken when terminating conductors to properly support the conductors and to avoid undue pressure on the connector or utilization equipment.
4. Conductors shall be terminated by use of lugs, pressure type connectors wire nuts or terminal blocks. Wrapping conductors around a screw type terminal is not acceptable.
5. Compression connectors shall be installed using the tool and die provided by the same manufacturer as the connectors and as per their directions.
6. Compressions on connectors used for # 8 AWG conductors and larger shall have a minimum of two (2) circumferential crimps.
7. Indenter type crimps on compression connectors shall not be used on conductors larger than # 10 AWG.
8. Additional conductor termination means and methods including terminal blocks and control conductors are specified in Sections 13410 Basic Measurement and Control Instrumentation Materials and Methods and Section 13430 Boxes, Control Panels and Control Centers.
9. Connectors shall be installed as per the manufacturer's directions.
10. Insulated wire ferrules shall be provided for conductors terminated on terminal blocks utilizing a crimping tool provided by the ferrule manufacture specifically for this purpose.
11. Where wire ducts in enclosures exist, conductors shall be grouped together and routed in the wire ducts and shall be fanned out to the terminals.
12. Wire nuts shall be used on conductors # 10 AWG or less and only for splicing conductors at light fixtures, at receptacles and motors. No other splicing of conductors with wire nuts are permitted unless specifically identified on the Drawings.
13. All spare conductors shall be identified individually, neatly coiled and fastened with cable ties. The coil shall be labeled to describe its origin. Spare conductors

shall be left long enough to be neatly routed and terminate anywhere within the enclosure.

14. Thin wall heat shrink tubing shall be installed over splices or over the barrel of connectors installed indoors.
15. Thin wall heat shrink tubing shall be installed over twisted shielded pair cable where the cable is stripped back. Reference Section 13410 Basic Measurement and Control Instrumentation Materials and Methods for specifics on this installation.
16. As connections are set with a torque wrench, a black felt marker shall be used to mark across the bolt, nut or screw indicating the torque has been set.
17. Insulated Mechanical Multi-Tap Connectors shall be utilized for splices located at in-ground lighting and power boxes. It may also be used for motor terminations.

B. Terminations For Motors.

1. Conductors sized # 10 AWG or less for phase conductors shall be connected with wire nuts set tight. The wire nuts shall be wrapped with premium grade electrical tape with a 50 percent overlap, installed in a clockwise rotation to hold the connector in place and to keep debris out of the connector.
2. The equipment grounding conductor shall be terminated on a lug identified for this use. If the motor is not supplied with a lug, a ring or compression type lug shall be used.
3. Conductors sized larger than # 10 AWG shall be terminated with compression connectors properly sized. The connectors shall be bolted together in a pigtail type fashion using stainless steel bolts, flat washers, lock washers and nuts. They shall have a torque as recommended by the bolt manufacturer for the bolt size used.
4. The bolt shall not be longer than the minimum necessary for the connection. The connectors shall be wrapped with varnished cambric tape with a 50 percent overlap covering the end of the connectors and extending one inch beyond the connector barrel. The varnished cambric tape shall be held in place by two layers of premium quality electrical tape, each layer with a 50 percent overlap.
5. Insulated Mechanical Multi-Tap Connectors may be used for motor terminations in lieu of the compression connectors and varnished cambric tape method.
6. Conductors shall be left as long as practical for termination in the motor terminal box.

END OF SECTION

SECTION 16265

VARIABLE FREQUENCY DRIVES (VFD)

PART 1 GENERAL

1.1 SUMMARY

- A. This specification covers materials, equipment and start-up services required to place into operation an integrated low voltage variable frequency drive (VFD) system.
- B. Every VFD system shall consist of all components required to meet the performance, protection, safety, and certification criteria of this specification.

1.2 REFERENCES

- A. NFPA 70 - US National Electrical Code
- B. NEMA ICS 3.1 - Safety standards for Construction and Guide for Selection, Installation and Operation of Adjustable Speed Drive Systems.
- C. NEMA 250 - Enclosures for Electrical Equipment.
- D. UL 508 - Underwriter's Laboratory.
- E. CAN/CSA-C22 No. 14-M91. - Canadian Standards Association.
- F. IEC 146 - International Electrical Code.
- G. IEEE 519 - IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.

1.3 PRE-MANUFACTURE SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
 - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16265.V06) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly

identify which components or parts are being submitted for approval, will be rejected as incomplete.

- B. Pursuant to Section 01300 Submittal Procedures.
- C. Manufacturer's data including materials of construction, equipment weight, and related information.
- D. Shop Drawings
 - 1. Elevation drawings showing dimensional information.
 - 2. Structure Descriptions showing
 - a. Enclosure ratings
 - b. Fault ratings
 - c. Other information as required for approval
 - 3. Available Conduit locations.
 - 4. Nameplate Information.
 - 5. Schematic wiring diagrams including amperage ratings, power rating, SCCR ratings, pilot devices, etc.
- E. Product Data
 - 1. Publications on variable frequency drive.
 - 2. Data Sheets and Publications on all major components
 - a. Contactors
 - b. Circuit Breaker and Fuse information including time current characteristics
 - c. Control Power Transformers
 - d. Pilot devices
 - e. Relays
 - f. Operator Interface
- F. Specification Response
 - 1. Detailed response to this specification showing where in the literature and drawings each requirement is satisfied.
 - 2. All clarifications and exceptions must be clearly identified.
- G. Testing and Test Reports
 - 1. Testing shall be per manufacturer's standard.
 - 2. A copy of the test reports shall be provided as part of the Closeout documentation.

1.4 CLOSEOUT SUBMITTALS

- A. The CONTRACTOR shall provide certification that the variable frequency drive has been installed in accordance with the manufacturer's instructions.
- B. The CONTRACTOR shall provide certification that the CONTRACTOR has properly adjusted any timing devices required in the starting circuitry.
- C. Final Drawings. The manufacturer shall provide final drawings reflecting the "As-Shipped" status of the VFD. The CONTRACTOR shall be responsible for making any

changes to the “As-Shipped” drawings from the manufacturer to reflect any field modifications.

D. Maintenance Data

1. VFD installation instructions and User Manual.
2. Installation and operation instructions for major components such as circuit breakers, contactors, relays, etc.
3. VFD parameter listing with factory default settings and final settings.
4. VFD start-up field service report.
5. VFD spare parts listing and pricing.
6. Local distributor contact information, including name and phone number, for warranty service and spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

- A. The CONTRACTOR shall coordinate the shipping of equipment with the manufacturer.
- B. The CONTRACTOR shall store the equipment in a clean and dry space.
- C. The CONTRACTOR shall protect the units from dirt, water, construction debris and traffic.
- D. The CONTRACTOR shall connect internal space heaters (if specified) with temporary power during storage.

1.6 WARRANTY

- A. The manufacturer shall provide their standard parts warranty for twelve (12) months from the date of being energized.
- B. The warranty shall be registered to the OWNER.
- C. The manufacturer shall confirm this warranty as part of the submittal.
- D. This warranty applies to variable frequency drive systems.

PART 2 PRODUCTS

2.1 VARIABLE FREQUENCY DRIVES (16265.V06).

- A. VFDs shall be provided as shown on the Drawings and as specified below.
- B. VFD Minimum Ratings
 1. VFDs shall accept nominal power of 240-volt, 3-phase at 60Hz.
 - a. Operating elevation: up to 1000 Meters (3,300ft) without derating.
 - b. Shall be normal duty rated for 5 HP pump motor.
 - c. Shall be provided with the ability to monitor three (3) normally closed (N/C) dry contacts which while all in the closed position will allow the VFD to

- operate normally. If, any one of the three N/C contacts opens, the VFD shall shut off and required a manual restart after the condition has cleared.
- d. Shall be provided with a rotary pot switch to allow easy operator interface to adjust the speed.
 - e. Shall be provide with an on and off switch.
 - f. Shall be surface mount.
 - g. Shall be provided in a NEMA 1 enclosure which will allow for conduits to enter/exit the enclosure from both the top and the bottom.
 - h. Shall be provide with a load reactor in a NEMA 1 enclosure suitable for surface mounting.
- C. Provide Allen-Bradley PowerFlex 525 model number 25B-B017N104 and a model # 25-JBAB NEMA Type 1 kit for a frame B VFD. Provide a load reactor MTE # RL-01811 and a NEMA 1 enclosure to house it, or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.

3.2 INSTALLATION

- A. Installation shall be in compliance with all manufacturer requirements, instructions and drawings.

3.3 START-UP SERVICE

- A. The service division of the variable frequency drive manufacturer shall perform all start-up services. The use of third party supplier start-up personnel is not allowed.
- B. Provide start-up service as required, with a minimum of two (2) hours of on-site start-up service for each VFD.
- C. At a minimum, the start-up service shall include:
 - 1. Pre-Power Check
 - 2. Megger Motor Resistances: Phase to Phase and Phase to Ground
 - 3. Verify system grounding per manufacturer's specifications
 - 4. Verify power and signal grounds
 - 5. Check connections
 - 6. Check environment
- D. Tune drive for system operation
- E. Provide Drive Parameter Listing

3.4 TRAINING

- A. Manufacturer to provide a quantity of one (1) on-site training sessions, one (1) hour in length, with handouts for up to 4 (4) trainees.
 - 1. The first training session shall be within seven (7) calendar days of the VFD start-up.
- B. The service engineer shall perform training.
- C. The instruction shall include the operational and maintenance requirements of the variable frequency drive.
- D. The basis of the training shall be the variable frequency drive, the engineered drawings and the user manual. At a minimum, the training shall:
 - 1. Review of the engineered drawings identifying the components shown on the drawings.
 - 2. Review starting / stopping and speed control options for the controller.
 - 3. Review operation of the Human Interface for programming and monitoring of the variable frequency drive.
 - 4. Review the maintenance requirements of the variable frequency drive.
 - 5. Review safety concerns with operating the variable frequency drive.

END OF SECTION

SECTION 16440

PANELBOARDS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes.
 - 1. This Section includes the requirements for panelboards.

1.2 REFERENCES

- A. The following is a list of Standards which may be referenced in this Section.
 - 1. National Fire Protection Association (NFPA).
 - a. 70 – National Electrical Code (NEC).
 - 2. National Electrical Contractors Association (NECA).
 - a. 5055 - National Electrical Installation Standards (NEIS).
 - 3. National Electrical Manufacturers Association (NEMA).
 - a. AB 1 – Molded Case Circuit Breakers.
 - b. KS 1 – Enclosed and Miscellaneous Distribution Equipment Switches (600 volts maximum).
 - c. PB 1 – Panelboards
 - d. PB 1.1 – Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
 - 4. International Electrical Testing Association (NETA).
 - a. Acceptance Testing Specifications.
 - 5. Underwriters Laboratory, Inc. (UL).
 - a. 50 – Enclosures for Electrical Equipment.
 - b. 67 – Panelboards.
 - c. 489 – Molded Case Circuit Breakers and Circuit Breaker Enclosures.

1.3 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
 - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16440.P01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for

approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 01300 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment dimensions, weight and related information for each item specified in PART 2 PRODUCTS.

1.4 QUALITY ASSURANCE

- A. Panelboards shall be manufactured in accordance with the Standards listed under 1.2 REFERENCES.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be stored and installed in clean, dry and heated environment.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

A. **Panelboard (LP-1) (16440.L02).**

1. Shall be rated 3 phase, 4-wire, 100 ampere, 240/120 volts AC.
2. Shall have a NEMA 12 enclosure, painted gray and flush mount unless shown otherwise on the Drawings. Enclosure shall not have pre-punched conduit knockouts.
3. Front cover shall be provided with a door within a door configuration with continuous hinged doors that are lockable for both the inner access and the front door providing access to the circuit breakers. The dead front shall be attached to the access door such that when opened the dead front swings open with the door.
4. Main breaker shall have an available in-rush current (AIC) rating as shown on the Drawings. Branch circuit breakers shall have the same rating unless specifically shown otherwise on the Drawings.
5. Main breaker shall have an ampere rating as shown on the Drawings.
6. Branch circuit breaker capacity shall be as shown on the Drawings. Provide branch circuit breakers as shown on the Drawings.
7. Bus material shall be 100 % copper rated for the voltage and ampere rating shown on the Drawings as a minimum.
8. Grounded conductor connection means shall be isolated, copper.
9. Grounding conductor connection means shall be copper.
10. Breakers shall be bolt-on type. No half sized breakers shall be permitted.
11. Provide factory installed lockable disconnecting means that meets the requirements of the National Electrical Code (NEC) Article 110-25 on every circuit breaker.
12. See the panel schedule in the Drawings for additional data.
13. All panelboards and main breaker disconnects on the project shall be of the same manufacturer.

14. Provide arc flash labels compliant with the NEC, OESC and OSHA.
15. Provide Eaton Series Pow-R-Line 1a, or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Panels shall be grounded and bonded as shown on the Drawings and per the NEC whichever is more stringent.
3. Conductors shall be neatly grouped and routed within the enclosures.
4. Used and spare conductors shall be clearly identified as specified in Section 16121.
5. Provide typed circuit directory for each panelboard.

END OF SECTION

DRAWINGS FOR:

SOUTH TANK SEISMIC VALVE AND WATER TREATMENT PLANT BACKWASH WATER RECYCLE IMPROVEMENTS

FOR:

The City of Yachats, Oregon
P.O. Box 345
Yachats, Oregon 97498
(541) 547-3565

DISCLAIMER: UTILITIES DEPICTED ARE BASED ON EVIDENCE FOUND IN THE FIELD, MUNICIPALITY AND/OR OTHER GOVERNMENT ENTITY AS-BUILT PLANS, CONTRACTOR PLANS AND OTHER DOCUMENTS OF RECORD. BARKER SURVEYING ASSUMES NO RESPONSIBILITY FOR UTILITIES THAT ARE NO LONGER IN USE, INSTALLED AFTER THE DATE OF ACTUAL SURVEY, NOT IDENTIFIED OR NOT LOCATED. THIS INCLUDES UTILITIES UPON PUBLIC OR PRIVATE PROPERTY.

SPECIFIC UTILITY POSITIONS INDICATED ON THE GROUND SURFACE PROVIDED BY LOCATION SERVICES MAY VARY DUE TO UNDERGROUND DETECTION CAPABILITIES.

ABBREVIATIONS

A.C. or ASPH.	ASPHALTIC CONCRETE	IRR.	IRRIGATION
A.D.	AREA DRAIN	INV.	INVERT
ASSY.	ASSEMBLY	J.B.	JUNCTION BOX
BLDG. or BLD.	BUILDING	L.P.	LIGHT POLE
BW	BOTTOM OF WALL	M	METER, MAIN
CATV	CABLE TELEVISION	M.B.	MAILBOX
C.B.	CATCH BASIN	M.H.	MANHOLE
C.O.	CLEAN-OUT	O.H.	OVER-HEAD
CONC.	CONCRETE	P/L or R	PROPERTY LINE
C.L. or C	CENTERLINE	P.P.	POWER POLE
D.I.	DUCTILE IRON	PVC	POLYVINYL CHLORIDE
E.G.	EDGE OF GRAVEL	PWR or P	POWER
E.O.P. or E.P.	EDGE OF PAVEMENT	R. or RAD.	RADIUS
ELEV.	ELEVATION	R.O.W. or R/W	RIGHT-OF-WAY
EX. or EXIST.	EXISTING	SAN. SEWER or S.S.	SANITARY SEWER
F.D.C.	FIRE DEPT. CONNECTOR	S.T.D. or S.D.	STORM DRAIN
FT.	FEET	SVC.	SERVICE
F.F.	FINISH FLOOR	S/W	SIDEWALK
F.G.	FINISH GRADE	T.C.	TOP OF CURB
F.H.	FIRE HYDRANT	TEL. or T	TELEPHONE
F.I.	FIELD INLET	TRANS.	TRANSFORMER
F.M.	FORCE MAIN	TRAF. SIG. or T.S.	TRAFFIC SIGNAL
GRAV.	GRAVEL	TW	TOP OF WALL
G.M.	GAS METER	TYP.	TYPICAL
G.P.	GATE POST	U.G. or U/G	UNDERGROUND
GS	GROUND SHOT	UTIL.	UTILITY
G.V.	GAS VALVE	W/	WITH
H.	HANDICAP	WAT. or W	WATER
HYD.	HYDRANT	WLM	WETLANDS MARKER
I.R.	IRON ROD	W.M.	WATER METER
I.P.	IRON PIPE	Y.P.C.	YELLOW PLASTIC CAP

SYMBOLS

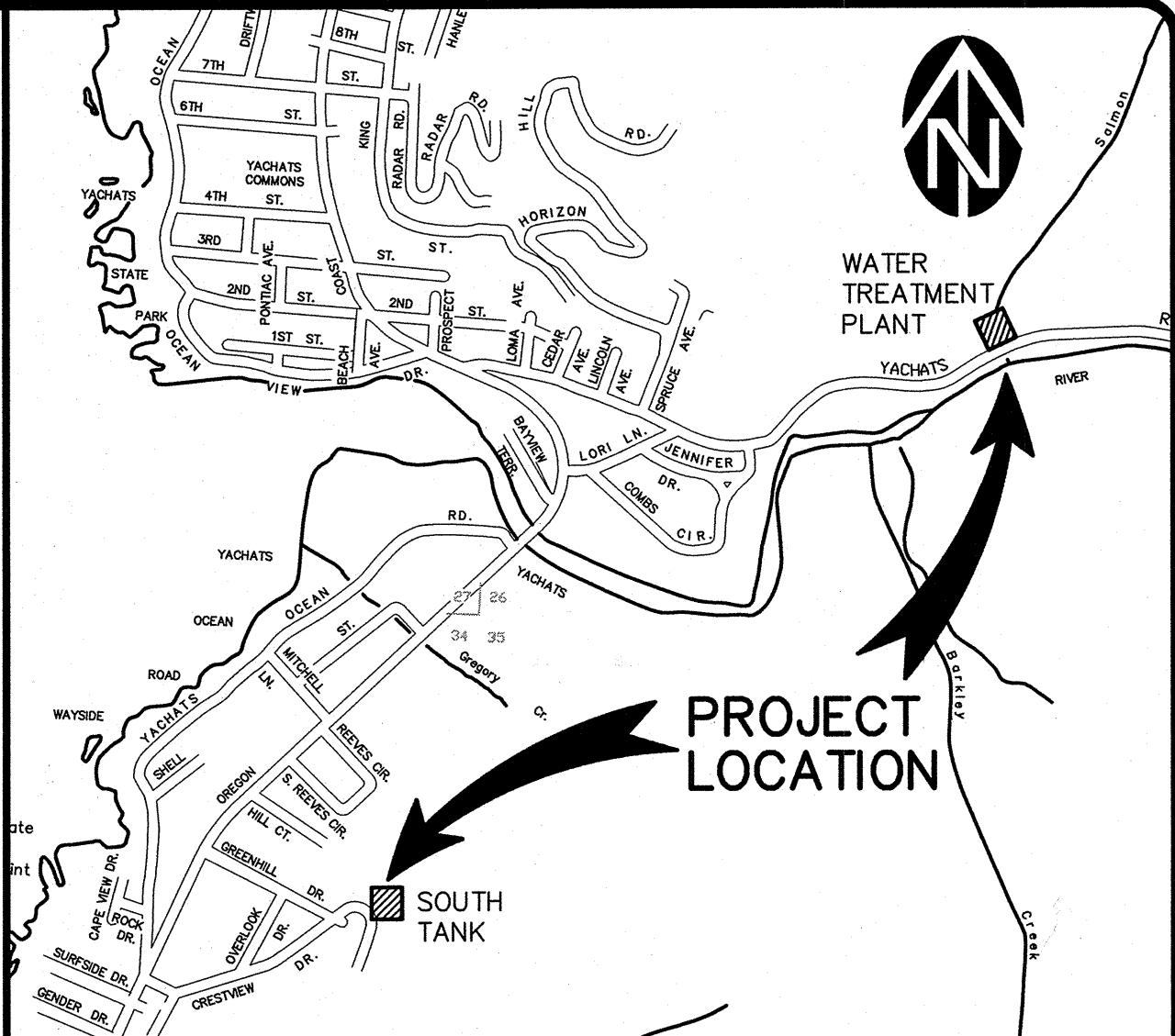
AD	AREA DRAIN	PS	SIGN POST
CD or III	CATCH BASIN	PP	POWER PEDESTAL
CO	SEWER CLEANOUT	TP	TELEPHONE PEDESTAL
FX	FIRE HYDRANT	TP	CATV PEDESTAL
GV	GAS VALVE	TP	CATV PEDESTAL
WV	WATER VALVE	MB	MAIL BOX
WM	WATER METER	IV	IRRIGATION VALVE
DS	DOWN SPOUT	SL	STREET LIGHTS
MS	MANHOLE TELEPHONE	UP	UTILITY/POWER POLES
MS	MANHOLE STORM DRAIN	TP	TEST PIT
MS	MANHOLE SAN. SEWER	MF	MONUMENT FOUND
MS	TREES - *TREENAME* DIAMETER (INCHES)/DRIP RADIUS (FEET)		
	NOTE: DIAMETER MEASURED AT BREAST HEIGHT		

LINE TYPES

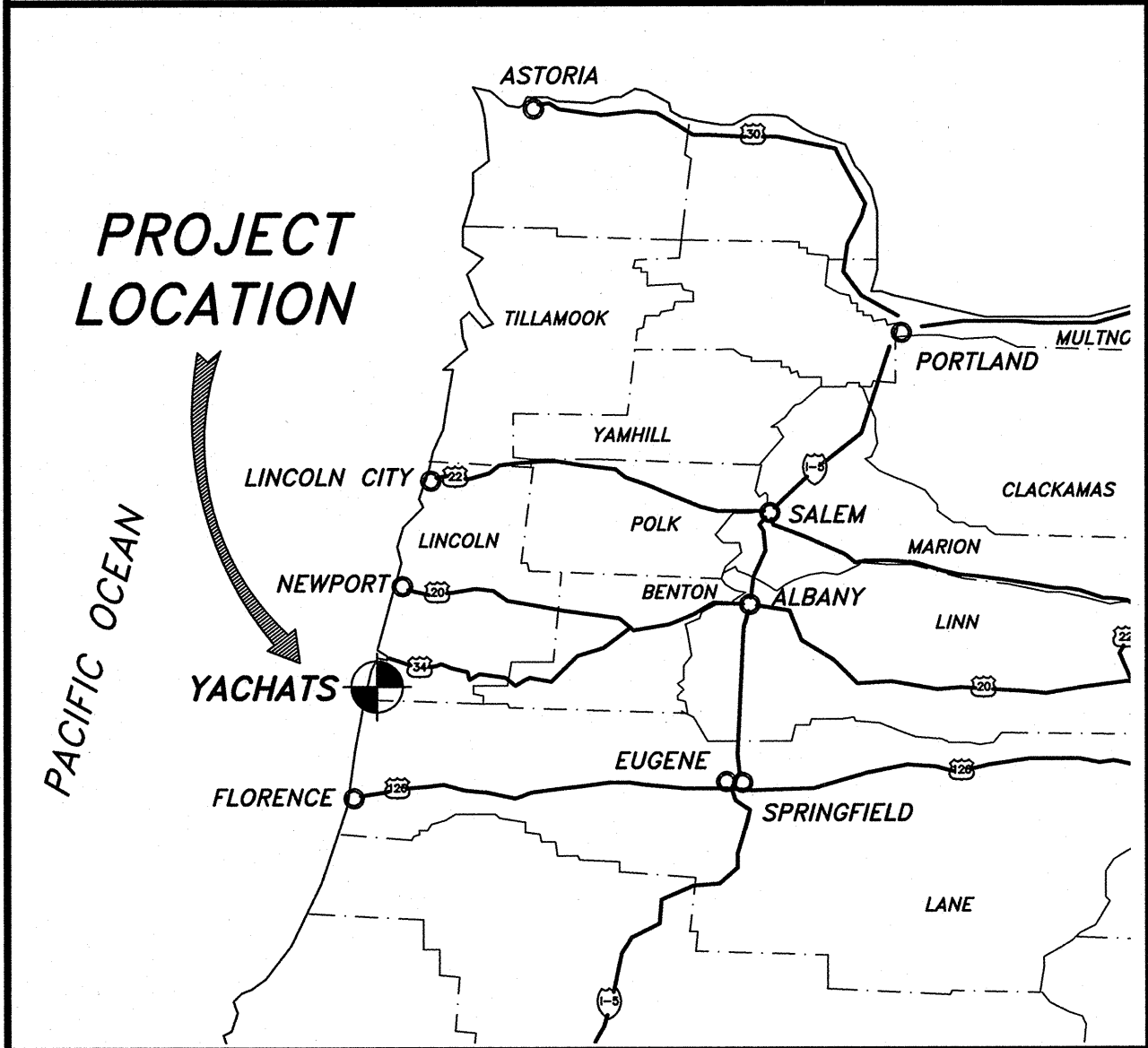
CATV LINE	CATV	CATV	CATV	CATV	CATV	CATV	CATV
COMMUNICATION LINE	COM	COM	COM	COM	COM	COM	COM
EASEMENT LINE							
FENCE LINE							
FIBER OPTIC	FDC	FDC	FDC	FDC	FDC	FDC	FDC
GAS LINE	GAS	GAS	GAS	GAS	GAS	GAS	GAS
OVERHEAD LINE	OH	OH	OH	OH	OH	OH	OH
PHONE LINE	PH	PH	PH	PH	PH	PH	PH
POWER LINE	ELEC	ELEC	ELEC	ELEC	ELEC	ELEC	ELEC
SANITARY SEWER	SS	SS	SS	SS	SS	SS	SS
STORM DRAIN	SD	SD	SD	SD	SD	SD	SD
WATER LINE	W	W	W	W	W	W	W



Know what's below.
Call before you dig.

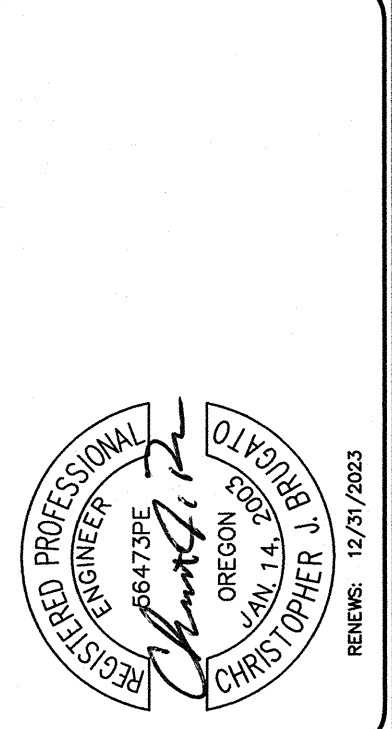


LOCATION MAP



VICINITY MAP

VERIFIED SCALE	DATE	NO.	DATE	DESCRIPTION	BY
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CONSULTING ENGINEERS AND PLANNERS
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City of Yachats, Oregon
South Tank Seismic Valve &
WTP Backwash Recycle
COVER SHEET
VICINITY MAPS &
DRAWING INDEX

DRAWING
G001
1 OF 19
JOB NUMBER
3096.4010.0

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C:\Westech\DWG\Yachats\2020 South Tank & Backwash Civil\Plots\G002 General Notes.dwg. (Plot tab)

1. Unless otherwise specified or noted on the drawings, all grading, rocking, paving, utility and related work shall conform to Oregon Standard Specifications for Construction – OSSC (ODOT/APWA), 2018 edition, or local jurisdiction standards, whichever is more stringent.
2. Contractor shall procure, and conform to all construction permits required by the City of Yachats and Lincoln County.
3. Owner to pay all project permit costs. The Contractor shall coordinate with the governing jurisdiction to determine appropriate fees and provide the Owner with 48 hours notice prior to the required payment of fees or costs.
4. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952–001–0010 through OAR 952–001–0090. You may obtain copies of the rules by calling the center. (Note: the telephone number for the Oregon Utility Notification Center is (503) 232–1987).
5. Contractor to notify City and County, a minimum of 48 business hours (2 business days) prior to start of construction, and comply with all other notification requirements of agencies with jurisdiction over the work.
6. A copy of final approved construction drawings and any required permits shall be kept on–site at all times, for review by inspectors upon request.
7. Contractor shall provide all bonds and insurance required by public and/or private agencies having jurisdiction.
8. Unless otherwise approved by the Public Works Director, construction of all public facilities shall be done between 7:00 a.m. and 6:00 p.m., Monday through Friday.
9. The Contractor shall perform all work necessary to complete the project in accordance with the approved construction drawings including such incidentals as may be necessary to meet applicable agency requirements and provide a completed project.
10. Any inspection by the City, County or other agencies shall not, in any way, relieve the Contractor from any obligation to perform the work in strict compliance with the contract documents, applicable codes, and agency requirements.
11. Contractor shall maintain one complete set of approved drawings on the construction site at all times whereon he will record all approved deviations in construction from the approved drawings, as well as the station locations and depths of all existing utilities encountered. These field record drawings shall be kept up to date at all times and shall be available for inspection by the City or Owner's Representative upon request. Failure to conform to this requirement may result in delay in payment and/or final acceptance of the project.
12. Upon completion of construction of all new facilities, Contractor shall submit a clean set of field record drawings containing all as–built information to the Engineer. All information shown on the Contractor's field record drawings shall be subject to verification. If significant errors or deviations are noted, an as–built survey prepared and stamped by a registered professional Land Surveyor shall be completed at the Contractor's expense.
13. The contractor shall retain and pay for the services of a registered Civil Engineer and/or Land Surveyor licensed in the State of Oregon to establish construction control and perform initial construction surveys to establish the lines and grades of improvements as indicated on the drawings. Staking for buildings, structures, curbs, gravity drainage pipes/structures and other critical improvements shall be completed using equipment accurate to 0.04 feet horizontally and 0.02 feet vertically, or better. Use of GPS equipment for final construction staking of these critical improvements is prohibited. The registered professional surveyor shall provide the design engineer with copies of all grade sheets for construction staking performed for the project.
14. Contractor is solely responsible for assuring that any site, street or utility work meets or exceeds any and all legal requirements and any and all industry best practices in the design, construction and/or performance of such site, street or utility work. Contractor is solely responsible for payment of any assessment, fine, penalty, claim, damages or costs that result from Contractor's (a) performing site, street or utility work or (b) failing to perform site, street or utility work that meets or exceeds any and all legal requirements and industry best practices. The City may require (and Contractor shall provide the City if requested) copies of confined space entry plans conforming with the requirements of OR–OSHA, traffic control plans, or other plans or performance descriptions necessary or desirable for Public Works to assure that these requirements can be met in performing the work. The City's acceptance, review, or comments on or about the adequacy of any such plan shall not remove or reduce Contractor's sole responsibility to meet any and all legal requirements, administrative requirements, or industry best practices, and Contractor specially assumes, will defend, and will indemnify the City for any liability, damages, fines, fees or assessments related in any manner to Contractor's site, street or utility work.
15. The Contractor shall be responsible to ensure that all required or necessary inspections are completed by authorized inspectors prior to proceeding with subsequent work which covers or that is dependent on the work to be inspected. Failure to obtain necessary inspection(s) and approval(s) shall result in the Contractor being fully responsible for all problems and/or corrective measures arising from uninspected work.
16. Unless otherwise specified, the attached "Required Testing and Frequency" table outlines the minimum testing schedule for the project. This testing schedule is not complete, and does not relieve the Contractor of the responsibility of obtaining all necessary inspections or observations for all work performed, regardless of who is responsible for payment. Cost for retesting shall be borne by the Contractor.
17. The location and descriptions of existing utilities shown on the drawings are compiled from available records and/or field surveys. The Engineer or utility companies do not guarantee the accuracy or the completeness of such records. Contractor shall field verify locations and sizes of all existing utilities prior to construction.
18. Contractor shall field verify location and depth of all existing utilities where new facilities cross. All utility crossings marked or shown on the drawings shall be potholed using hand tools or other non–invasive methods prior to excavating or boring. Contractor shall be responsible for exposing potential utility and other conflicts far enough ahead of construction to determine necessary grade, alignment or depth modifications without delaying the work or requiring otherwise unnecessary materials, fittings or structures. If grade, alignment or depth modification is necessary, Contractor shall notify the Design Engineer, and the Design Engineer or the Owner's Representative shall obtain approval from the City prior to construction.
19. All facilities shall be maintained in–place by the Contractor unless otherwise shown or directed. Contractor shall take all precautions necessary to support, maintain, or otherwise protect existing utilities and other facilities at all times during construction. Contractor to leave existing facilities in an equal or better–than–original condition and to the satisfaction of the City and Owner's Representative.
20. Utilities that are abandoned in place, or interfering portions of utilities, shall be removed by the Contractor to the extent necessary to accomplish the work. The Contractor shall plug the remaining exposed ends of abandoned utilities after appropriate verification procedures have taken place (grout or concrete plugs, if used, shall be installed to fill the full pipe diameter for a distance of two times the pipe diameter back from the pipe end).
21. Contractor shall remove all existing signs, mailboxes, fences, landscaping, etc., as required to avoid damage during construction and replace them to existing or better condition.
22. The Contractor shall be responsible for managing construction activities to ensure that public streets and right–of–ways are kept clean of mud, dust or debris. Dust abatement shall be maintained by adequate watering of the site by the Contractor.
23. Unless otherwise noted, all grading, rocking and paving to conform to OSSC (ODOT/APWA), 2018 edition.
24. Clear and grub within work limits all surface vegetation, trees, stumps, brush, roots, etc. Do not damage or remove trees except as shown or noted on the drawings, or as approved by the Owner's Representative. Protect all roots two inches in diameter or larger on trees which are not to be removed.
25. Strip work limits, removing all organic matter, which cannot be compacted into a stable mass. All trees, brush, and debris associated with clearing, stripping or grading shall be removed and disposed of off–site.
26. For public and private improvements immediately following stripping and grading operations, compact subgrade to 95% of the maximum dry density per AASHTO T–180 test method (Modified Proctor).
27. Granular baserock shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate).
28. Compact granular baserock to 95% of the maximum dry density per AASHTO T–180 test method (Modified Proctor). Written baserock compaction test results from an independent testing laboratory must be received by the Owner's authorized representative.
29. Contractor shall seed and mulch all exposed slopes and disturbed areas which are not scheduled to be landscaped, including trench restoration areas. Mulch shall be either hydromulch or finely chopped fescue or rygrass mulch conforming with OSSC (ODOT/APWA) Section 01030.15 Per the OSSC, CEREAL GRAIN STRAW (wheat or similar) IS NOT AN ACCEPTABLE SUBSTITUTE without specific written approval.
30. The Contractor shall have appropriate equipment on site to produce a firm, smooth, undisturbed subgrade at the trench bottom, true to grade. The bottom of the trench excavation shall be shall be smooth, free of loose materials or tooth grooves for the entire width of the trench prior to placing the granular bedding material.
31. All pipes shall be bedded with minimum 6–inches of 3/4"–0 crushed rock bedding and backfilled with compacted 3/4"–0 crushed rock in the pipe zone (crushed rock shall extend a minimum of 12–inches over the top of the pipe in all cases). Unless CLSM, CDF or other backfill is shown or noted on the drawings, crushed rock trench backfill shall be used under all improved areas, including pavement, gravel roadways, sidewalks, foundation slabs, buildings, etc.
32. Granular trench bedding and backfill shall conform to the requirements of OSSC (ODOT/APWA) 02630.10 (Dense Graded Base Aggregate), 3/4"–0. Unless otherwise shown on the drawings, compact granular backfill to 92% of the maximum dry density per AASHTO T–180 test method (Modified Proctor).
33. If trenches are over– excavated for any reason, over–excavation shall be filled to the design trench subgrade (ie. to the bottom of the 6" thick pipe bedding layer) with compacted, well–graded granular backfill as specified (the use of open graded rock for trench foundation stabilization is prohibited unless it is completely encapsulated in geotextile fabric & approved in writing by the AHJ).
34. Temporary thrust restraint on pressure pipelines shall be provided at all locations where necessary due to construction sequencing shown on the drawings, required by City standards or chosen by the Contractor. The adequacy of the temporary thrust restraint shall be the Contractor's sole responsibility, but shall be acceptable to the City and any other agency with jurisdiction. Any movement of the pipe or fittings during pressurization of the pipeline or connection shall be considered evidence that the temporary thrust restraint is not adequate, and the pipeline or connection shall be depressurized and the thrust restraint increased as necessary.
35. All piped utilities abandoned in place shall have all openings closed with concrete plugs with a minimum length equal to 2 times the diameter of the abandoned pipe.
36. All buried piping shall have an electrically conductive insulated 12 gauge solid core copper tracer wire the full length of the installed pipe using blue wire for water and green wire for storm and sanitary piping. Tracer wire shall be extended up into all valve boxes, catch basins, manholes and lateral cleanout boxes. Tracer wire penetrations into manholes shall be within 18 inches of the rim elevation and adjacent to manhole steps. The tracer wire shall be tied to the top manhole step or otherwise supported to allow retrieval from the outside of the manhole. All tracer wire splices shall be made with waterproof splices or waterproof/corrosion resistant wire nuts.
37. Warning Tape. All underground piping shall have a 6–inch wide warning tape installed in the upper reaches of the trench as shown on details (color & "Caution: Buried ____ Below" wording as required for water, sewer, storm drain, etc.).
38. No trenches shall be left in an open condition overnight. All such trenches shall be closed before the end of each workday and normal traffic and pedestrian flows restored.
39. City forces to operate all valves, including fire hydrants, on the existing public water system including the water treatment plant.
40. All piping material shall be as noted on the plans.

41. All fittings 4–inches through 24–inches in diameter shall be ductile iron fittings in conformance with AWWA C–153 or AWWA C–110. The minimum working pressure for all MJ cast iron or ductile iron fittings 4–inches through 24–inch in diameter shall be 350 psi for MJ fittings and 250 psi for flanged fittings.
42. Thrust restraint shall be provided on all bends, tees and other direction changes per local jurisdiction requirements and as specified or shown on the drawings.
43. Where concrete thrust blocks/straddle blocks are required, concrete shall conform to the requirements of OSSC (ODOT/APWA) 00440, Commercial Grade Concrete, 3300 psi (5" slump or stiffer). Concrete mix design shall be submitted to the City for review and approval prior to use. If hand mixed sack–crete type concrete is proposed (and approved by the City prior to use), it shall be a 4000 psi minimum mix, mixed with the minimum amount of water necessary for workability (5" slump or stiffer). In no case will dry sack–crete mix (either in bags or as loose mix) be considered as an acceptable substitute for an approved mixed concrete.
44. It shall be the Contractor's responsibility to coordinate for visual inspection and verification of all thrust restraint and thrust blocking prior to covering or backfilling (by the agency with jurisdiction).
45. Where approved by the Owner's Representative prior to construction, temporary thrust restraint may be used at mainline connections where it is not possible (prior to pressurization of the connection and placing the waterline in service) to install permanent concrete thrust blocks, straddle blocks or other permanent thrust restraint as required or shown/noted on the drawings. Trenches at the temporary thrust restraint location shall be left open and not backfilled (but plated as necessary or required) until the permanent thrust restraint is installed and approved by the Owner's Representative. Unless otherwise approved in writing by the Owner's Representative, permanent thrust restraint shall be installed by the end of the next working day after installation of the temporary thrust restraint, but in no case later than the calendar third day following installation of the temporary thrust restraint.
46. The work shall be performed in a manner designated to maintain storage tank and treatment plant operations. In no case shall the City's operations be interrupted for more than four (4) hours in any one–day. Contractor shall notify the City a minimum of 24 business hours (1 business day) before any interruption of the storage tank or treatment plant operations.
47. Contractor shall provide all necessary equipment and materials to install temporary restrained caps/plugs and blowoffs as required on new pressure piping for flushing and pressure testing.
48. Pressure Testing. The new recycle pump station forcemain shall be pressure tested for leakage. All testing shall conform to requirements as outlined in the specifications, City standards and/or testing forms. Prior to the start of each pressure test, the position of all mainline valves in the test segment shall be verified.
49. Mastic wrap on the exterior of manhole joints & pickholes as noted on the drawings shall be installed immediately after joint assembly and prior to backfilling. The exterior mastic wrap shall be held in place with plastic stretch wrap (ie. pallet wrap plastic) to hold the mastic tape in place during backfilling, with the plastic wrap installed immediately after the mastic wrap is placed.
50. Prior to acceptance, the Owner's Representative may lamp storm lines upstream & downstream of structures to verify that the pipes are clean and there is no grout or concrete in the mainlines, and that there are no observable bellies in the line. When necessary, sufficient water to reveal low areas shall be discharged into the pipe by the Contractor prior to any such inspection by the Owner's Representative or the City.

REQUIRED TESTING AND FREQUENCY TABLE		Party Responsible for payment	
		Contractor	Others (see note 1)
Piped Utilities, All			
Trench Backfill	1 Test/200 Foot Trench/Lift (4 min)	✓	See note 2
Water			
Pressure Test	(to be witnessed by Owner's Representative or approving agency)	✓	See note 3
Concrete, Block, etc.			
Slump, Air & Cylinders for structural & reinforced concrete, equipment slabs, curbs, sidewalks & PCC pavements. Unless otherwise specified, one set of cylinders per 100 cubic yards (or portion thereof) of each class of concrete placed per day. Slump & air tests required on same load as cylinders.		✓	See note 2
Building permit inspection & Special Inspection for structural concrete, reinforced masonry, epoxy anchors, etc. as required by applicable State Building Codes.		✓	See note 5
Note 1: "Others" refers to Owner's authorized Representative or Approving Agency as applicable. Contractor responsible for scheduling testing. All testing must be completed prior to performing subsequent work.			
Note 2: Testing must be performed by an approved independent testing laboratory.			
Note 3: To be witnessed by the Owner's Representative or approving agency. The Contractor shall perform pretests prior to scheduling witnessed waterline or sanitary sewer pressure tests, or pipeline mandrel test.			
Note 5: Regardless of who is responsible for payment, the Contractor is responsible for scheduling and coordinating any and all required inspections and Special Inspections as required by applicable building codes or jurisdictions having authority.			

City of Yachats, Oregon

South Tank Seismic Valve & WTP Backwash Recycle

GENERAL NOTES & SUGGESTED SEQUENCE OF OPERATIONS

DRAWING G002

2 OF 19

JOB NUMBER 3096.4010.0

VERIFIED PROFESSIONAL ENGINEER
REGISTERED PROFESSIONAL ENGINEER
1964/396
Jody L. Westech
OLYMPIA, WA
OREGON
VALLEY, OR
CHRISTOPHER J. WESTECH

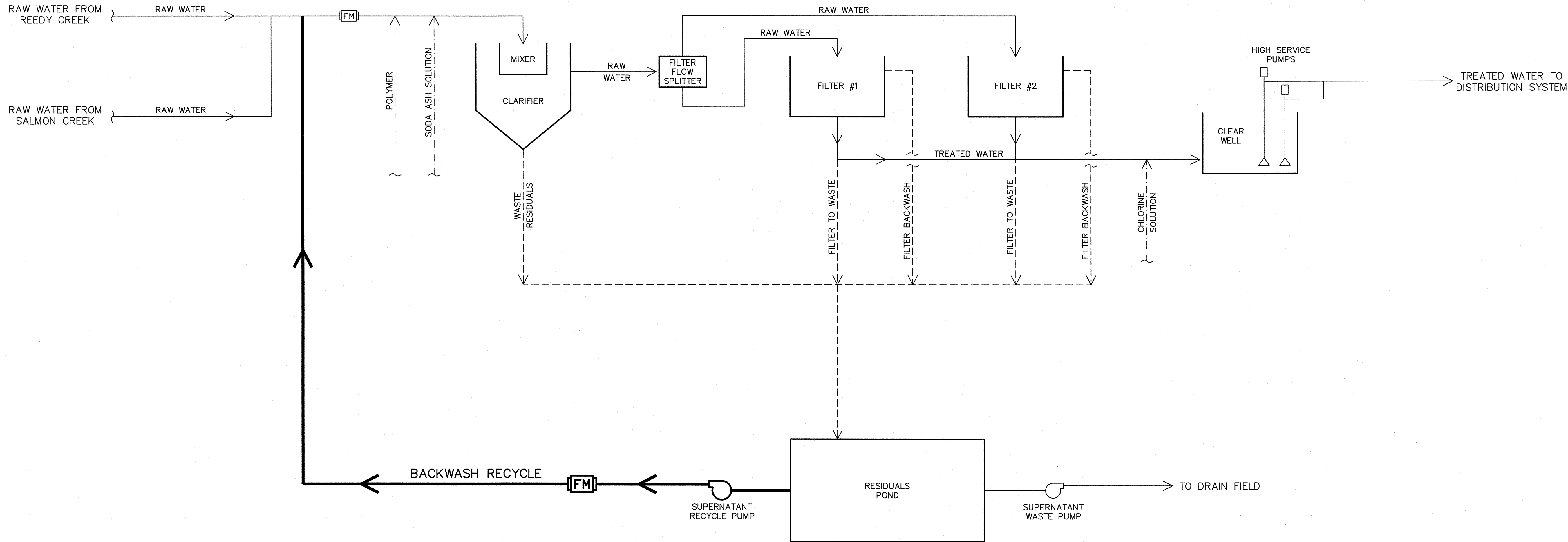
WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97202
Phone: (503) 585–2474 Fax: (503) 585–3986
E-mail: westech@westech-eng.com

REVISIONS

DATE: 3/30/2022

12/31/2023

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WATER TREATMENT PLANT FLOW SCHEMATIC

KEY

- EXISTING PROCESS PIPING
- EXISTING RESIDUALS PIPING
- EXISTING CHEMICAL PIPING
- NEW PROCESS PIPING
- CENTRIFUGAL PUMP (FUNCTION NOTED)
- VERTICAL TURBINE PUMP (FUNCTION NOTED)
- FLOW METER

DESIGN CRITERIA

TYPICAL FLOW TO RESIDUALS POND: 60,000 GALLONS PER DAY
SUPERNATANT RECYCLE PUMP MAXIMUM FLOW RATE: 100 GALLONS PER MINUTE
SUPERNATANT RECYCLE PUMP SIZE: 4 HP

VERIFIED SCALE
1" = 100' - 0"

DATE: 3/30/2022

REGISTERED PROFESSIONAL ENGINEER
CRISTOPHER J. J. J.

REVIEW: 12/31/2023

WESTECH ENGINEERING, INC.
CONSULTING ENGINEERS AND PLANNERS

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City of Yachats, Oregon

South Tank Seismic Valve & WTP Backwash Recycle

WTP BACKWASH RECYCLE FLOW SCHEMATIC & DESIGN CRITERIA

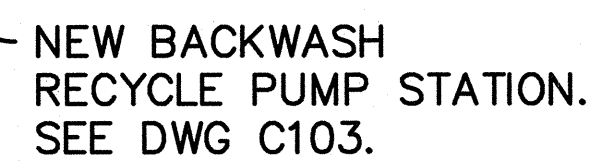
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3 OF 19

JOB NUMBER 3096.4010.0

REVISIONS

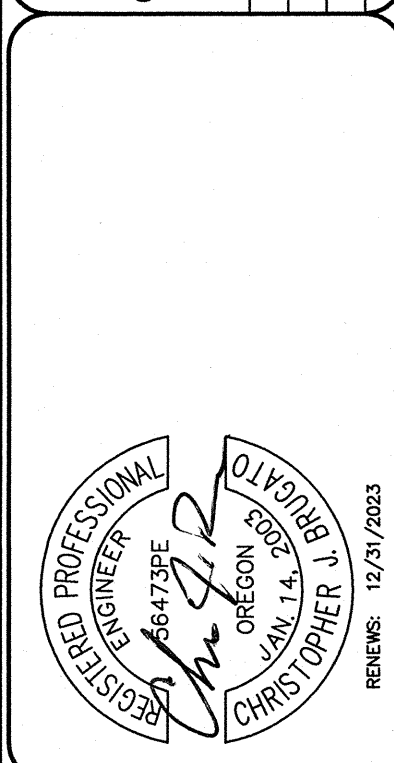
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ELEV: 21.5'

- ① POTHOLE EXISTING PIPE VERIFY SIZE, MATERIAL, & DEPTH PRIOR TO CONSTRUCTION. NOTIFY ENGINEER OF ANY CONFLICTS.
- ② INSTALL NEW 4" AWWA C900 PVC RAW WATER LINE WITH 3' MINIMUM OF COVER AND ELECTRICAL CONDUITS PER ELECTRICAL DWGS. SEE DETAIL 3015. CLASS 1 TRENCH BACKFILL (DTL. 3010) & GRAVEL SURFACE RESTORATION (DTL. 3030).
- ③ FURNISH & INSTALL 4" 11 ¼" BEND (MJxMJ) WITH THRUST BLOCK & RETAINER GLANDS.
- ④ FURNISH & INSTALL 4" 90° BEND (MJxMJ) WITH THRUST BLOCK & RETAINER GLANDS.
- ⑤ REMOVE & DISPOSE OF EXISTING VAULT. CONNECT TO EXISTING WATER LINE PER CONNECTION DETAIL 1.
- ⑥ POTHOLE UTILITY CROSSING PRIOR TO CONSTRUCTION, NOTIFY ENGINEER OF ANY CONFLICTS.

- | | |
|--|-----------------|
| <p>VERIFY SCALE</p> <p>BAR IS ONE INCH ON ORIGINAL DRAWING</p> <p>0  1"</p> <p>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</p> | DSN. CB |
| | DRN. TN |
| | CKD. CB |
| | DATE: 3/30/2022 |



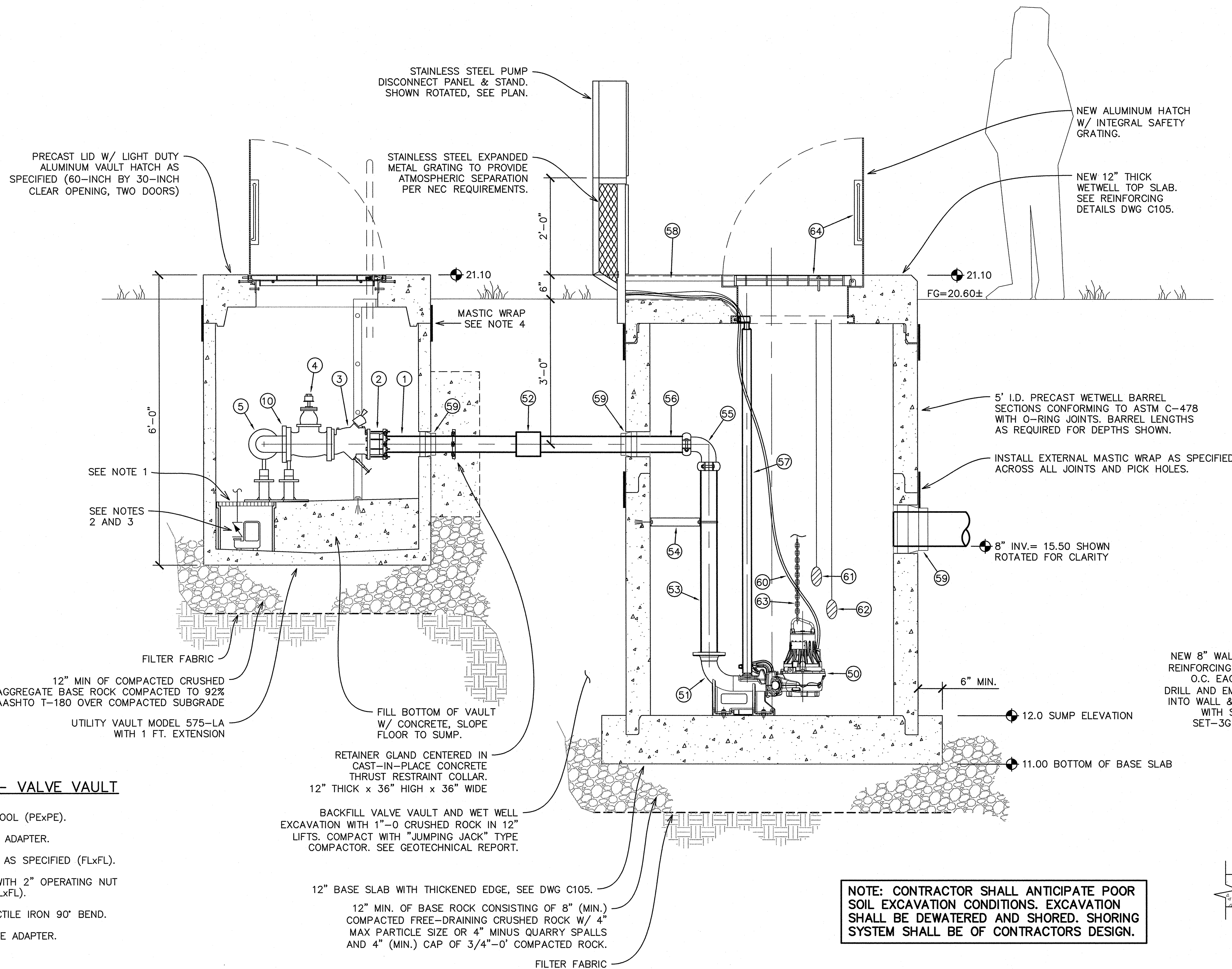
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- | | |
|---|---|
| City of Yachats, Oregon

South Tank Seismic Valve &
WTP Backwash Recycle | WATER TREATMENT PLANT
 BACKWASH RECYCLE PUMP
 STATION DETAILED SITE PLAN |
| DRAWING
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| 5 | OF 19 |
| JOB NUMBER
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KEY CALLOUTS – VALVE VAULT

- ① 3" CL.52 D.I. SPOOL (PEXPE).
- ② 3" MEGA FLANGE ADAPTER.
- ③ 3" CHECK VALVE AS SPECIFIED (FLxFL).
- ④ 3" GATE VALVE WITH 2" OPERATING NUT AS SPECIFIED (FLxFL).
- ⑤ 3" GROOVED DUCTILE IRON 90° BEND.
- ⑩ FLANGE x GROOVE ADAPTER.

NOTES:

1. CONSTRUCT GRATED MODULAR SUMP WITH PRODUCTS MANUFACTURED BY "SOURCE ONE ENVIRONMENTAL", WWW.S1EONLINE.COM. UTILIZE (1) 12"Ø GRATED LID FSD-3017-GEB, (1) 12"Ø ROUND RISERS FSD-3017-R AND A SECTION OF 12"Ø 3034 PIPE.
2. VAULT SHALL BE PROVIDED WITH FLOAT SWITCH ALARM AND ELECTRICAL CONNECTION FOR SUMP PUMP. SEE ELECTRICAL DRAWINGS. FLOAT SWITCH SHALL BE SET TO TRIP WHEN LIQUID LEVEL RISES 2-INCHES ABOVE VAULT FLOOR.
3. PROVIDE SUMP PUMP AS SPECIFIED WITH CHECK VALVE AND AS SHOWN IN DRAWING C106. PLUMB 1.5-INCH PVC DISCHARGE AS SHOWN ON THE CIVIL PLANS.
4. EXTERNAL MASTIC WRAP SHALL BE INSTALLED ACROSS ALL VAULT JOINTS. MASTIC WRAP SHALL BE 9-INCH WIDE. PRODUCT SHALL BE BIDCO EXTERNAL JOINT WRAP BY TELLEBORG, OR APPROVED EQUAL.

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C104

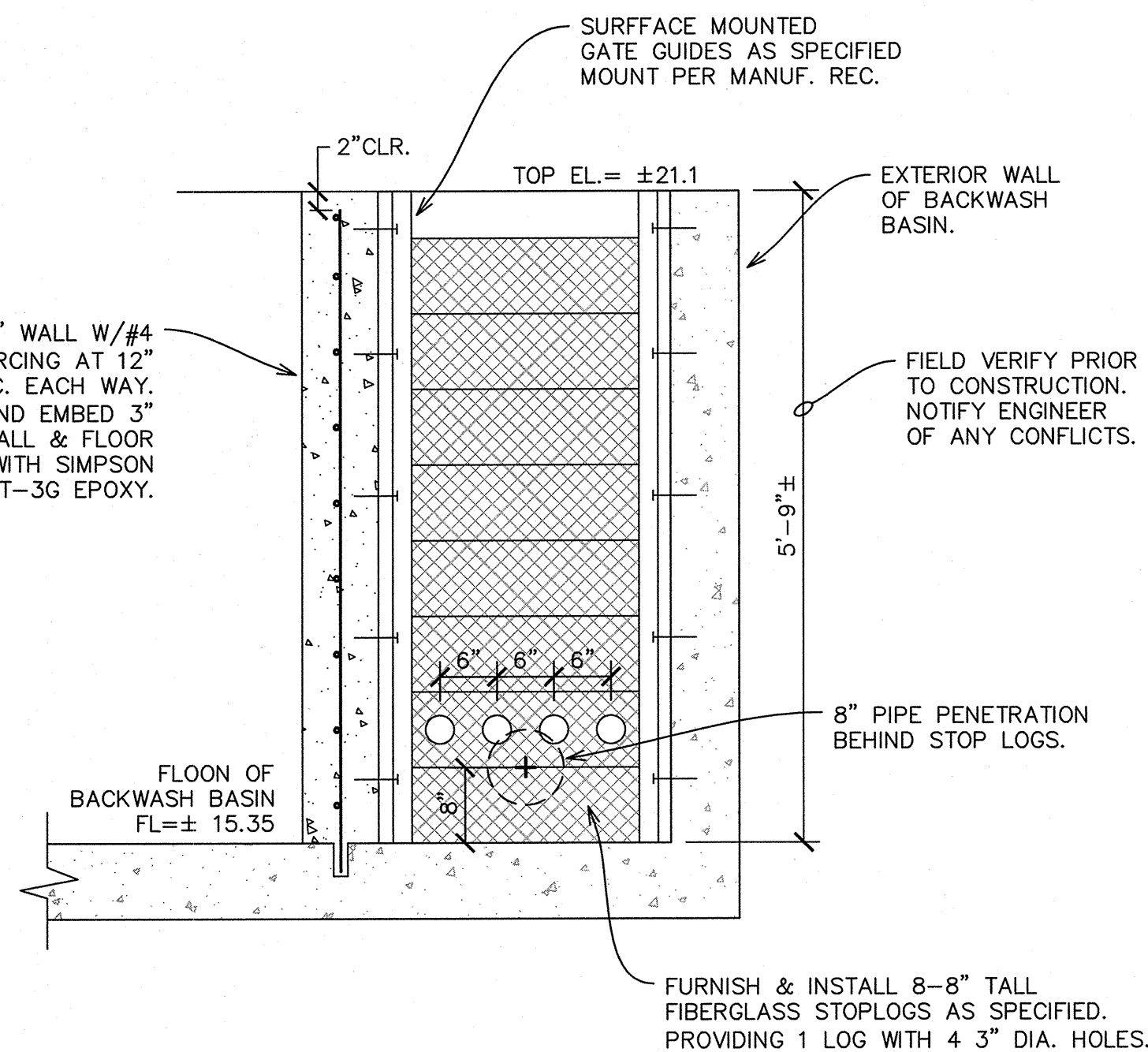
PUMP STATION & VALVE VAULT SECTION

SCALE: 3/4"=1'-0"

2
C104

STOP LOG END VIEW

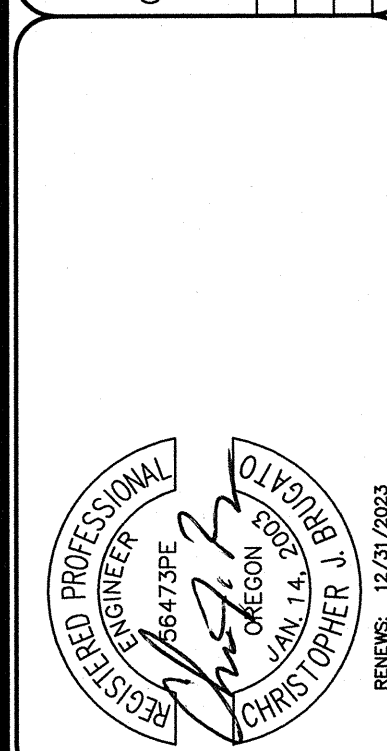
SCALE: 3/4"=1'-0"



KEY CALLOUTS – PUMP STATION

- ⑤0 SUBMERSIBLE NON-CLOG PUMP. FLYGT 3085-256 OR APPROVED EQUAL.
- ⑤1 3" FLYGT DISCHARGE ELBOW.
- ⑤2 3" MJ SLEEVE COUPLING WITH RETAINER GLANDS.
- ⑤3 3" CL. 52 D.I. DISCHARGE PIPING WITH GROOVED UPPER END. COORDINATE DISCHARGE ELBOW CONNECTION WITH PUMP SUPPLIER.
- ⑤4 STAINLESS STEEL DISCHARGE PIPE ANCHOR BRACKET. SEE DTL. U7302A DWG C106.
- ⑤5 3" 90° BEND (GRxGR).
- ⑤6 3" CL. 52 D.I. SPOOL (GRxPE).
- ⑤7 TWO 2-INCH SCHEDULE 40 STAINLESS STEEL GUIDE BARS (FULL HEIGHT). ATTACH TO HATCH UNI-STRUT WITH UPPER GUIDE BAR BRACKET.
- ⑤8 CABLE TRAY FROM DISCONNECT PANEL TO HATCH. SEE DETAIL DWG C106. SHOWN ROTATED, SEE PLAN.
- ⑤9 PIPE BOOT, KOR-N-SEAL OR EQUIVALENT TYPICAL ALL PIPE PENETRATIONS.
- ⑥0 PUMP POWER CABLE. PROVIDE EACH CABLE WITH A STAINLESS STEEL BASKET CABLE GRIP ATTACHED TO HOOK ON UPPER GUIDE BAR BRACKET. FURNISH & INSTALL MELTRIX END CONNECTORS AS SPECIFIED.
- ⑥1 LOW LEVEL OFF FLOAT SWITCH. PROVIDE MOUNTING BRACKET MOUNTED TO HATCH UNI-STRUT. EL=16.50 FT.
- ⑥2 REDUNDANT LOW LEVEL OFF FLOAT SWITCH. PROVIDE MOUNTING BRACKET MOUNTED TO HATCH UNI-STRUT. EL=15.50 FT.
- ⑥3 STAINLESS STEEL CHAIN SLING FOR PUMP RETRIEVAL USING FLYGT GRIP-EYE. ATTACH TO PUMP LIFTING HANDLE. SEE DETAIL 7900, SHT C106.
- ⑥4 ALUMINUM WETWELL ACCESS HATCH AS SPECIFIED CAST INTO WETWELL TOP SLAB.

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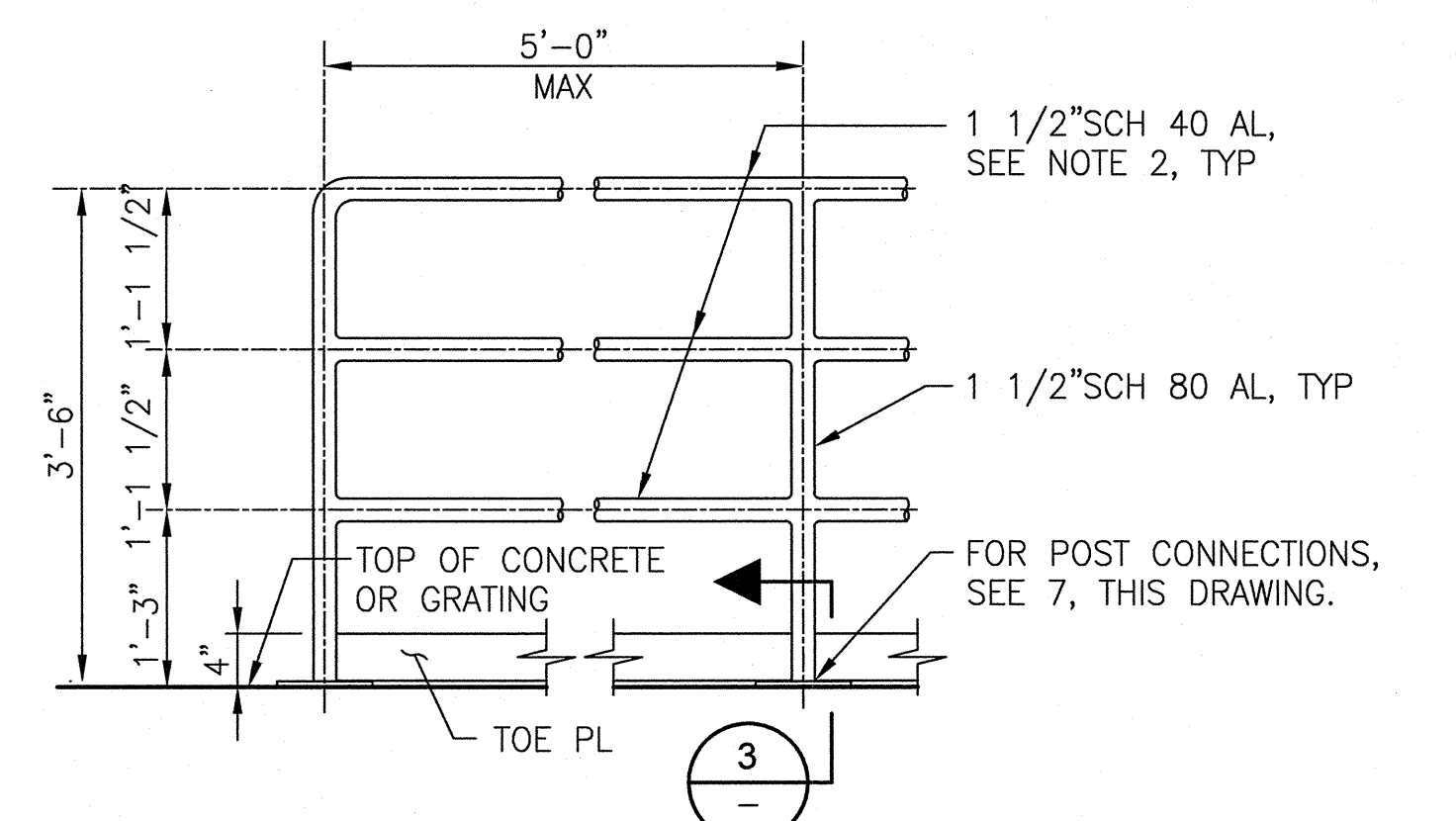
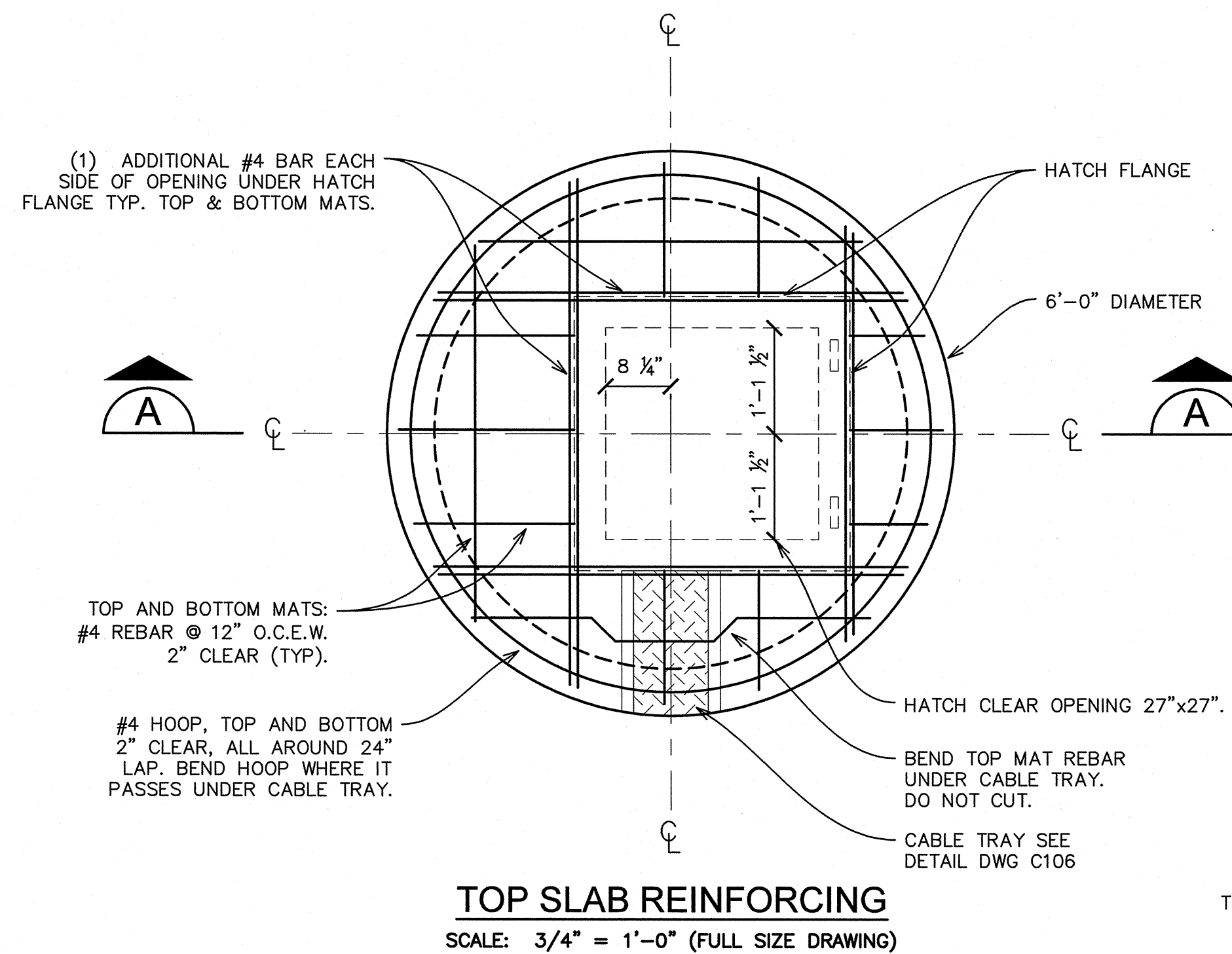
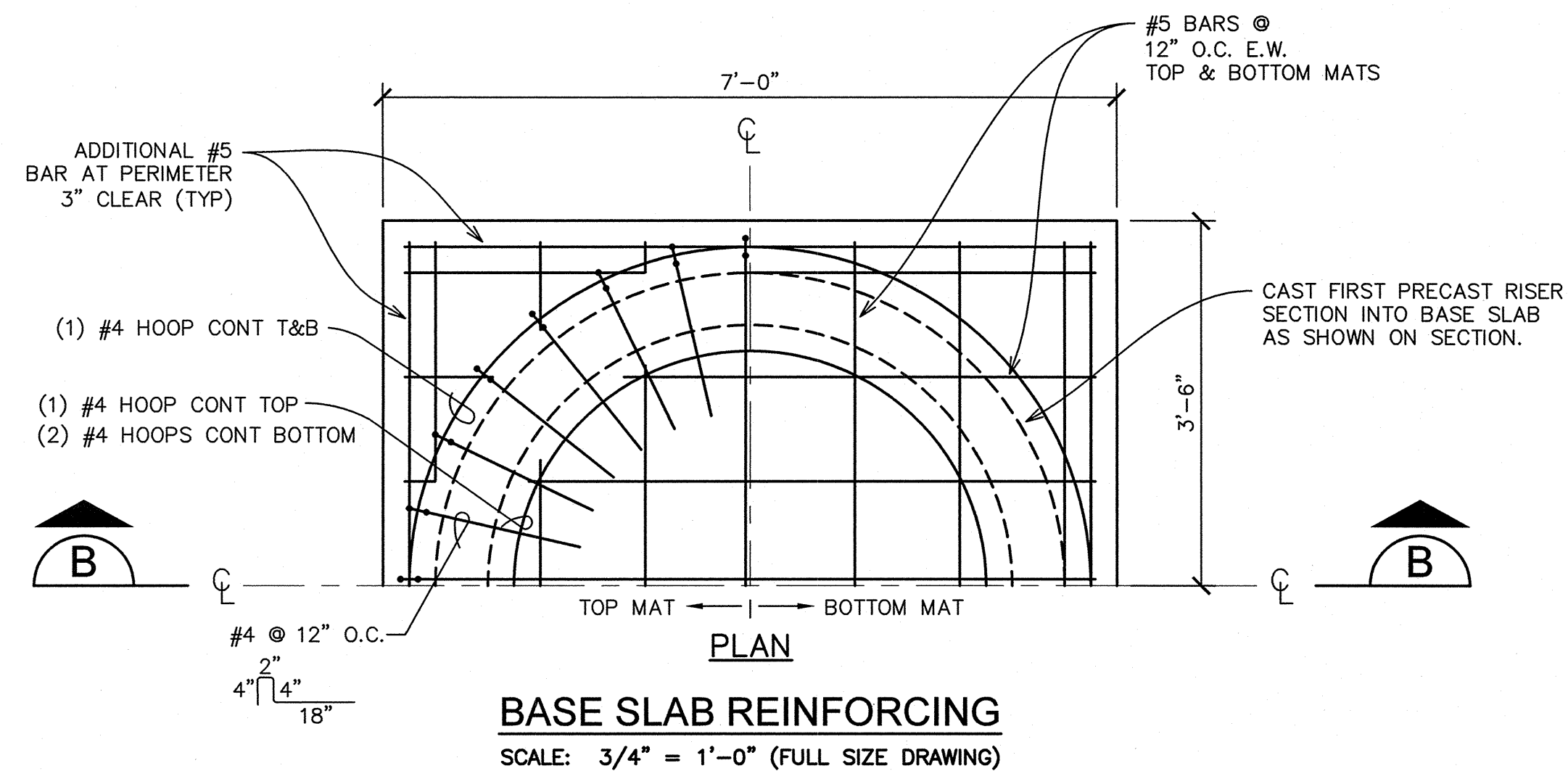


WESTECH ENGINEERING, INC.
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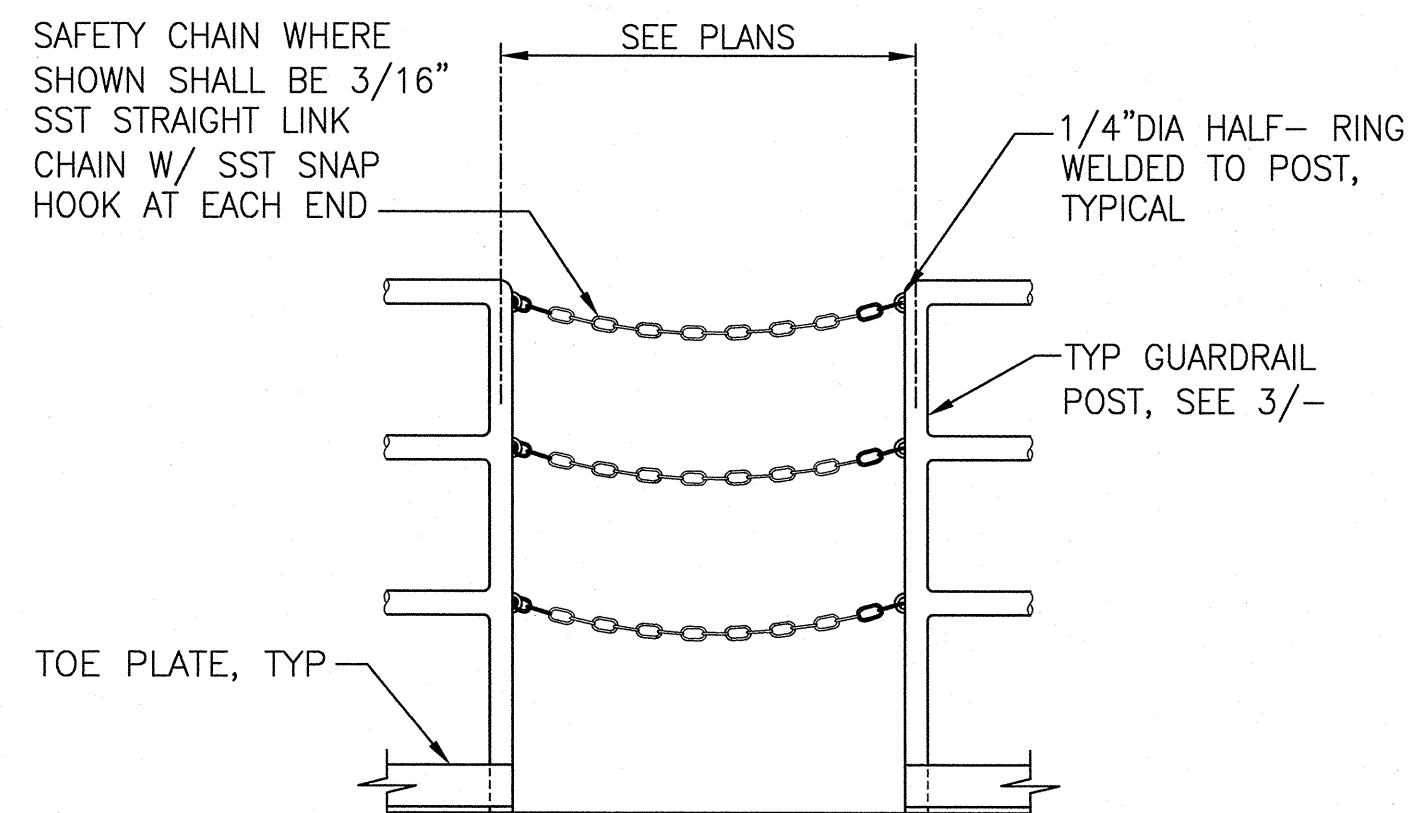
3841 Fairview Industrial Dr. S.E., Suite 100, Salem, OR 97302
Phone: (503) 585-2474 Fax: (503) 585-3986
E-mail: westech@westech-eng.com

City of Yachats, Oregon
South Tank Seismic Valve & Backwash Recycle
WTP TREATMENT PLANT
BACKWASH RECYCLE PUMP
STATION SECTION & END VIEW

DRAWING
C104
6 OF 19
JOB NUMBER
3096.4010.0

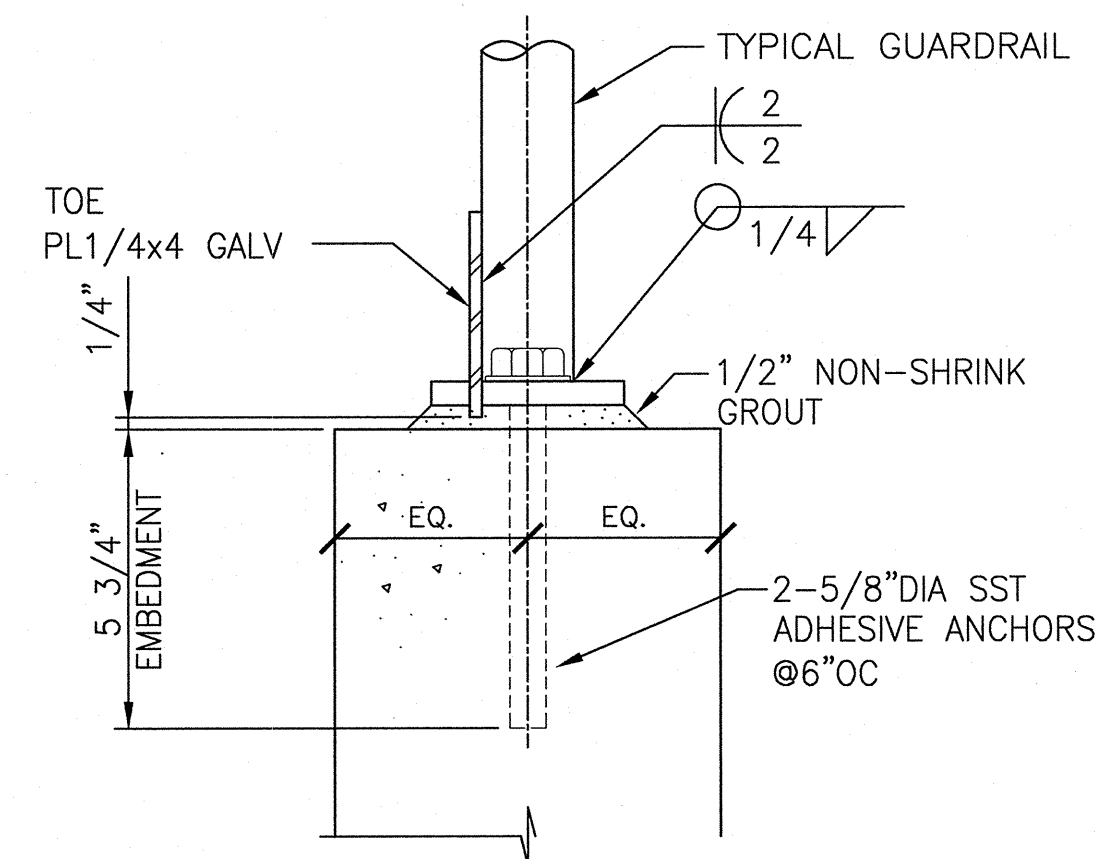


- TYPICAL GUARDRAIL**
NO SCALE

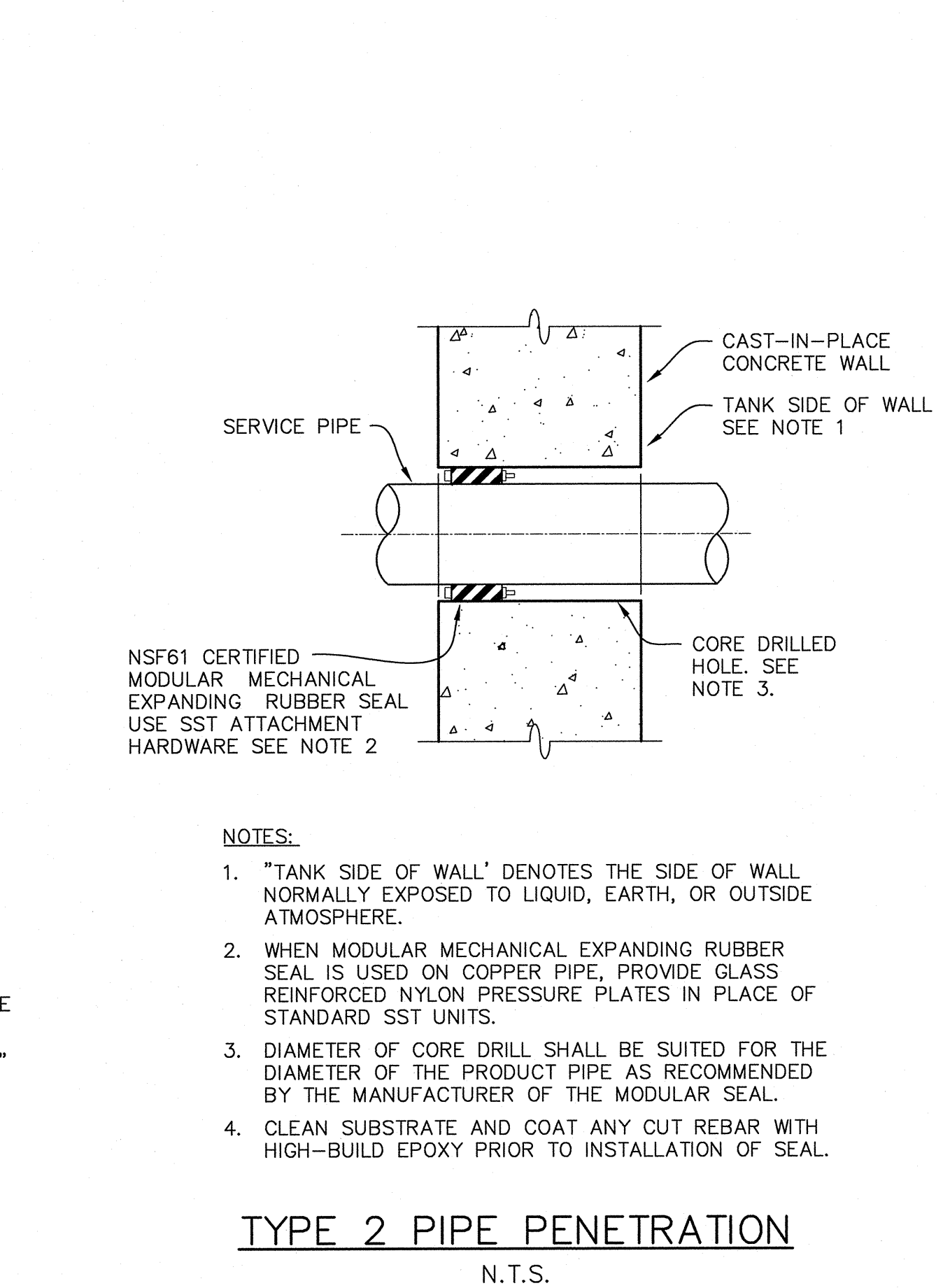
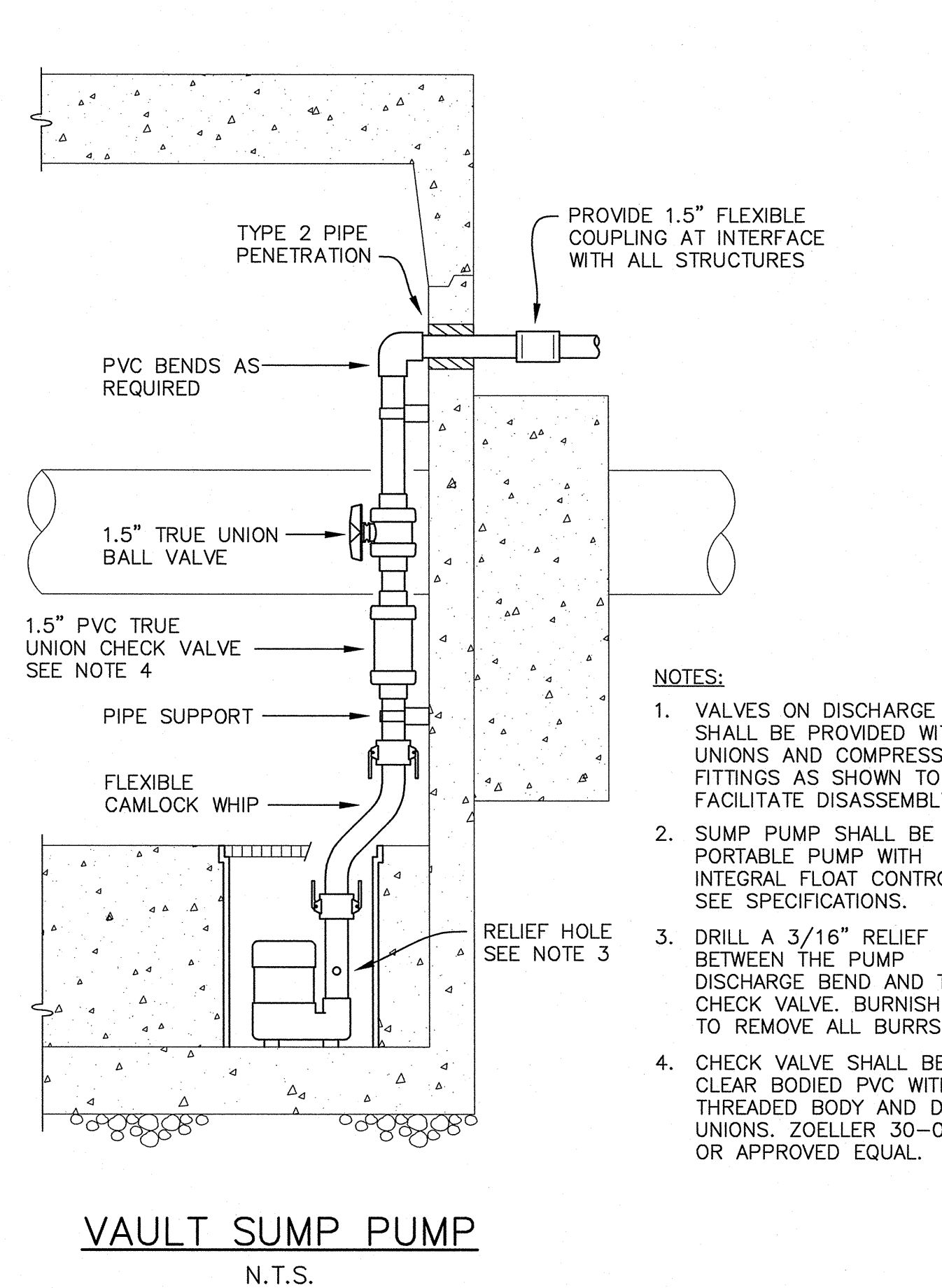
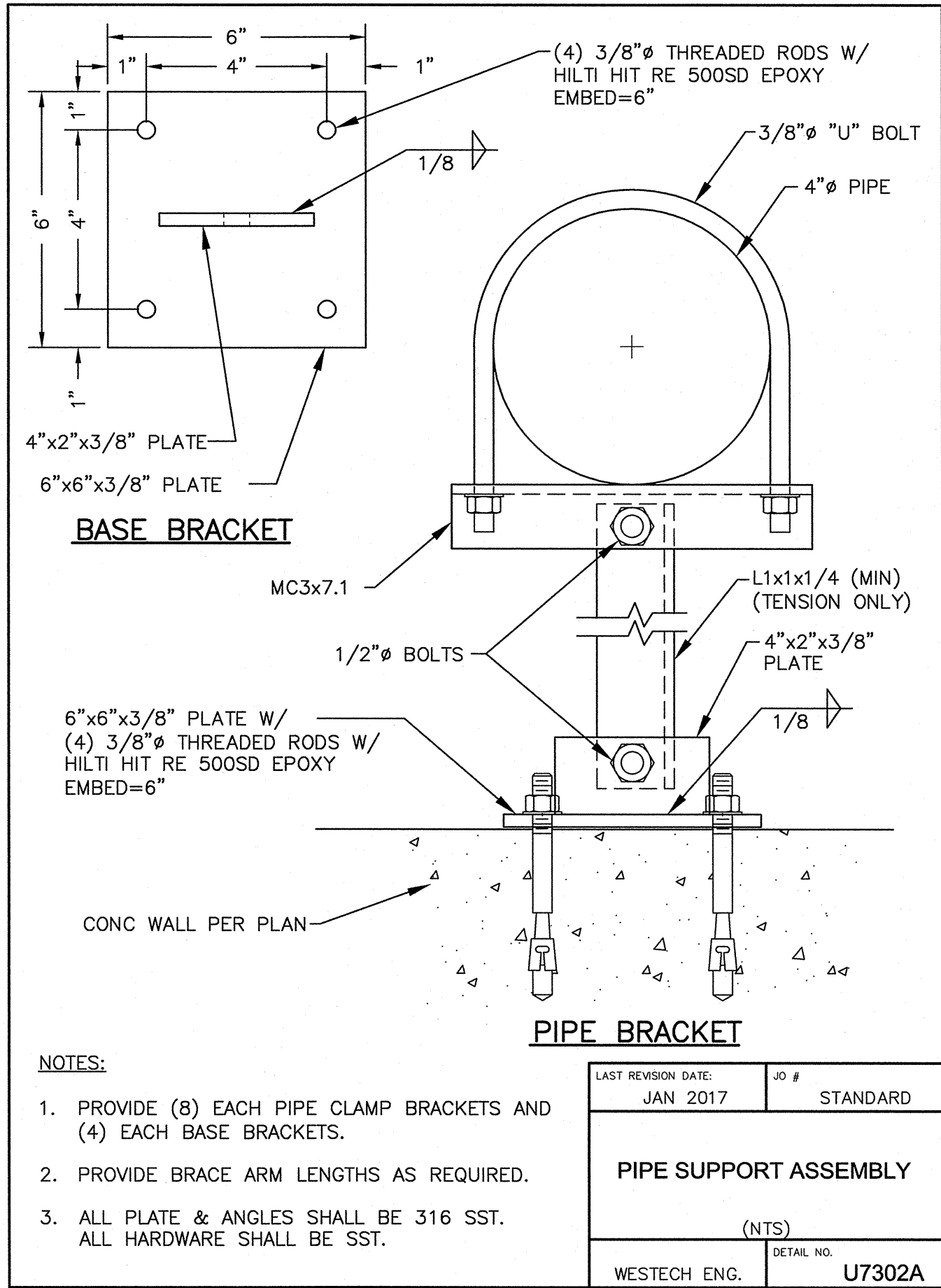
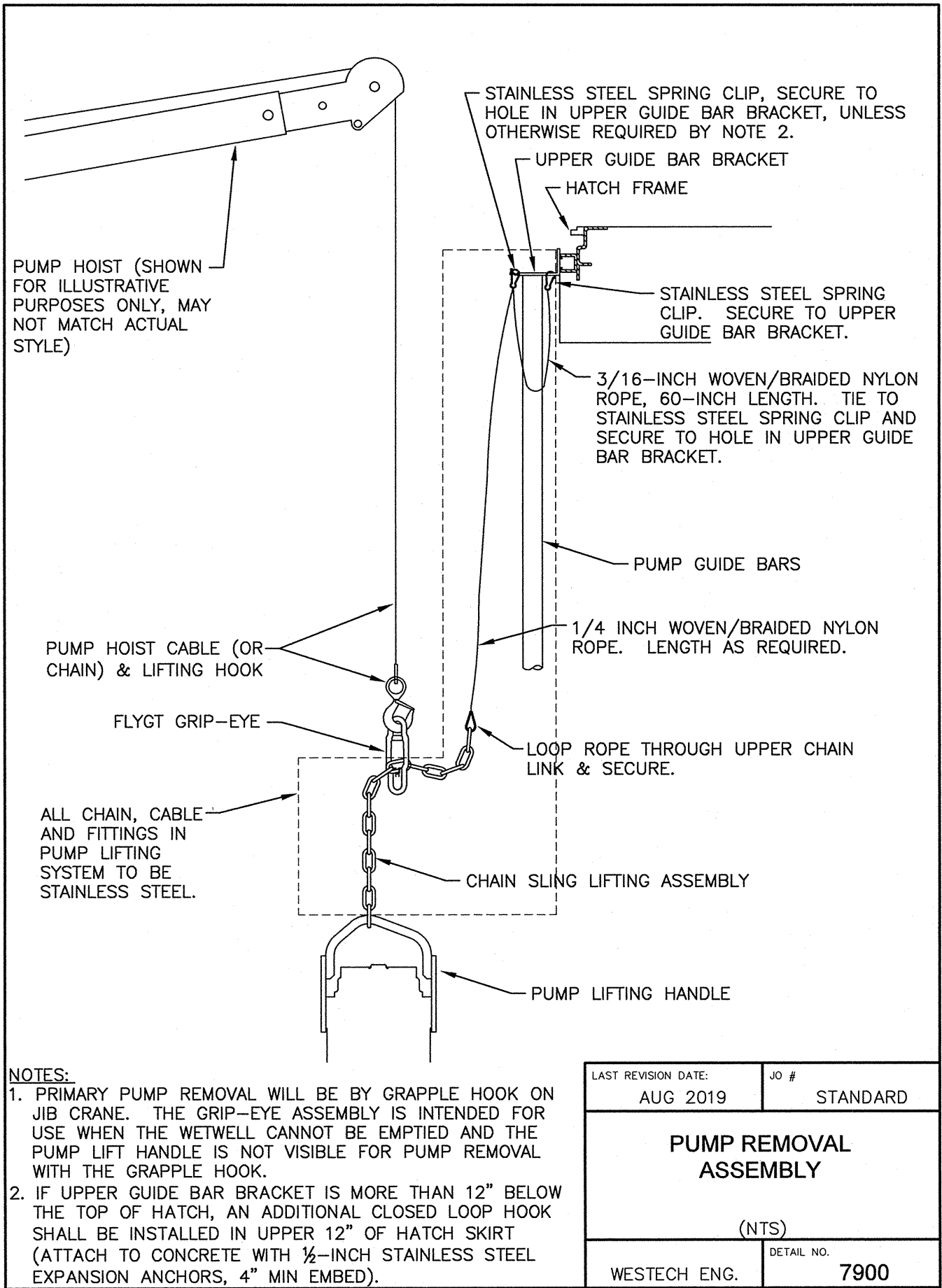
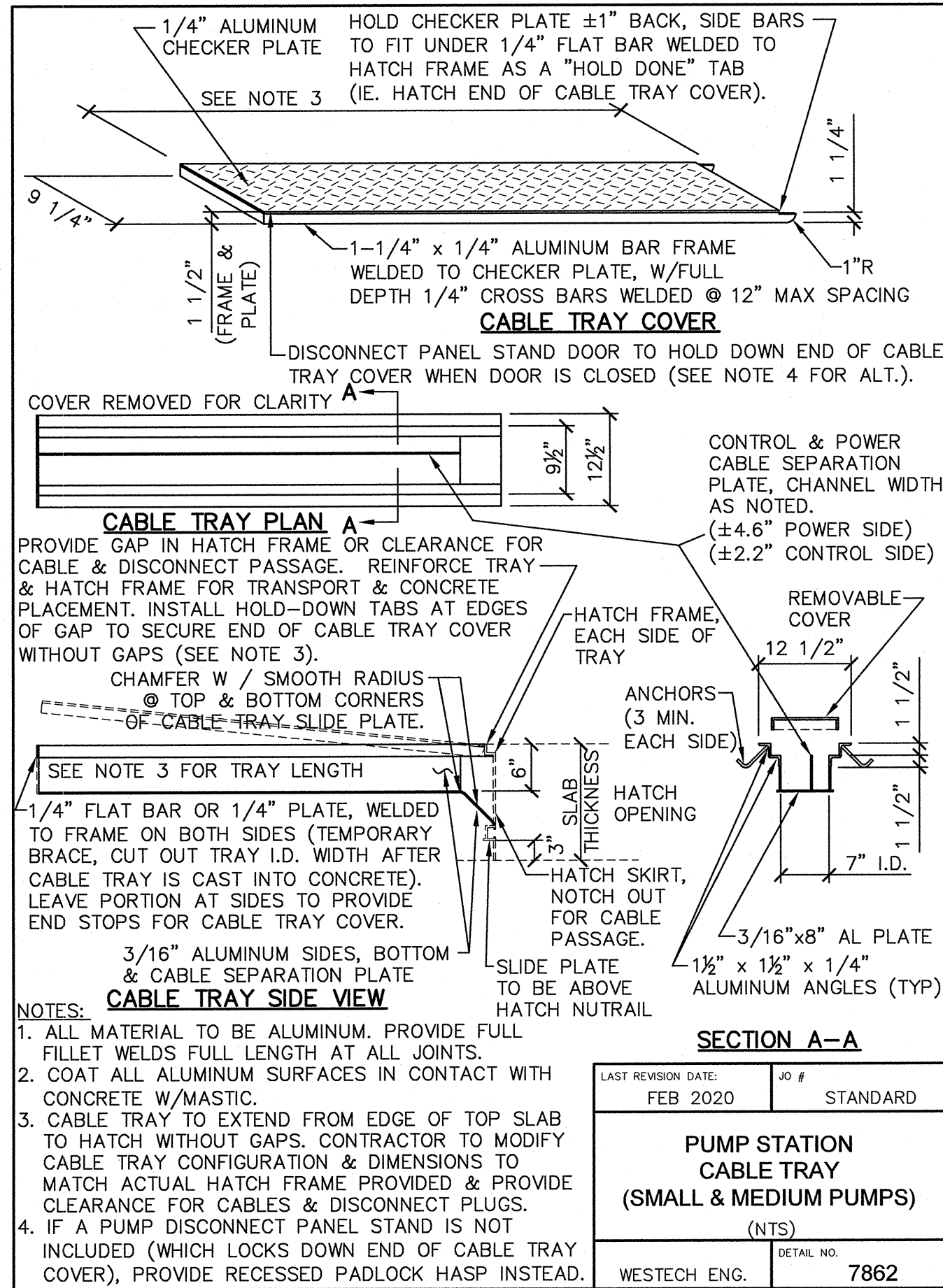
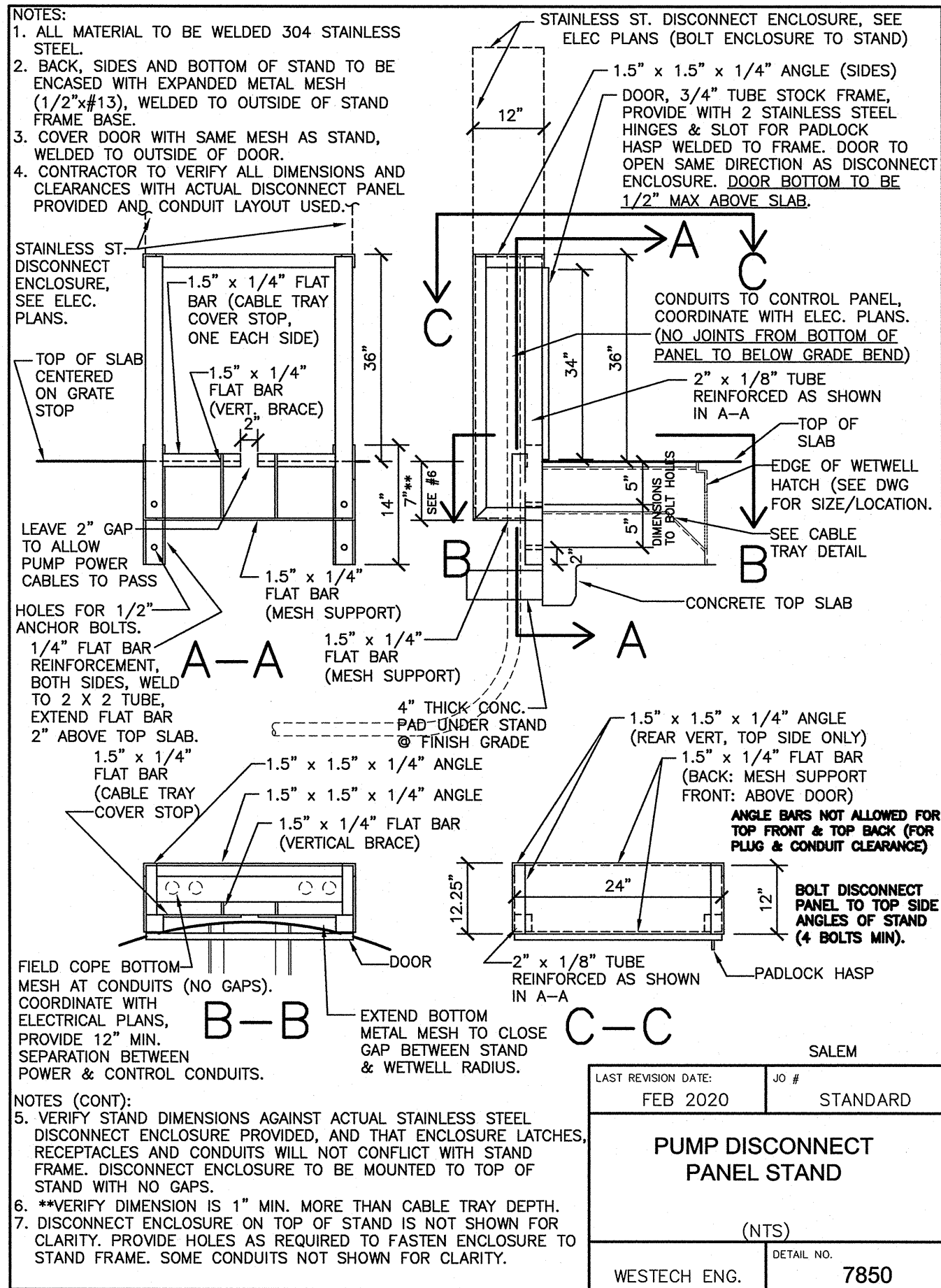
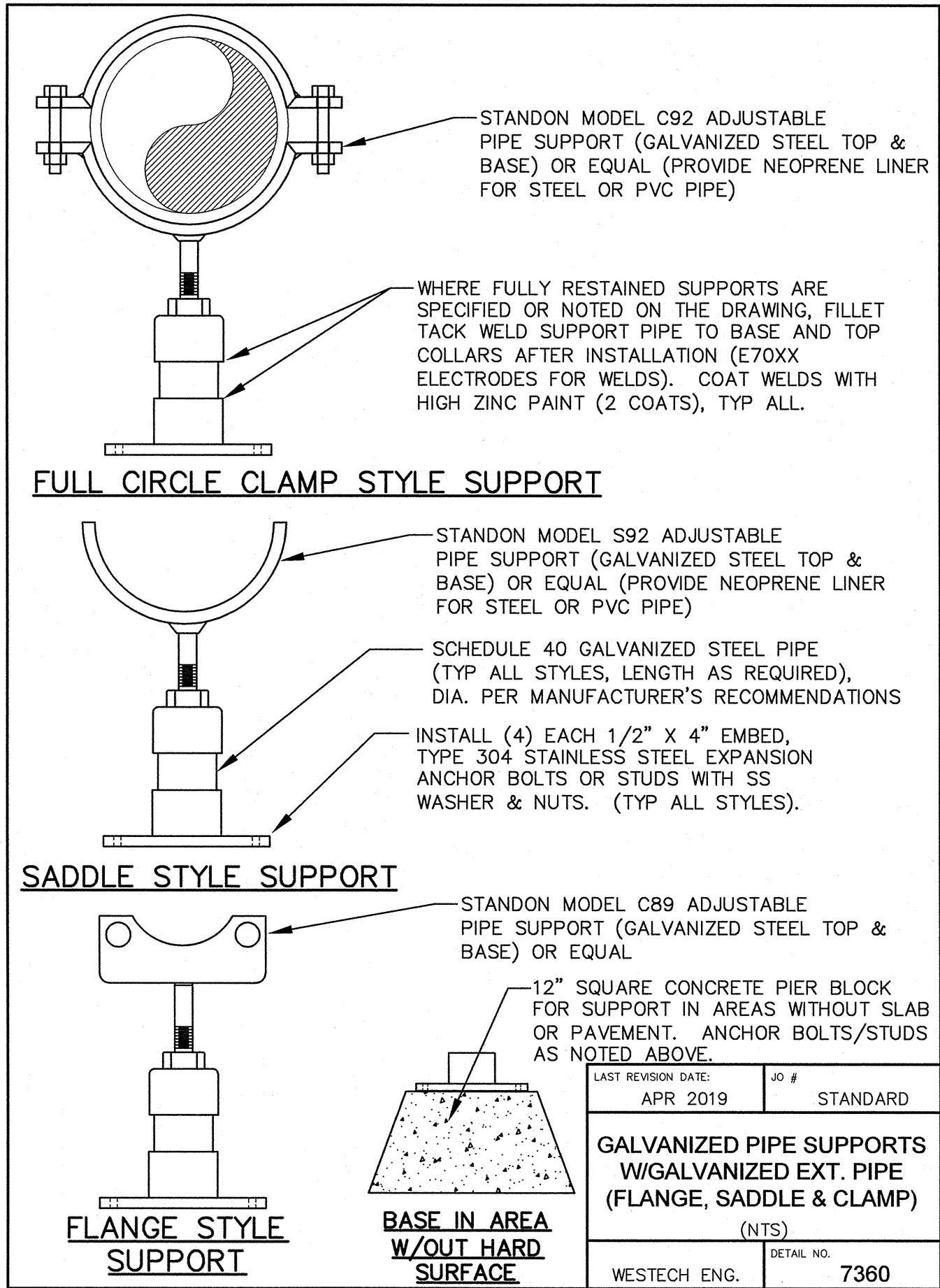
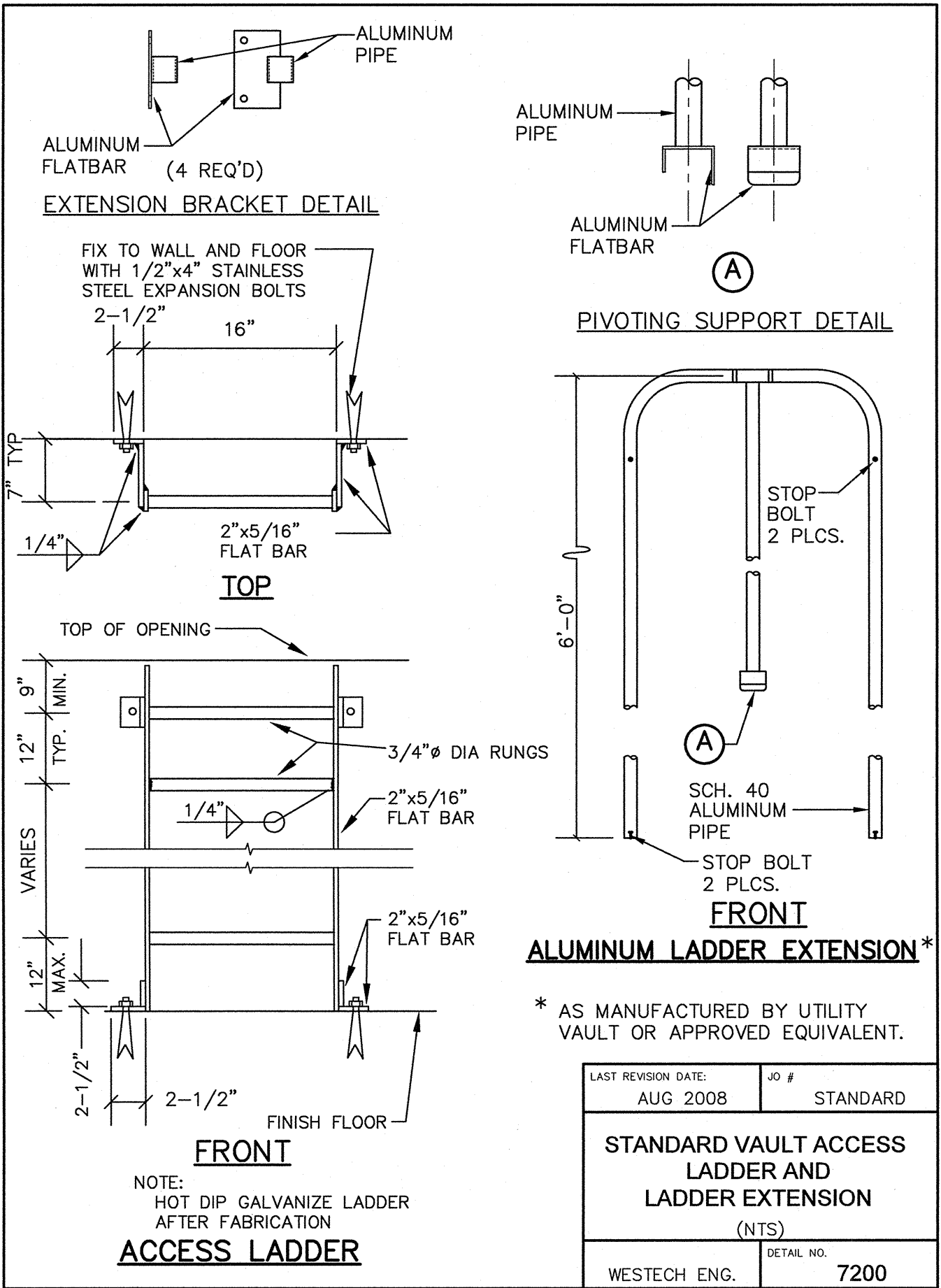


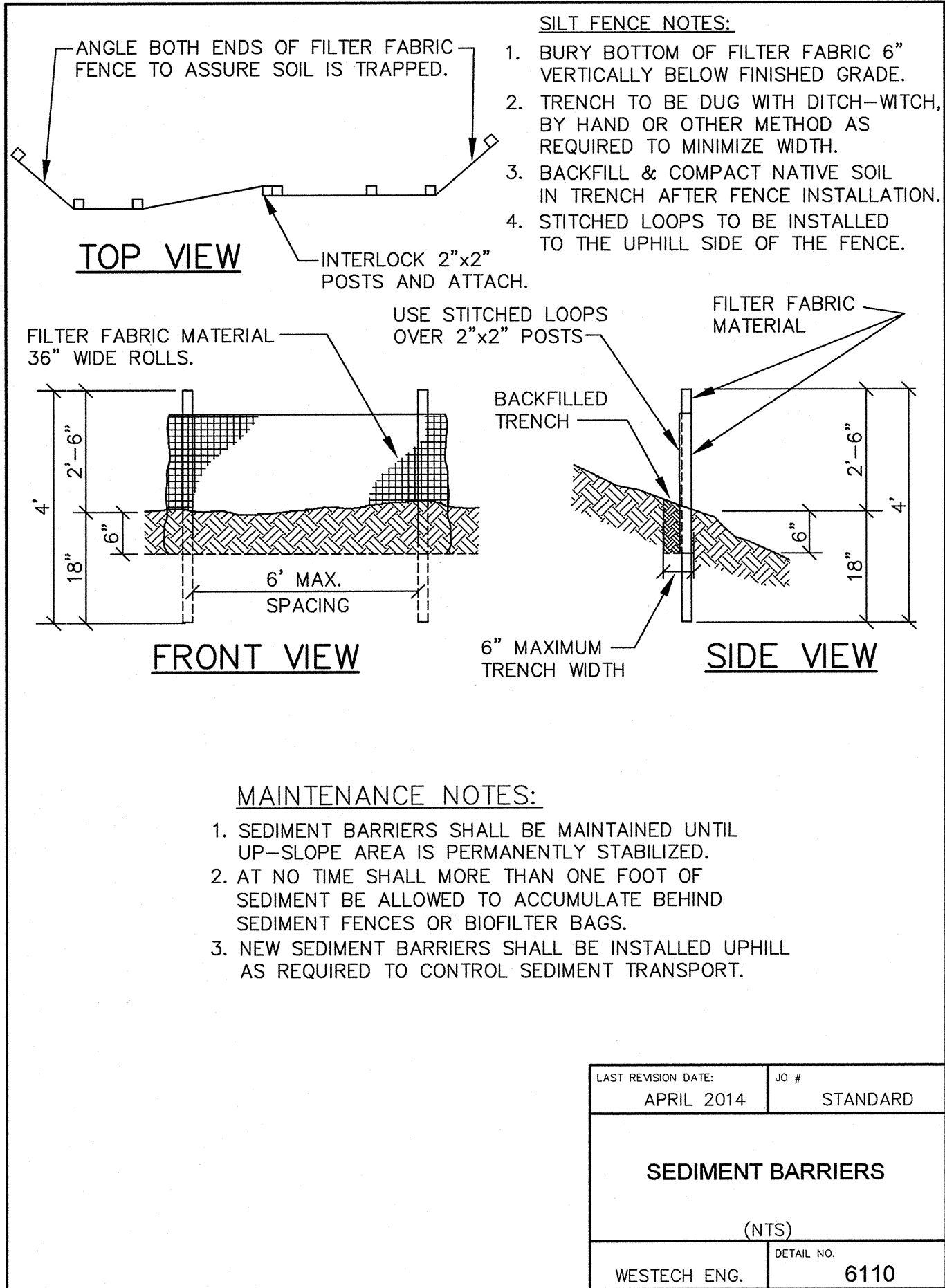
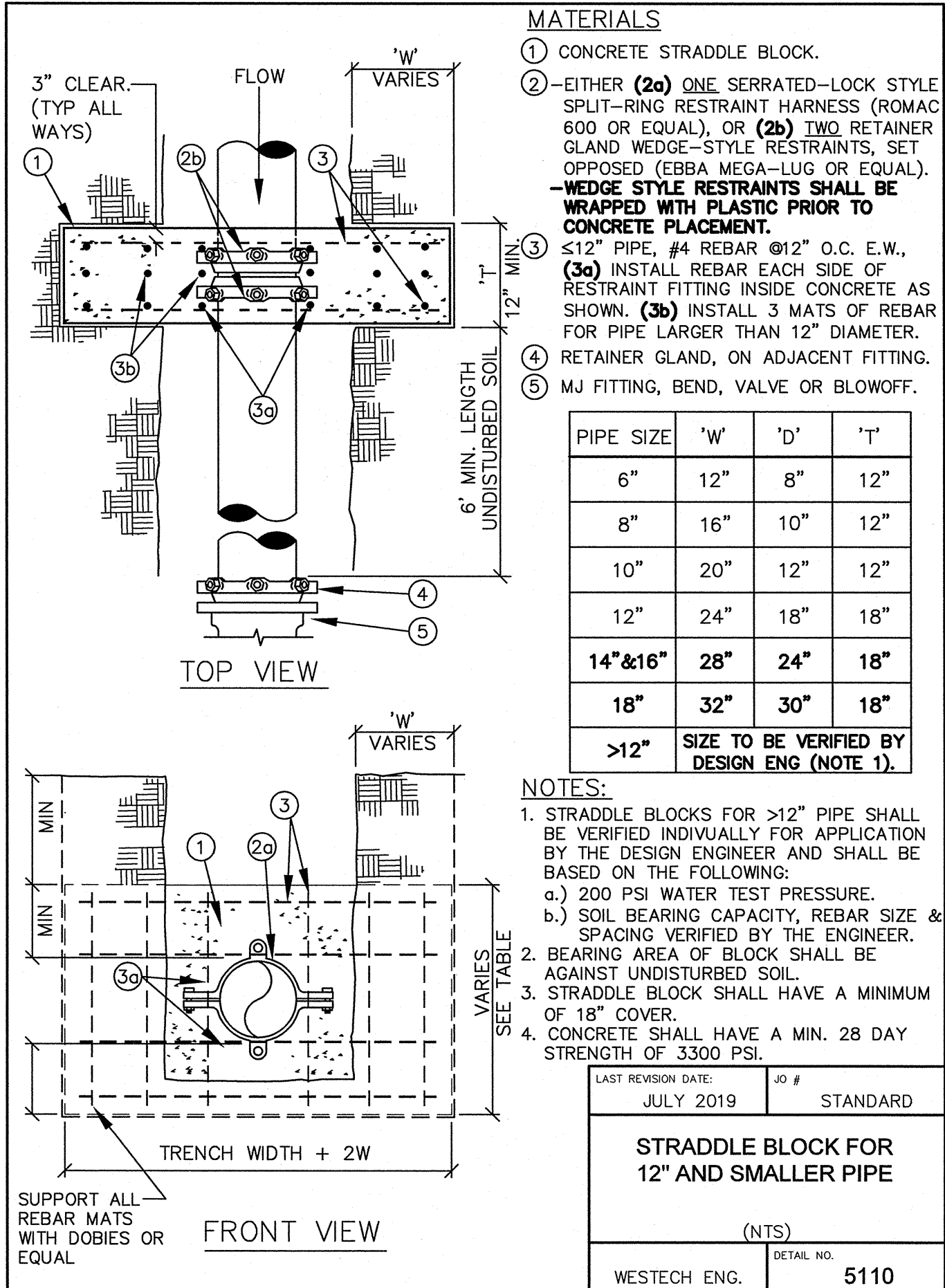
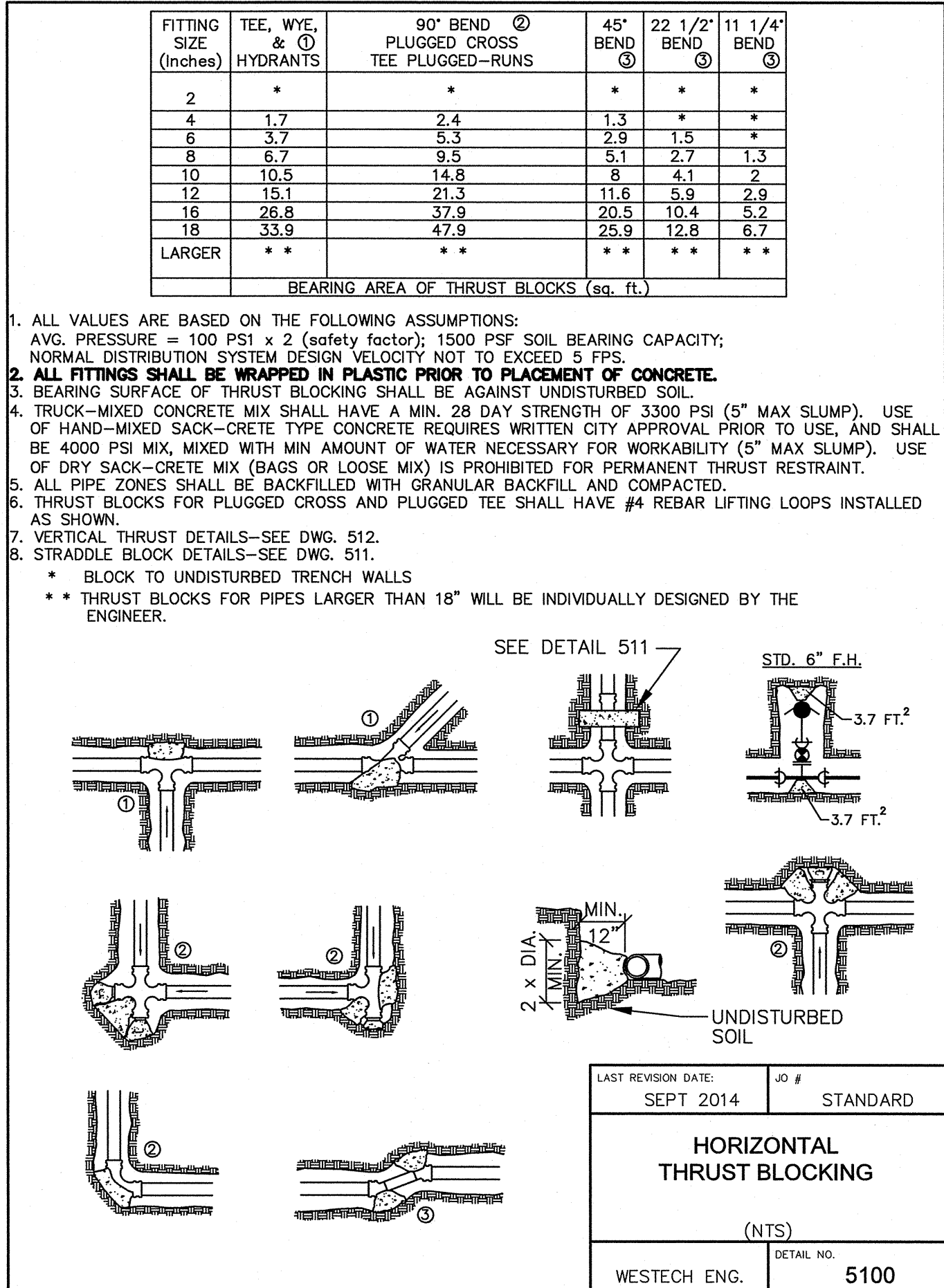
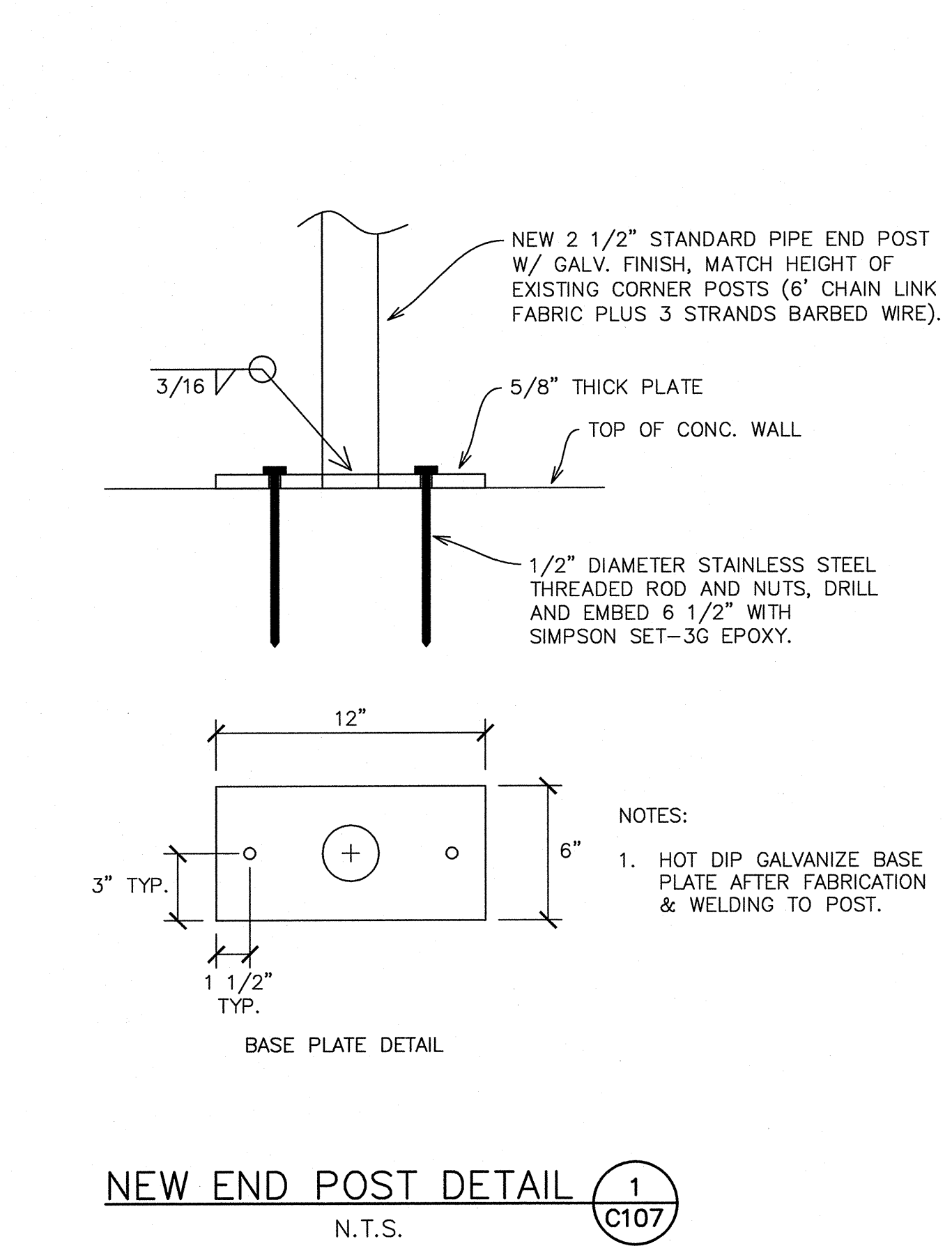
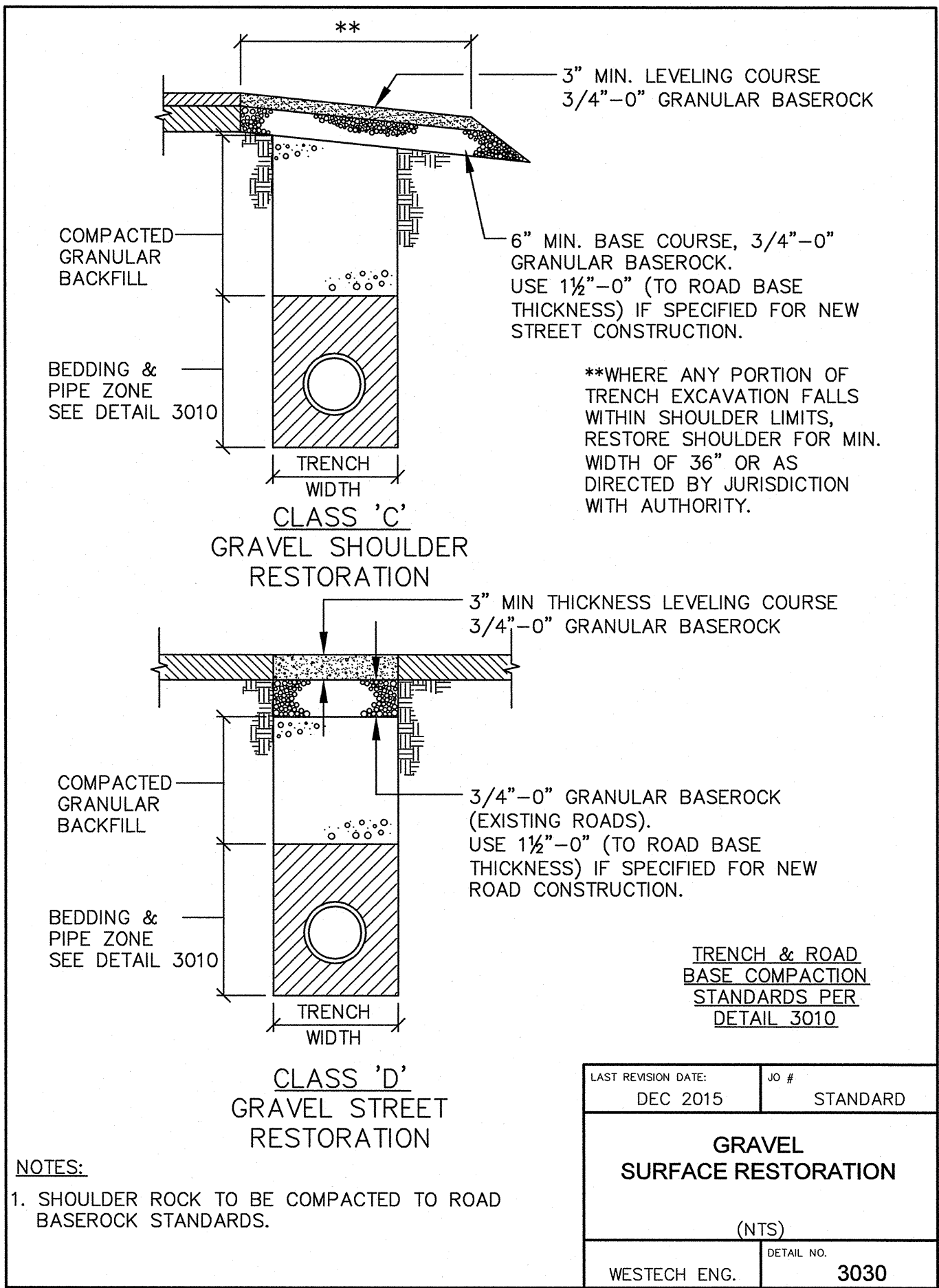
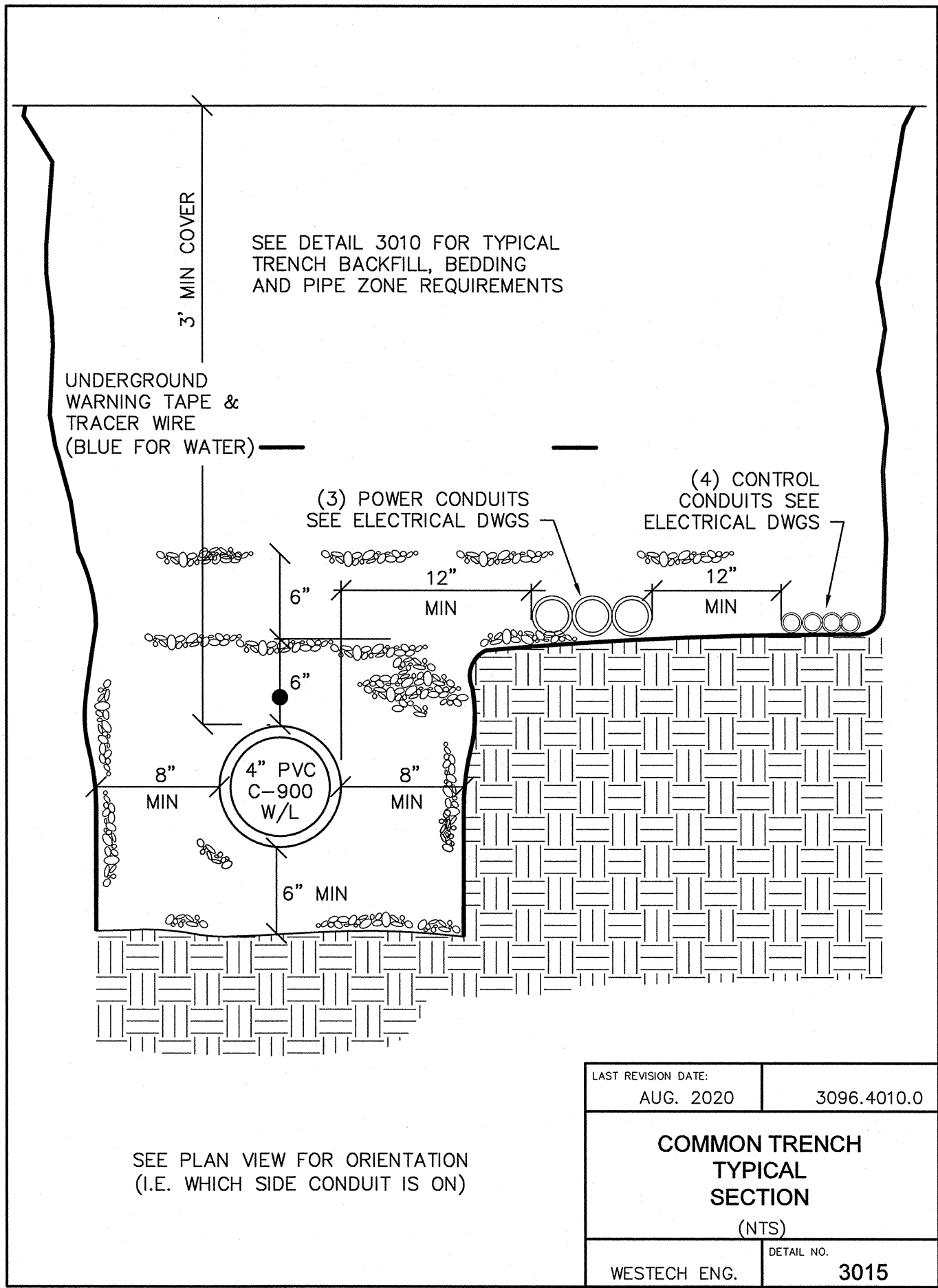
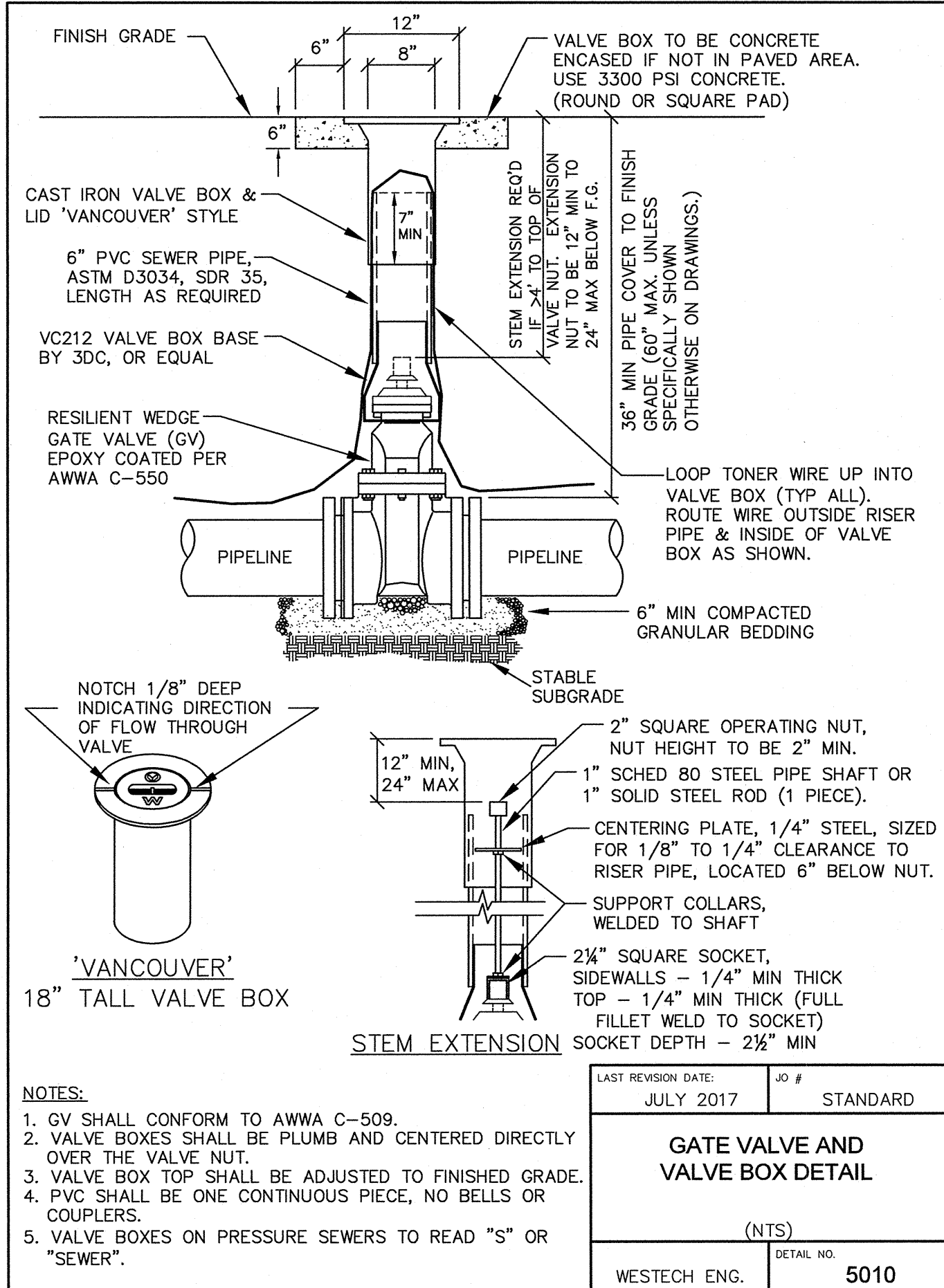
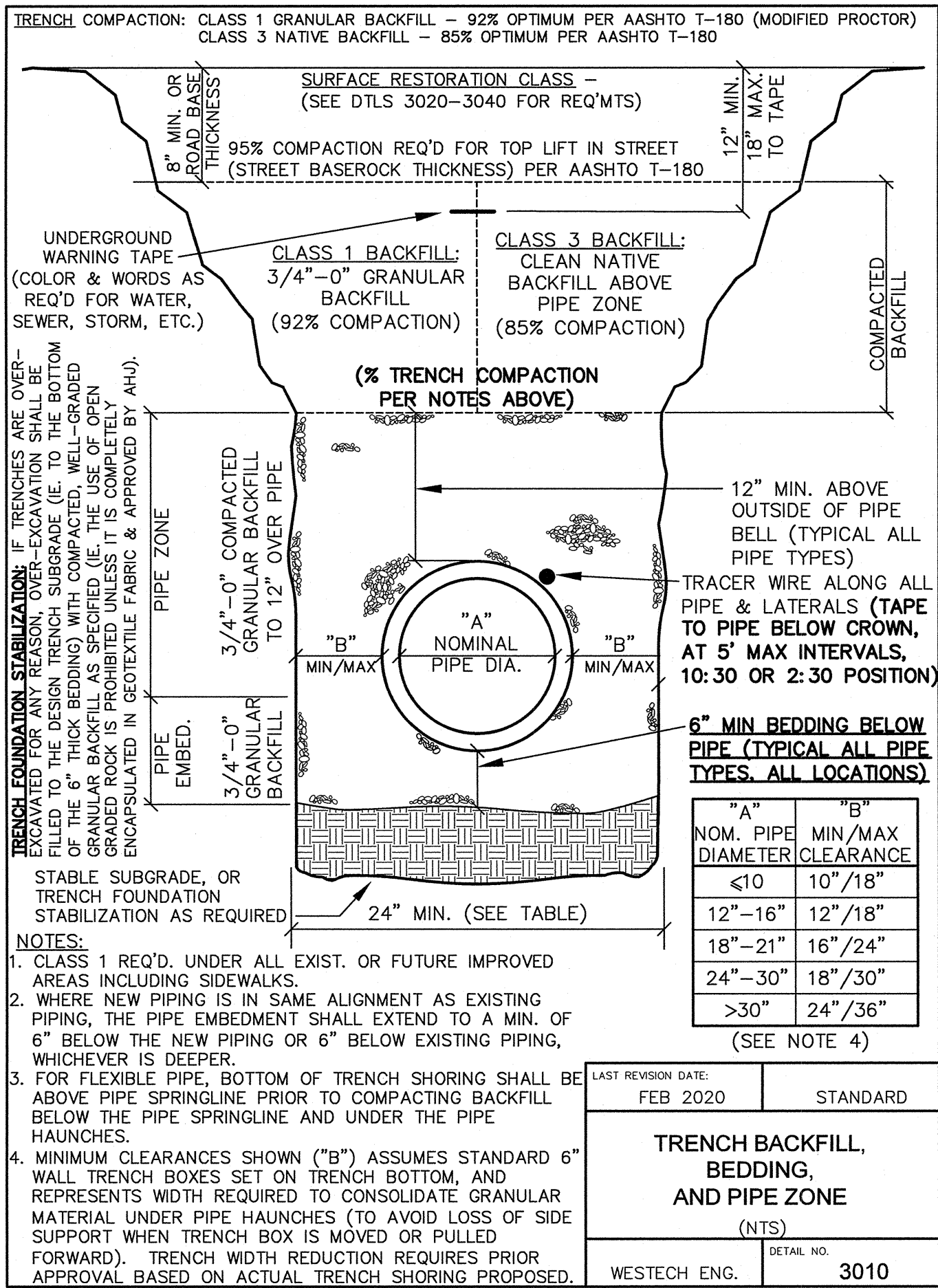
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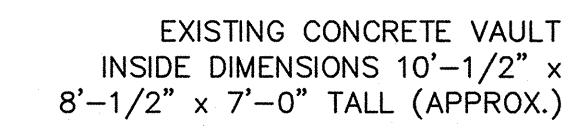
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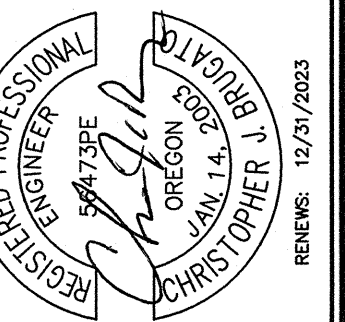
CONCRETE
TOP MOUNTING
NO SCALE







SCALE: 1" = 1'-0"

[illegible]

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City of Yachats, Oregon

South Tank Seismic Valve &
WTP Backwash Recycle

SOUTH TANK VALVE
VAULT IMPROVEMENTS

DRAWING
C201
10 OF 19
JOB NUMBER
6096.4010.0

Electrical Abbreviations, General Notes, & Symbol Legend

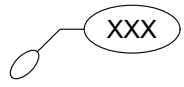
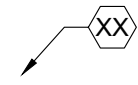
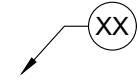
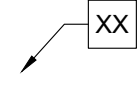
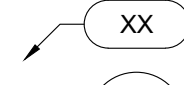
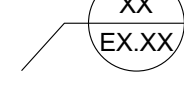
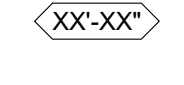
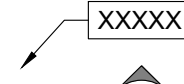
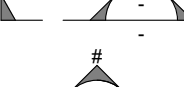
Abbreviations

A	AMPERE	MCA	MINIMUM CIRCUIT AMPACITY
AC	ALTERNATING CURRENT, AIR CONDITIONING UNIT	MCC	MOTOR CONTROL CENTER
AHJ	AUTHORITY HAVING JURISDICTION	MCP	MOTOR CIRCUIT PROTECTOR
AI	ANALOG INPUT	MDF	MAIN DISTRIBUTION FRAME
AIC	AVAILABLE INTERRUPTING CAPACITY	MHz	MEGAHERTZ
AF	AMPERE FRAME / AMPERE FUSED	MISC	MISCELLANEOUS
AFC	ABOVE FINISHED CEILING	MLO	MAIN LUGS ONLY
AFF	ABOVE FINISHED FLOOR	MOCF	MAXIMUM OVERCURRENT PROTECTION
AFG	ABOVE FINISHED GRADE		
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	N	NEUTRAL
AO	ANALOG OUTPUT	NAC	NOTIFICATION APPLIANCE CIRCUIT
ARMS	ARC FLASH REDUCTION MAINTENANCE SYSTEM	N/A	NOT APPLICABLE
AT	AMPERE TRIP	NC	NORMALLY CLOSED
AV	AUDIO / VIDEO	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
		NEX	REPLACE EXISTING WIRING DEVICE AND FACEPLATE WITH NEW. BACK BOX AND CONDUIT SHALL REMAIN.
BAS	BUILDING AUTOMATION SYSTEM	NL	NIGHT LIGHT
BFG	BELOW FINISHED GRADE	NO	NORMALLY OPEN
BLDG	BUILDING	NTS	NOT TO SCALE
C	CONDUIT	OC	ON CENTER
CAT	CATEGORY	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
CB	CIRCUIT BREAKER	OFOI	OWNER FURNISHED, OWNER INSTALLED
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED		
CFOI	CONTRACTOR FURNISHED, OWNER INSTALLED	Ø	PHASE
CKT	CIRCUIT		
CPT	CONTROL POWER TRANSFORMER	PB	PULL BOX, PANIC BUTTON, PUSH BUTTON
CR	CONTROL RELAY	PE	PHOTO EYE
CU	COPPER	PNL	PANEL
		POE	POWER OVER ETHERNET
		PTZ	PAN, TILT, ZOOM
		RF	RADIO FREQUENCY
		RFI	REQUEST FOR INFORMATION
		SLC	SIGNALING LINE CIRCUIT
		SPD	SURGE PROTECTION DEVICE
		STD	STANDARD
		SW	SWITCH
		T/M	THERMAL MAGNETIC CIRCUIT BREAKER
		TBD	TO BE DETERMINED
		TV	TELEVISION / MONITOR OUTLET
		TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
		TYP	TYPICAL
		UH	UNIT HEATER
		UG	UNDERGROUND
		UL	UNDERWRITERS LABORATORIES
		UPS	UNINTERRUPTIBLE POWER SUPPLY
		UON	UNLESS OTHERWISE NOTED
		USB	UNIVERSAL SERIAL BUS
		V	VOLTS, VOLTAGE
		VA	VOLT-AMPERE
		VFD	VARIABLE FREQUENCY DRIVE
		W	WATT, WIRE
		WAN	WIDE AREA NETWORK
		WAP	WIRELESS ACCESS POINT
		WI-FI	WIRELESS FIDELITY
		W/	WITH
		W/O	WITHOUT
		XFMR	TRANSFORMER
		Y	WYE
		1P	ONE POLE
		2P	TWO POLE
		3P	THREE POLE
		4P	FOUR POLE
dB	DECIBAL		
DC	DIRECT CURRENT		
DI	DIGITAL INPUT		
DIM	DIMENSION		
DIV	DIVISION		
DO	DIGITAL OUTPUT		
DTL	DETAIL		
DWG	DRAWING		
EIP	ETHERNET IP		
EL	ELEVATION		
EMT	ELECTRICAL METALLIC TUBING		
EOLR	END OF LINE RESISTOR		
FACP	FIRE ALARM CONTROL PANEL		
FF	FINISH FLOOR		
FLA	FULL LOAD AMPERES		
FT	FOOT, FEET		
FBO	FURNISHED BY OTHERS		
G, GND	GROUND		
GFCI	GROUND FAULT CIRCUIT INTERRUPTER		
HH	HAND HOLE		
HP	HORSEPOWER		
ID	IDENTIFICATION		
IDC	INITIATING DEVICE CIRCUIT		
IDF	INTERMEDIATE DISTRIBUTION FRAME		
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS		
IG	ISOLATED GROUND		
IT	INFORMATION TECHNOLOGY		
JB	JUNCTION BOX		
KAIC	THOUSAND AMPS INTERRUPTING CURRENT		
KCMIL	THOUSAND CIRCULAR MILS		
KVA	KILOVOLT-AMPERE		
KW	KILOWATT		
LAN	LOCAL AREA NETWORK		
LED	LIGHT EMITTING DIODE		
LS	LIMIT SWITCH		
LSI	ELECTRONIC TRIP UNIT ADJUSTABLE LONG TIME DELAY, SHORT TIME DELAY, INSTANTANEOUS TRIP		
LSIG	ELECTRONIC TRIP UNIT WITH ADJUSTABLE LONG TIME DELAY, SHORT TIME DELAY, INSTANTANEOUS TRIP, AND GROUND FAULT		
LV	LOW VOLTAGE		

General Electrical Notes

- ALL LIGHTING BRANCH CIRCUITS SHALL BE 2#10, 1#10G IN 3/4" CONDUIT, UON.
- ALL 20-AMP RECEPTACLE AND HARDWIRED BRANCH CIRCUITS SHALL BE 2#12, 1#12G IN 3/4" CONDUIT, UON.
- ALL EXIT SIGNS SHALL BE WIRED TO THE LOCAL LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING.
- PROVIDE 0-10V DIMMING CONDUCTORS TO ALL LUMINAIRES WHICH ARE CONTROLLED BY 0-10V DIMMERS SHOWN ON THE DRAWINGS.

Annotation

- (N) INDICATES NEW EQUIPMENT.
- (E) INDICATES EXISTING EQUIPMENT TO REMAIN.
- (D) INDICATES EXISTING EQUIPMENT TO BE DEMOLISHED.
- (RR)/(RD) INDICATED EXISTING EQUIPMENT OR DEVICE TO BE REMOVED AND REINSTALLED.
-  CONDUIT & CONDUCTOR CALLOUT. REFER TO CONDUIT & CONDUCTOR SCHEDULE.
-  KEYED NOTE CALLOUT. REFER TO CORRESPONDING SHEET KEYNOTES.
-  KEYED NOTE CALLOUT. REFER TO CORRESPONDING SHEET KEYNOTES.
-  KEYED NOTE CALLOUT. REFER TO CORRESPONDING SHEET KEYNOTES.
-  MECHANICAL EQUIPMENT CALLOUT. REFER TO MECHANICAL EQUIPMENT CONNECTION SCHEDULE.
-  DETAIL CALLOUT. REFER TO DETAIL AND SHEET AS INDICATED ON CALLOUT.
-  FIXTURE MOUNTING CALLOUT. HEIGHT ABOVE FINISHED FLOOR (A.F.F.)
-  EQUIPMENT CALLOUT. REFER TO NEMA CONNECTION SCHEDULE.
-  SECTION CALLOUT. REFER TO SECTION AND SHEET AS INDICATED ON CALLOUT.
-  ELEVATION CALLOUT. REFER TO ELEVATION AND SHEET AS INDICATED ON CALLOUT.

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON ORIGINAL DRAWING, SCALES ACCORDINGLY

DSN. GL JCL
DRN. JCL
CKD. GL
DATE: APR. 2022

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City of Yachats, Oregon
South Tank Seismic Valve & WTP Backwash Recycle

ELECTRICAL ABBREVIATIONS & GENERAL NOTES

DRAWING
E001
11 OF 19

JOB NUMBER
3096.4010.0

REVISIONS
NO. 1
DATE
DESCRIPTION

Electrical Symbol Legend

Power Distribution

	DUPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	SIMPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	QUADPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	GFCI DUPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	GFCI QUADPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	TAMPERPROOF DUPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	TAMPERPROOF QUADPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	SWITCHED DUPLEX RECEPTACLE, MOUNTED AT 18" AFF, UON.
	NEMA SPECIAL RECEPTACLE, MOUNTED AT 18" AFF, UON. NEMA CONFIGURATION AS INDICATED.
	CENTER HATCHED RECEPTACLE TO BE WIRED TO EMERGENCY CIRCUIT.
	RECEPTACLE MOUNTED ON CEILING.
	RECEPTACLE MOUNTED IN-COUNTER.
	DISCONNECT SWITCH.
	FUSED DISCONNECT SWITCH.
	ENCLOSED CIRCUIT BREAKER.
	COMBINATION STARTER.
	FLOORBOX COMBINATION POWER & DATA.
	FLOORBOX POWER.
	POKETHRU COMBINATION POWER & DATA.
	POKETHRU POWER.
	POWER/DATA POLE.
	PANELBOARD SURFACE MOUNT.
	PANELBOARD FLUSH MOUNT.
	MAIN DISTRIBUTION PANEL.
	UTILITY CT METER.

Drawing Symbol Variables

3	THREE WAY SWITCH.
4	FOUR WAY SWITCH.
#J	QUANTITY OF JACKS AND HORIZONTAL CABLES. J = CAT6, JA = CAT6A, JE = CAT5E
+XX	MOUNTING UNITS EXPRESSED IN INCHES TO CENTERLINE ABOVE FINISHED FLOOR OR GRADE.
C	MOUNTED HORIZONTALLY AT 4" ABOVE COUNTERTOP.
CL	CLOCK.
DR	DUAL RELAY.
E	RED EMERGENCY SWITCH.
EL	ELEVATOR RECALL.
ETR	EXISTING DEVICE SHALL REMAIN.
G	GLASS BREAK SENSOR.
LF	LOW FREQUENCY.
LV	LOW VOLTAGE SWITCH.
M	MOTOR RATED TOGGLE SWITCH.
NEX	REPLACE EXISTING WIRING DEVICE AND FACEPLATE WITH NEW. BACK BOX AND CONDUIT SHALL REMAIN.
O	INTEGRAL OCCUPANCY SENSOR.
P	ADA PHONE, VERIFY HEIGHT WITH ARCHITECT / OWNER.
REX	REMOVE EXISTING DEVICE / EQUIPMENT.
TK	MOUNTED IN TOE KICK OF CASEWORK.
TV	MOUNTED ADJACENT TO TV AT 60" AFF, UON.
V	VANDAL RESISTANT.
WG	WIREGUARD.
WP	WEATHERPROOF.

Lighting

	TROFFER LUMINAIRE, SURFACE OR RECESS MOUNTED AS INDICATED ON THE DRAWINGS.
	DOWNLIGHT LUMINAIRE, SURFACE, RECESS, OR PENDANT MOUNTED AS INDICATED ON THE DRAWINGS.
	UNDERCABINET LUMINAIRE.
	EMERGENCY BATTERY PACK LUMINAIRE, WALL OR CEILING MOUNTED.
	LINEAR PENDANT MOUNTED LUMINAIRE.
	LINEAR WALL MOUNTED LUMINAIRE.
	BOLLARD LUMINAIRE.
	SITE LUMINAIRE POLE MOUNTED. NUMBER OF HEADS AS SHOWN.
	TRACK LUMINAIRE.
	SPOT LUMINAIRE.
	WALL MOUNTED LUMINAIRE.
	EXIT SIGN, WALL OR CEILING MOUNTED, SINGLE FACE WITH DIRECTIONAL CHEVRONS AS INDICATED ON DRAWINGS.
	
	EXIT SIGN, WALL OR CEILING MOUNTED, DOUBLE FACE WITH DIRECTIONAL CHEVRONS AS INDICATED ON DRAWINGS.
	
	HALF HATCHED LUMINAIRE TO BE WIRED TO EMERGENCY CIRCUIT.
	FULL HATCHED LUMINAIRE TO BE WIRED TO NIGHTLIGHT CIRCUIT.
	WALL WASH LUMINAIRE POINTED IN DIRECTION AS SHOWN

Raceways

	CONDUIT AND/OR CONDUCTORS INSTALLED ABOVE GRADE, CONCEALED IN WALL OR CEILING SPACE.
	CONDUIT AND/OR CONDUCTORS INSTALLED BELOW GRADE, BELOW SLAB.
	CONDUIT TURNED DOWN.
	CONDUIT TURNED UP.
	CONDUIT STUBBED AND CAPPED.
	CONDUIT DIRECT CONNECTION TO EQUIPMENT.
	FLEXIBLE CONNECTION TO EQUIPMENT.
	CONDUIT / WIRING CONTINUATION.
	HOMERUN TO PANELBOARD.
	CABLE TRAY. SIZE AND TYPE AS INDICATED ON DRAWINGS.

Low Voltage

	ETHERNET OUTLET MOUNTED AT 18" AFF, UON.
	COAXIAL OUTLET MOUNTED AT 18" AFF, UON.
	PHONE OUTLET MOUNTED AT 18" AFF, UON.
	LOW VOLTAGE OUTLET CEILING MOUNTED.
	WIRELESS ACCESS POINT CEILING MOUNTED.
	WIRELESS ACCESS POINT WALL MOUNTED.
	DIGITAL CLOCK.
	FLOORBOX DATA.
	POKETHRU DATA.

One-Line Diagram

	CIRCUIT BREAKER.
	DRAWOUT CIRCUIT BREAKER.
	ENCLOSED CIRCUIT BREAKER.
	MOTOR STARTER CONTACT.
	DISCONNECT SWITCH.
	ENCLOSED DISCONNECT SWITCH.
	FUSED DISCONNECT SWITCH.
	ENCLOSED FUSED DISCONNECT SWITCH.
	CURRENT TRANSFORMER METER.
	FUSE, RATING AS SHOWN ON DRAWINGS.
	GENERATOR, CONFIGURATION AS INDICATED ON DRAWING.
	GROUND ROD.
	EQUIPMENT GROUND.
	MOTOR, RATED AS INDICATED ON DRAWINGS.
	NEMA CONNECTION.
	PANEL.
	MINI POWER CENTER.
	SHUNT TRIP.
	HEATER.
	REMOTE ANNUNCIATOR.
	BATTERY CHARGER.
	SURGE SUPPRESSION DEVICE.
	DIGITAL METER.
	VARIABLE FREQUENCY DRIVE.
	SOFT STARTER.
	TRANSFER SWITCH, WITH FUSES OR BREAKERS AS SHOWN ON DRAWINGS.
	TRANSFORMER.

Miscellaneous

	JUNCTION BOX (ROUND, SQUARE)
	THERMOSTAT.
	RELAY.
	CORD REEL.
	MOTOR / EXHAUST FAN.
	CEILING FAN.
	UTILITY POLE.
	WEATHERHEAD.
	GROUND ROD.
	GROUND ROD WITH TEST WELL.
	SURFACE RACEWAY / WIREMOLD.
	FIRE RATED BACKBOARD.

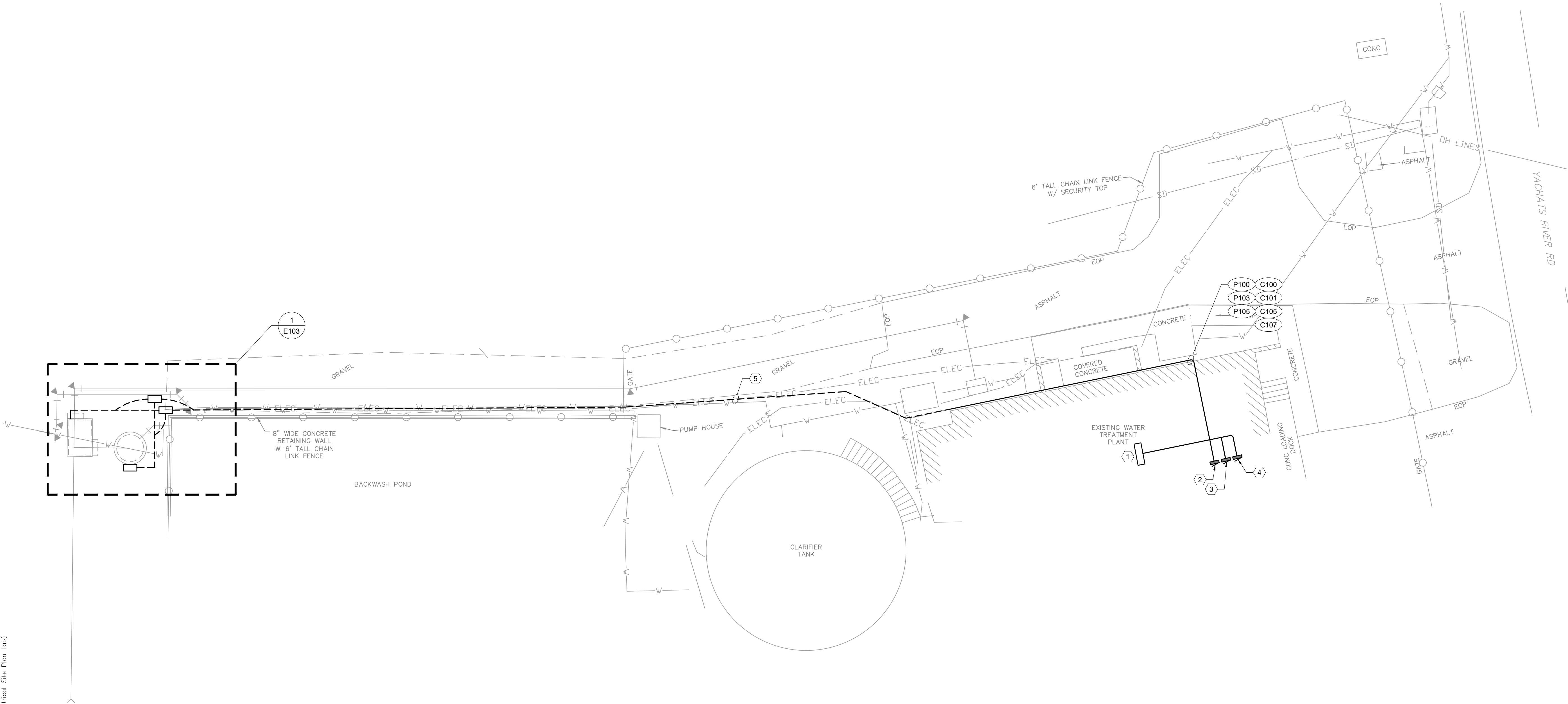
Access Control & Security

	ACCESS CONTROL - DOOR CONTACT. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - CARD READER. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - ELECTRIC STRIKE. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - KEY PAD. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - MAGNETIC LOCK. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - REQUEST TO EXIT. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - ELECTRIFIED PANIC BAR. PROVIDE 3/4" CONDUIT FROM DOOR FRAME TO ACCESSIBLE CEILING OR SECURITY JUNCTION BOX AS SHOWN ON THE DRAWINGS.
	ACCESS CONTROL - SECURITY JUNCTION BOX. SIZED AS RECOMMENDED BY SECURITY SYSTEM MANUFACTURER.
	ACCESS CONTROL - CAMERA / INTERCOM.
	ACCESS CONTROL - PANIC BUTTON.
	SECURITY CAMERA - CEILING MOUNTED. PROVIDE ONE (1) CAT6.
	SECURITY CAMERA - WALL MOUNTED. PROVIDE ONE (1) CAT6.
	INTRUSION SENSOR - CEILING MOUNTED.
	INTRUSION SENSOR - WALL MOUNTED.
	INTRUSION KEYPAD.

Switches

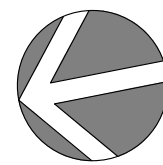
	SINGLE POLE SWITCH - MOUNTED AT 42" AFF, UON.
	LOW VOLTAGE 0-10 VOLT DIMMING SWITCH - MOUNTED AT 42" AFF, UON.
 	OCCUPANCY SENSOR - CEILING OR WALL MOUNTED.
	OCCUPANCY SENSOR POWER PACK.
 	PHOTOCELL - CEILING OR WALL MOUNTED.
	ADA DOOR PUSHPLATE.
	EMERGENCY STOP SWITCH, MUSHROOM HEAD.
	PUSHBUTTON, SINGLE OR DOUBLE.

4/6/2022 1:30:33 PM
g:\PROJECTS\101 - westech engineering\101908 - yachats water district\Design\Drawings\Current\yachats water
Plant Backwash Recycle Electrical Site Plan tab



1 WATER TREATMENT PLANT BACKWASH RECYCLE ELECTRICAL SITE PLAN
SCALE: 1" = 10'

0' 5' 10'



SHEET KEY NOTES

- EXISTING MCC & PLC.
- EXISTING PANEL LP-1 TO BE REPLACED.
- NEW BACKWASH PUMP VFD.
- NEW FLOW METER TRANSMITTER.
- COORDINATE TRENCH LOCATION WITH SHARED TRENCH SHOWN ON CIVIL PLANS.

VERIFY SCALE
BAR IS ONE INCH ON
ORIGINAL DRAWING
IF NOT ONE INCH ON
THIS SHEET, SCALE
APPROPRIATELY

1"

0

DSN. GL
DRN. JCL
CKD. GL

1

NO.

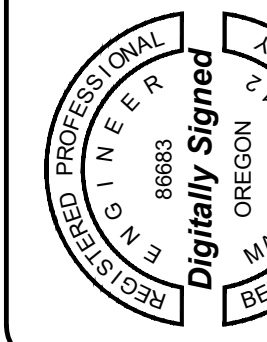
DATE

DATE: APR 2022

REVISIONS

BY

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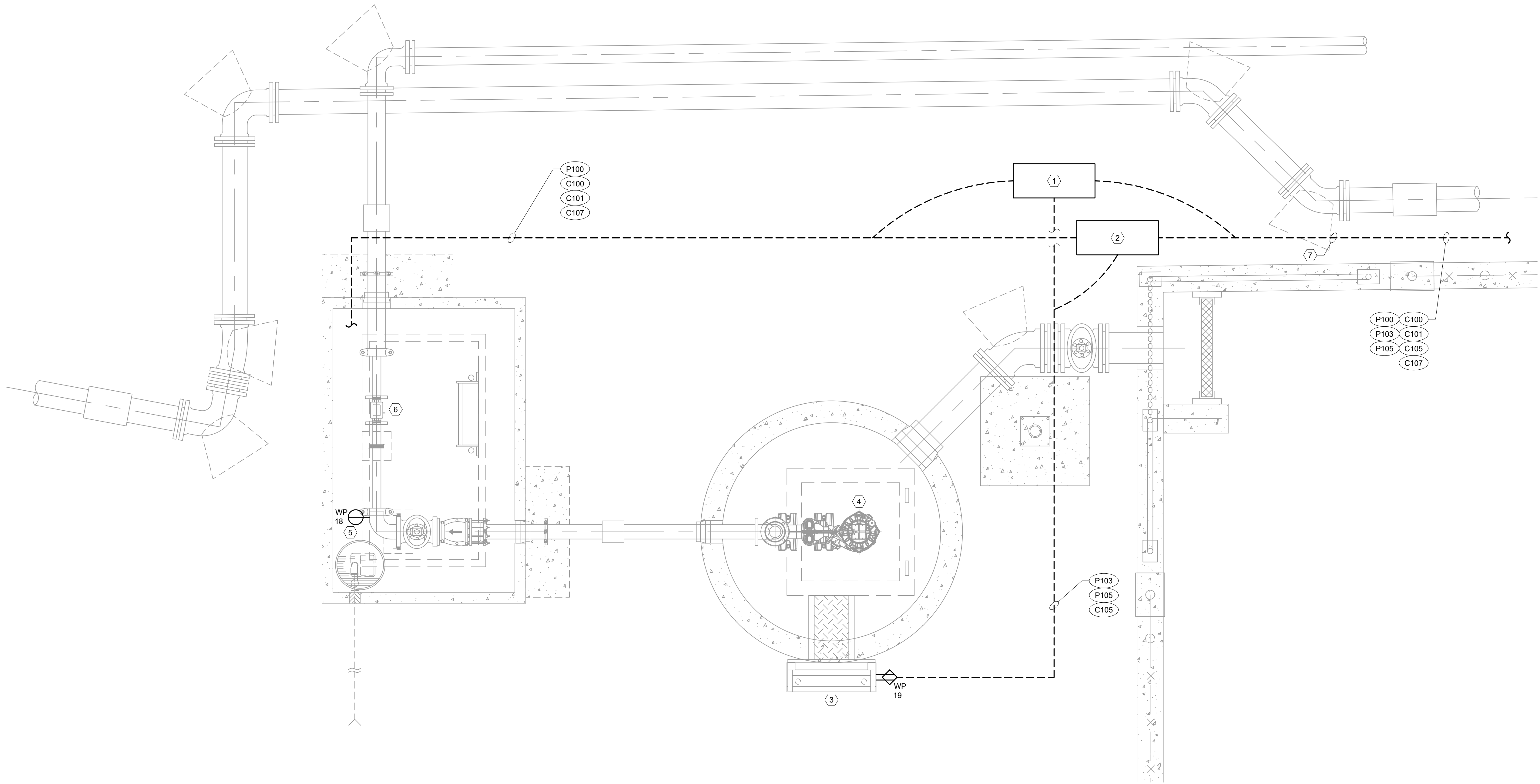


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City of Yachats, Oregon
South Tank Seismic Valve &
WTP Backwash Recycle
**WATER TREATMENT PLANT
BACKWASH RECYCLE
ELECTRICAL SITE PLAN**

**DRAWING
E102**
14 OF 19
JOB NUMBER
3096.4010.0

4/6/2022 1:30:59 PM
g:\PROJECTS\101 - westech engineering\101908 - yachats water district\Design\Drawings\Current\yachats water
Treatment Plant Backwash Recycle Pump Station Site Plan tab



SHEET KEY NOTES

1. IN-GROUND PULL BOX C-01. SEE DETAIL 3, ON DRAWING E101.
2. IN-GROUND PULL BOX P-01. SEE DETAIL 3, ON DRAWING E101.
3. BACKWASH PUMP DISCONNECT PANEL.
4. BACKWASH PUMP.
5. BACKWASH VALVE VAULT SUMP PUMP.
6. BACKWASH FLOW TUBE/ELEMENT.
7. COORDINATE TRENCH LOCATION WITH SHARED TRENCH SHOWN ON CIVIL PLANS.

VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING	1"
IF NOT ONE INCH ON ORIGINAL DRAWING, SCALES APPLY	
DSN. GL	
DRN. JCL	
CKD. GL	
NO. 1	
DATE	
NO.	
DATE: APR 2022	

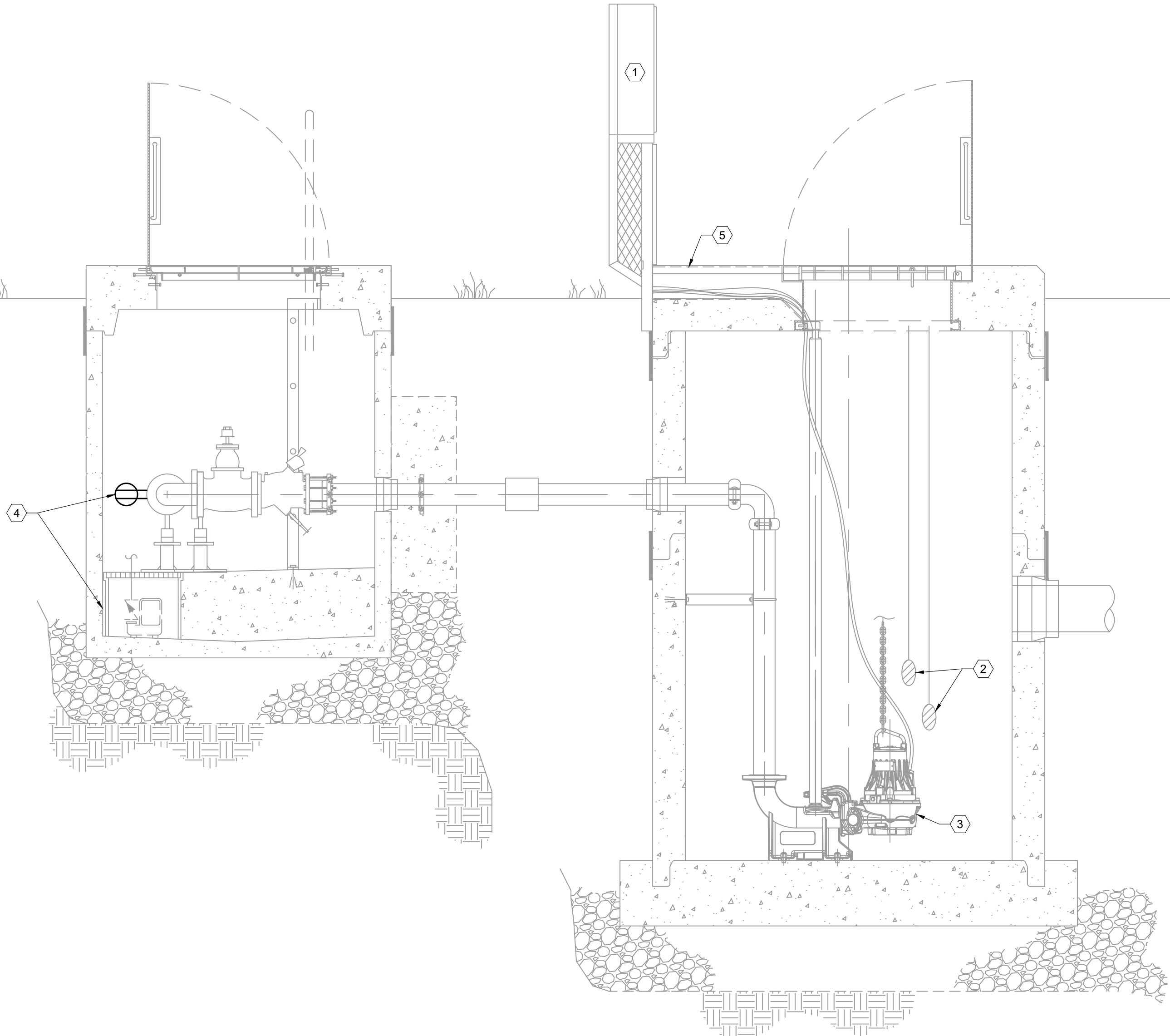
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PROFESSIONAL ENGINEER
86683
OREGON
MAY 08 2022
BEVAMIN E.
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City of Yachats, Oregon
South Tank Seismic Valve & WTP Backwash Recycle
**WATER TREATMENT PLANT
BACKWASH RECYCLE PUMP
STATION DETAILED SITE PLAN**

**DRAWING
E103**
15 OF 19
JOB NUMBER
3096.4010.0



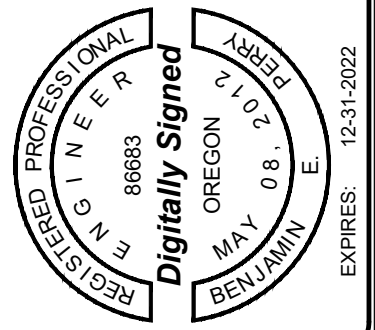
1 WATER TREATMENT PLANT BACKWASH PUMP STATION SECTION

SHEET KEY NOTES

1. BACKWASH PUMP DISCONNECT PANEL.
2. FLOAT SWITCHES.
3. SUBMERSIBLE PUMP.
4. BACKWASH VALVE VAULT SUMP PUMP & RECEPTACLE.
5. CABLE TROUGH.

VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 0  1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DSN. GL
	DRN. JCL
	CKD. GL
DATE: APR 2022	

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City of Yachats, Oregon

South Tank Seismic Valve & WTP Backwash Recycle

WTP Backwash Recycle
WATER TREATMENT PLANT
BACKWASH PUMP STATION
SECTION

DRAWING
E104

16 OF 19

JOB NUMBER

3096.4010.0

POWER CONDUIT / CONDUCTOR SCHEDULE												
CONDUIT ID NO.	CONDUIT		CONDUCTORS PER CONDUIT					FROM	TO	DESCRIPTION	SHEET KEY NOTE	
	QUANTITY	SIZE	UNGROUND	GROUND	GROUNDING	CABLE	SPARE					
P100	1	1.0 INCH	1 - #10	1 - #10	1 - #10	-	-	PANEL LP-1	BACKWASH VAULT SUMP PUMP	CIRCUIT #18	2,4	
P101	1	0.75 INCH	1 - #12	1 - #12	1 - #12	-	-	PANEL LP-1	BACKWASH FLOW TRANSMITTER	CIRCUIT #17	-	
P102	1	0.75 INCH	3 - #10	-	1 - #10	-	-	PANEL LP-1	BACKWASH PUMP VFD	CIRCUITS #20,22,24	-	
P103	1	0.75 INCH	1 - #10	1 - #10	1 - #10	-	-	PANEL LP-1	RECEPTACLE AT PUMP DISCONNECT PANEL	CIRCUIT #19	3	
P104	-	-	-	-	-	-	-	-	-	-	-	
P105	1	1.5 INCH	-	-	-	1- VFD CABLE	-	BACKWASH PUMP VFD	BACKWASH PUMP	ROUTE CONDUIT VIA PULL BOX P-01 AND PUMP DISCONNECT PANEL	-	
P106	-	-	-	-	-	-	-	-	-	-	-	
P107	-	-	-	-	-	-	-	-	-	-	-	
P108	-	-	-	-	-	-	-	-	-	-	-	
P109	-	-	-	-	-	-	-	-	-	-	-	
P110	-	-	-	-	-	-	-	-	-	-	-	
P111	-	-	-	-	-	-	-	-	-	-	-	
P112	-	-	-	-	-	-	-	-	-	-	-	
P113	-	-	-	-	-	-	-	-	-	-	-	
P114	1	2.0 INCH	1 - #10	1 - #10	1 - #10	-	-	EXISTING CIRCUIT BREAKER PANEL	EXISTING TELEMETRY PANEL	NEW CIRCUIT FOR SEISMIC CONTROL PANEL, SEE DRAWING E201	1	

NOTES:

[1] EXISTING 2" CONDUIT AT SOUTH TANK RESERVOIR.

[2] MOUNT SIMPLEX RECEPTACLE IN BACKWASH VALVE VAULT FOR SUMP PUMP.

[3] PROVIDE GFCI RECEPTACLE AT BACKWASH PUMP DISCONNECT PANEL. FASTEN TO PDP STAND.

[4] INSTALL CONDUIT DRAIN ON CONDUIT SHORTLY AFTER ENTERING VAULT. SEE DETAIL 2, DRAWING E101.

CONTROL CONDUIT / CONDUCTOR SCHEDULE											
CONDUIT ID NO.	CONDUIT		CONDUCTORS PER CONDUIT					FROM	TO	DESCRIPTION	SHEET KEY NOTE
	QUANTITY	SIZE	UNGROUND	GROUND	GROUNDING	CABLE	SPARE				
C100	1	0.75 INCH	-	-	-	1 - MSC	-	BACKWASH FLOW TRANSMITTER	BACKWASH FLOW TUBE (ELEMENT)	(COIL)	3
C101	1	0.75 INCH	-	-	-	1 - MSC	-	BACKWASH FLOW TRANSMITTER	BACKWASH FLOW TUBE (ELEMENT)	(ELECTRODE)	3
C102	1	0.75 INCH	-	-	-	1 - TSP	-	BACKWASH FLOW TRANSMITTER	PLC LOCATED AT MCC LOCATION	-	2
C103	-	-	-	-	-	-	-	-	-	-	-
C104	-	-	-	-	-	-	-	-	-	-	-
C105	1	0.75 INCH	4 - #12	-	1 - #12	-	-	BACKWASH WETWELL FLOAT SWITCHES	BACKWASH PUMP VFD	LOW & LOW-LOW FLOAT SWITCHES	-
C106	-	-	-	-	-	-	-	-	-	-	-
C107	1	0.75 INCH	2 - #12	-	1 - #12	-	-	BACKWASH VALVE VAULT FLOAT SWITCH	PLC	HIGH ALARM FLOAT SWITCH	2,3
C108	-	-	-	-	-	-	-	-	-	-	-
C109	-	-	-	-	-	-	-	-	-	-	-
C110	-	-	-	-	-	-	-	-	-	-	-
C111	-	-	-	-	-	-	-	-	-	-	-
C112	-	-	-	-	-	-	-	-	-	-	-
C113	-	-	-	-	-	-	-	-	-	-	-
C114	1	1.0 INCH	-	-	-	-	-	-	-	PROVIDE CONDUCTORS/CABLES PER APPROVED SEISMIC CONTROL SUBMITTALS	1

NOTES:

[1] EXISTING CONDUIT ROUTED FROM TELEMETRY PANEL TO VALVE VAULT AT SOUTH TANK RESERVOIR.

[2] OWNERS SYSTEM INTEGRATED TO TERMINATE CABLE AT PLC. LEAVE AMPLE LENGTH TO TERMINATE ANYWHERE WITHIN THAT ENCLOSURE.

[3] INSTALL CONDUIT DRAIN ON CONDUIT SHORTLY AFTER ENTERING VAULT. SEE DETAIL 2, DRAWING E101.

VERIFY SCALE																					
BAR IS ONE INCH ON ORIGINAL DRAWING																					
0 1" =																					
DO NOT ONE INCH ON THIS SHEET. ADJUST SCALES ACCORDINGLY																					
DSN:	GL	DRN:	JCL	NO.	DATE	DESCRIPTION		BY													
CD:	GL					REVISIONS															
DATE: APR 2022																					

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REGISTERED PROFESSIONAL
ENGINEER
88693
Oregon
Benjamin E.
April 2012
May 08

Digitally Signed

EXPIRES: 12-31-2022

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City of Yachats, Oregon

South Tank Seismic Valve &
WTP Backwash Recycle

**ELECTRICAL POWER &
CONTROL SCHEDULES**

DRAWING
E105
17 OF 19
JOB NUMBER
3096.4010.0

PANEL NAME:

LP-1

VOLT/PHASE:

240/120V, 3Ø

NUM. POLES:

24

AIC RATING:

10,000

NOTES:

CAUTION "B" PHASE WILD LEG

REF. KEY NOTE #:

LOCATION:

HALLWAY

FED FROM:

EXISTING MCC

BREAKER MOUNTING:

BOLTED

MAIN BREAKER AMPS:

100

BUS RATING AMPS:

100

SPD:

NO

NOTES	LOAD DESCRIPTION	LOAD TYPE	VA L1	VA L2	VA L3	TRIP RATING AMPS	CIRCUIT NUMBER	CIRCUIT NUMBER	TRIP RATING AMPS	VA L1	VA L2	VA L3	LOAD TYPE	LOAD DESCRIPTION	NOTES
	SPARE		-			20	1	2	20	-				SPARE	
	SPARE			-		20	3	4	20		-			SPARE	
	SPARE				-	20	5	6	20			-		SPARE	
1	LAGOON PUMP	M1	-			50	7	8	20	-				CHLORINATOR RECTIFIER	1
		M1		-			9	10			-				
		M1			-		11	12				-			
	RECEPTACLE IN VAULT FOR SUMP PUMP	R	960			20	13	14	20	-				CHLORINATOR CONTROLLER	1
	SPARE			-		20	15	16			-				
	BACKWASH FLOW TRANSMITTER	E			100	20	17	18	20			960	M	BACKWASH VALVE VAULT SUMP PUMP RECEPTACLE	
	RECEPTACLE AT PUMP DISCONNECT PANEL	R	180			20	19	20	20	1,329			M	BACKWASH RECYCLE PUMP	
	SPARE			-		20	21	22			1,329		M		
	SPARE				-	20	23	24				1,329	M		

TOTAL LOAD:

1,140

0

100

TOTAL LOAD:

1,329

1,329

2,289

COMBINED LOAD:

2,469

1,329

2,389

CONNECTED LOAD:

6,187

DEMAND LOAD:

6,187

DEMAND AMPS:

15

Load Type Key

R

General Purpose Receptacle

L

Lighting

M1

Largest Motor

M

Motor

A

Appliance

H

HVAC

K

Kitchen

E

Equipment

T

Transformer

W

Welder

RV

Recreational Vehicle

Demand Factor

100% First 10kVA, 50% thereafter

125% Load

125% Load

100% Load

50% Load

100% Load

XX% Load

100% Load

100% Load

XX% Load

Connected Load

1,140

0

0

4,947

0

0

0

100

0

0

0

Demand Load

1,140

0

0

4,947

0

0

0

100

0

0

0

XX

Units of Equipment - See NEC Table 220.56

XX

RV Sites - See NEC Table 551.71 (A)

NOTES:

[1] EXISTING LOADS ON NEW PANEL.

GENERAL SHEET NOTES

1. REPLACE EXISTING 100AMP, 120/240 VOLT 3-PHASE PANEL WITH NEW 100AMP, 120/240 VOLT 3-PHASE PANEL 24 CIRCUIT MINIMUM. NOTE LAGOON PUMP AND BACKWASH PUMP WILL NEVER OPERATE AT THE SAME TIME.
2. CONTRACTOR SHALL POSITION PANEL SO ALL EXISTING CONDUCTORS CAN BE REUSED. SPLICES, IF NECESSARY, SHALL TAKE PLACE WITHIN THE CIRCUIT BREAKER PANEL.
3. CONTRACTOR TO MEASURE AMPS ON LOADS WHILE RUNNING & AND AS-BUILT THE VOLT-AMPS ON PANEL SCHEDULE.

0	1"
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	
DSN.	GL
DRN.	JCL
CKD.	GL
DATE: APR 2022	

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Registered Professional Engineer
86683
Digitally Signed
BENJAMIN E. HENRY
MAY 08, 2012
OREGON
EXPIRES: 12-31-2022

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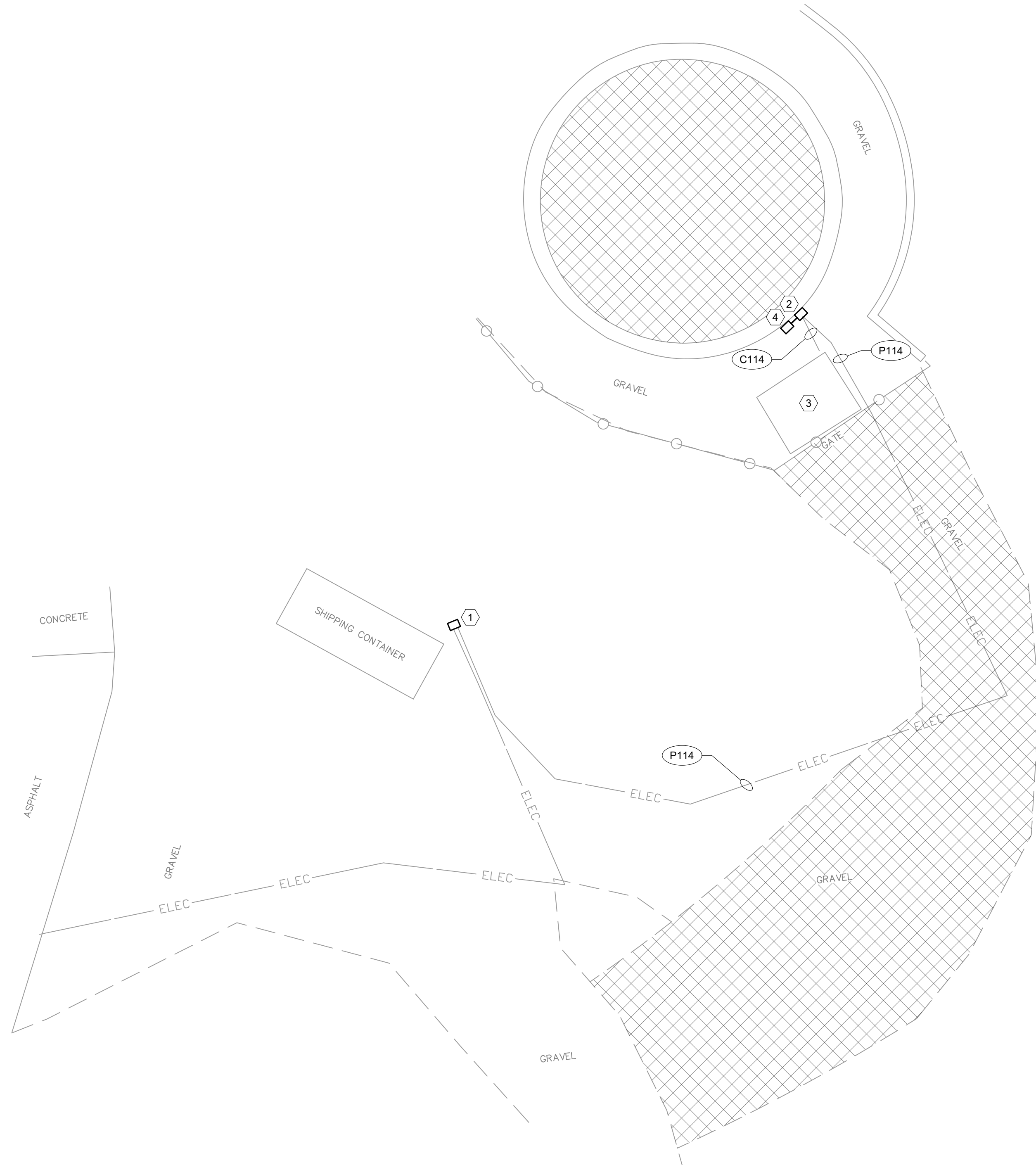
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City of Yachats, Oregon

South Tank Seismic Valve &
WTP Backwash Recycle

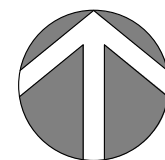
ELECTRICAL PANEL SCHEDULES

DRAWING
E106
18 OF 19
JOB NUMBER
3096.4010.0



1 SOUTH TANK ELECTRICAL SITE PLAN
SCALE: 1" = 10'

0' 5' 10'



SHEET KEY NOTES

- EXISTING CIRCUIT BREAKER PANEL.
- EXISTING CONTROL/TELEMETRY PANEL.
- VALVE VAULT.
- NEW SEISMIC CONTROL PANEL. PROVIDE EQUIPMENT STAND NEXT TO EXISTING CONTROL/TELEMETRY PANEL. INSTALL TWO CONDUIT NIPPLES BETWEEN THESE PANELS ONE WILL BE A NEW 120-VOLT, 20AMP DEDICATED CIRCUIT ROUTED FROM THE EXISTING CIRCUIT BREAKER PANEL IN CONDUIT #P114. 3 - #10 AWG. THE OTHER CONDUIT NIPPLE WITH BE FOR MONITORING/CONTROL. ROUTE CONTROL FROM SEISMIC CONTROL PANEL THROUGH TELEMETRY PANEL TO VALVE VAULT. PROVIDE CABLES/CONDUCTORS PER APPROVED SEISMIC CONTROLLER SUBMITTALS.

VERIFY SCALE	1"
BAR IS ONE INCH ON ORIGINAL DRAWING	
IF NOT ONE INCH ON ORIGINAL DRAWING, SCALES ACCORDINGLY	
DSN.	GL
DRN.	JCL
CKD.	GL
NO.	1
DATE	APR 2022

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OREGON
MAY 08 2022
BEVUAMIN E
EXPRESS 12-31-2022

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City of Yachats, Oregon
South Tank Seismic Valve & WTP Backwash Recycle
SOUTH TANK ELECTRICAL SITE PLAN

DRAWING
E201
19 OF 19
JOB NUMBER
3096.4010.0

City of Yachats
Public Works and Streets Commission
Summary Minutes Draft
 September 13, 2022

I. (00:16) West called the meeting to order at 2:01 pm.

Present: Ron Urban, Kevin Erdahl, Alex Cox, Linn West, Bob Bennett, Don Groth and Don Phipps

Staff: Kimmie Jackson, David Buckwald, Rick McClung, Councilor Greg Scott

II. (01:22) Correspondence / Communications – Summary of minutes review

(3:11) Public Works (Buckwald) main pump station PLC control panel failed & fixed the next day, water relater went bad and was repaired; McClung reported water plant had a PLC go out; had to run manually, will get backup module.

Backwash Recycle and Valve was approved; the lagoon will be pumped out in the next week or two.

Delineators - ODOT suggest a foot wide delineator go inside, but has to be inside the fog line, there is a bottleneck area that needs to be looked at; ODOT did send the revised IGA giving more money, walking/sidewalk on the west side road wanting to add two feet to the narrow spot, the other side a bike path; will need approx. 6 feet for both sides; phase two would be about 5 years out.

(17:49) Discussed water report July and August showing what was sold; April and May are together on gallons sold, and June was at 3-4 million gallons and July is at 4-5 million, did have a leak in August sold 5 million gallons.

(19:41) Generator pump station quotes: Buckwald – approved for the generator from the city manager; there are two portable generators, but one needs to be worked on.

Received three Pump Station Engineering quotes, need to move the control panel up the list, to do in the next year or two; the other quote is for the Main Pump Station Control; Air Valve Actuator motor went out weeks ago, controls the air to the basin of the sewer plant; don't make that motor any longer, will find replacement.

CIP Wastewater Rollup Doors – there's an option to put in with like kind material, cost from 130k down to 60-80k.

(31:43) Stormwater status, won't start for another month per McClung.

(32:17) E 2nd St. design revision, the grant results are coming in November, but want to put out to bid again; working on a temporary solution, public works has an underground reestablished storm water line that will help; and the Earthquake Valve Bid has been accepted already.

(40:33) Finance Report (Groth), no July report, no additional revenue for June expected; should spike in August; need Tim Tice to come back and see what his model says; revenues are down since the forecast; 1.8mil in water cap, 1.5mil wastewater cap, these projects are going to wipe it out in two years; McClung will request from city manager to contact Tim Tice.

(48:30) CIP projects next 10- & 20-years – establishing priorities and accomplishing some of the projects, Groth will put together a document and will start talking about the next five years.

(50:06) Emergency Prep – West & Cox – met yesterday and discussed the Conex issues and requesting to be on the council; talked about communicating with the community; fairs, ham radio classes and first aid courses will need to get information out to the public.

Storm Ready certification has been passed on to get signature from city manager. McClung signed emergency preparedness for the Shakeout just drop & roll where you are.

(55:14) Fire dept – will get notified once they are recertified and then reach out to the community for classes.

Putting in a preapplication for phase 2 for the sidewalks/sidepath to ODOT and getting the foot in the door; phase 3 would be the north part of town and sidewalks, south is a lot more pedestrians and a higher priority; provided cross walks for phase 3; the speed monitoring on both ends of town do collect data Buckwald can start getting the information/reports together; possibly approach ODOT about installing automated traffic enforcement, 70% of the revenue goes to the state, it could be an incentive to ODOT.

Announcement there is coming up webinar on Water Law, put on by attorneys, 2 day covering water policy, and the state and legislative development, early bird registration is about \$700/800.00 event.

(1:19:55) Betty Johnston – 6th St. dead end/boardwalk - egress to Ocean View Road, it's busy and the amount of people is very high and needs to be spruced up, should be a more presentable for the tourist; Buckwald will take a look at it and put on their list, maybe Will Williams could add to his mowing route.

(1:24:00) Old business

Street inventory and Street light study have no reports.

Public works standards – in the CIP listing Westtech identified 10k in the budget they can recreate the Yachats Standards; McClung will contact them for an update.

No further business to discuss, meeting adjourned by West at 4:12 pm.

Prepared by Kimmie Jackson Deputy Recorder on 9/14/2022.

Water

Priority	Year	Projects	Original Estimated Cost
Current	22	#2. Water Source Plan	30,000
Current	22	South Tank Earthquake Valve	100,000
Current	22	Backwash Recycle System	300,000
Current	22	SCADA Upgrade	60,000
Current	22	WTP Upgrade CIP Annually	30,000
Current	22	Public Works Slide Gate	15,000
Current	22	Annual Hydrant Replacements	6,000
Current	22	E. 2nd St. Waterline- Prospect to Loma Engineering	14,000
Current	22	Property Acquisition, surveys, geotech	250,000
1	24	50% share of Design Standards	10,000
1	23	Service Truck	50,000
1	23	Roll-up Doors for Shop Replacement	70,000
1	23	E. 2nd St. Waterline- Prospect to Loma Construction	141,000
1	23	E 2nd Street Loma to Yachats River Rd Engineering	
2	23	Reservoirs Seismic Survey	60,000
1	24	E 2nd Street Loma to Yachats River Rd Construction	136,000
1	24	WTP Clarifier Rehab Drives	250,000
1	24	Reedy Cr Raw Water Line	208,000
1	25	Combs Circle PRV Rehab	40,000
1	25	System PRV upgrades	50,000
2	25	3rd Street Waterline	167,000
2	25	Pontiac Water line	88,000
1	26	WTP Electrical Control Systems	814,000

Fiscal Year

Current 22-23	23-24	24-25	25-26	26-27	27-28
17,269					
100,000					
300,000					
49,044					
30,000	30,000	30,000	30,000	30,000	30,000
15,000					
6,000	8,000	8,000	10,000	10,000	10,000
14,000					
250,000					
	10,000				
	75,000				
	70,000				
	141,000				
	20,000				
		60,000			
		136,000			
	250,000				
		208,000			
			40,000		
			50,000		
			167,000		
			88,000		
				814,000	

	27	Raw Reservoir Development on New property	1,500,000
		Total before capitalized labor	4,259,000
		Capitalized labor/10%	\$ 425,900
		Total CIP	4,684,900

					1,500,000
664,044	604,000	442,000	385,000	854,000	1,540,000
Total					4,489,044
\$ 66,404	\$ 60,400	\$ 44,200	\$ 38,500	\$ 85,400	\$ 154,000
730,448	664,400	486,200	423,500	939,400	1,694,000

Wastewater

Fiscal Year

Priority	Year	Projects	Original Estimated Cost	Current 22-23	23-24	24-25	25-26	26-27	27-28
current 1	22	Submersible Pump Electric Plugs Engineering.	45,000	50,000					
current 1	22	125kw Portable generator	61,000	30,000					
3	22	Public Works Slide Gate	15,000		15,000				
current 1	22	Platform Lift	50,000	50,000					
current 3	23-27	Annual I&I Basin Rehab	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Complete	23	WW Tractor	60,000	58,000					
2	23	Roll-up Doors for Shop Replacement	90,000			89,000			
1	23	E 2nd Street Loma to River Rd Engineering	15,000	15,000					
current 1	23	Air Valve for WWTP	9,000	9,000					
current 1	23	Bypass connections for 3 lift stations.	8,000	8,000					
current 2	23	Intergater of Record RFP	4,500	5,000					
1	24	50% share of Design Standards	10,000		10,000				
1	24	Submersible Pump Pulg Installation	220,000		220,000				
1	24	E 2nd Street Prospect to Loma Rd Construction	43,000		60,000				
1	24	E 2nd Street Loma to River Rd Construction	0		0	60,000			
1	24	Hanley Drive Sewer Manholes	25,000		40,000				
1	25	Main Pump Station Improvements	382,000			382,000			
2	26	Sewer Line, King St. to E.3rd St.	140,000				160,000		
2	26	UV Disinfection Control Upgrades	40,000					60,000	
1	27	Outfall Pipeline Improvements	96,000					120,000	
1	28	Riverside Pump Station Improvemants	218,000						250,000
		Total before capitalized labor	1,571,500	265,000	385,000	571,000	200,000	220,000	290,000

Total 1,931,000

Capitalized labor/10%	\$ 157,150
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\$ 26,500	\$ 38,500	\$ 57,100	\$ 20,000	\$ 22,000	\$ 29,000
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Total CIP 1,728,650
change

291,500 **423,500** **628,100** **220,000** **242,000** **319,000**
21,975

Streets

Current	22-23	23-24	24-25	25-26	26-27	27-28
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[illegible]

Storm Water

Current	22-23	23-24	24-25	25-26	26-27	27-28
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[illegible]